BARRIE GUNTER

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MAKE PLAYERS MORE VIOLENT?

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What Are the Concerns About Mediated Violence?

This book is about video games and violence. Video games, or computer or electronic games as they are also known, represent a major source of entertainment for millions of players around the world. These games—as mass entertainment products—became popular during the late twentieth century. The initial products made for home consumption had very simple formats when they entered the marketplace in the 1970s. Playing games on computers, however, can be traced back to a period about 20 years before the introduction of home gaming when computer enthusiasts used keyboards as programming tools.

   The aim of this book is not to provide a general history of video games and game playing or to examine all aspects of this subject. Video games can take on many different forms and cover a range of content themes. The level of sophistication of these games can also vary widely, and so too can their production quality. The earliest games were crude in terms of the complexity of game play, as well as in the way they were made. They were underpinned by relatively simple levels of programming, by twenty-first century standards, and comprised unsophisticated play narratives embedded in basic presentation formats. The games that characterise the video game market of the twenty-first century offer much more complex game-playing scenarios involving on-screen characters and settings that have come to increasingly resemble real people and real environments. The increased 'realism' of these games has, in turn, led to growing concerns about the impact of game-playing experiences on regular players because

video games are believed to draw players in cognitively and emotionally and to create both short-term and lasting psychological effects, not always of the sort that should be welcomed.

The backdrop to this book is the wider public disquiet that has arisen over several decades about unwanted and socially undesirable side-effects of consuming violence in the mass media. Debates about media violence have mostly revolved around the most popular mass electronic media of their times, such as motion pictures and television. The earliest concerns, however, pre-date even these media and can be traced back to complaints made about Victorian novels that dealt with sensitive themes and issues that people did not usually air or like to have discussed in public. Many early popular books targeted at children, most especially in the fairy tale genre, had scary, threatening and violent themes (Tatar, 1998). Once popular media began to achieve mass circulation, which was catalysed by developments in printing technology and transportation networks, they attracted more attention, became wider sources of conversation, and were feared by authorities for feeding ideas to the masses that might undermine common standards of decency and decorum in the way ordinary people might behave towards each other.

Themes of crime, violence and sex were regarded by critics as being openly flaunted by the early mass media. As the motion picture industry took hold in the United States in the early decades of the twentieth century, these themes were presented more explicitly by being visually played out, rather than simply described as they were in novels. The main benefit of novels in this context was that much was left to the imagination of the reader. With the onset of audio-visual entertainment, much less was left to the imagination, and much more was actually shown.

Many of these themes were integral aspects of children's, and especially boys', play and were encouraged by toys with war and other fighting themes that were marketed throughout large parts of the twentieth century (Goldstein, 1998). Indeed, there were often resonances between movie themes, settings and characters and toys that took their inspiration from screen narratives played out at the cinema and on television (e.g., Captain America, GI Joe, Rambo). Eventually, these themes surfaced again in video games.

By the 1920s, the concerns of governing authorities about what people could see at the cinema had reached a pinnacle, leading to the launch of the first large-scale social scientific inquiry into the effects that films might have on cinema-goers. The advances in social science methods at

this time also facilitated this research as social scientists developed tools that enabled them to conduct systematic analyses of the contents of movies and of the audience reactions to them. The first big investigation of its type was funded not by government in the United States, however, but by a philanthropic organisation, called The Payne Fund. Findings from this programme of inquiry revealed, among other things, that one in four motion pictures had crime as a prominent theme and that these films visually depicted numerous criminal acts (Dale, 1935).

The initial concerns about movies spread to another source of entertainment that was highly popular and widely consumed by children and also by many adults, and that was comic books (Wertham, 1954). At the same time, television had begun to achieve widespread penetration in the economic boom years that followed recovery from the Second World War. On directing their attention toward the emergent new medium, social scientists again reported that crime, violence and sexual themes also pervaded many television programmes Smythe, 1954). Across subsequent decades, crime and violence were acknowledged to be all pervasive in the peak-time television dramas that held so many people in thrall (Gerbner & Gross, 1976; Gerbner, Gross, Morgan, & Signorielli, 1986; Gunter & Harrison, 1998; Gunter, Harrison, & Wykes, 2003; Smith, Nathanson, & Wilson, 2002).

During the 1960s, behavioural psychologists turned their attention toward film and television and went in search of scientific evidence that violent portrayals shown in these media could *cause* people to become more aggressive as individuals. Assuming this effect was true and occurred commonly enough opened up the possibility that media violence might be a significant contributor to levels of violence in the general society. Some researchers at this time proposed that children, for example, could learn how to behave in an aggressive way simply by observing other people doing so. It was not necessary to observe real people in the same physical setting for this effect to occur. Learning to behave aggressively could take place by watching a person display violent conduct on film. Children were found to copy violent behaviours they had seen performed by a grown-up in short films. This imitative learning seemed to be especially likely to occur if the filmed role model received benefits or rewards for his or her behaviour (Bandura, Ross, & Ross, 1961, 1963).

Further research revealed that it was possible to trigger non-imitative aggression in young adults by showing them violent scenes from motion pictures or television drama shows. In this context, it was theorised that

normally socialized inhibitions against behaving aggressively in person could be weakened by watching others behave aggressively with apparent impunity. This effect was especially likely to occur among individuals who were already in a state of annoyance with another person and if the violence they saw on screen was presented as being justified (Berkowitz, 1965; Berkowitz & Alioto, 1973).

Later psychological research not only confirmed these early findings, but it also extended them to demonstrate other effects that could occur from watching violence played out on screen. These effects included a loss of empathy for victims of violence, combined with a greater acceptance of violence as an appropriate problem-solving mechanism, once initial emotion reactions to it had subsided through a process called desensitization (Cline, Croft, & Courier, 1973; Drabman & Thomas, 1974, 1975). In addition, there was a view that watching violence on screen was arousing and that this arousal could remain activated after viewing had finished, creating a psychological condition that might render viewers more likely to behave aggressively if put in a setting in which they were intimidated or angered. Such arousal did not even necessarily have to derive from watching violence on screen for this effect to occur (Zillmann, 1971).

Media violence as a genuine social problem was confirmed by a number of major government-backed national inquiries launched in the United States during the 1960s and 1970s. The investigations were triggered by pubic reactions to several assassinations in the 1960s of high profile political figures and activists, including President John F Kennedy, his brother Senator Robert Kennedy, Martin Luthor King and Malcolm X. In addition, during this decade, there had been widespread civil unrest and disturbances linked to race issues in the southern states and, more generally, in college campuses among young people campaigning against the Vietnam War (Comstock, Chaffee, Katzman, McCombs, & Roberts, 1978).

An initial inquiry explored a range of potential causal factors underlying the occurrence of social violence, among which the mass media featured (National Commission on the Causes and Prevention of Violence, 1969). Although media violence was not the focus of this inquiry, sufficient evidence was gathered to indicate that it could play an active part in promoting violence in individuals and social groups, and thus it deserved closer attention. This evidence triggered a follow-up inquiry that placed television centre-stage as a possible agent of influence over the social behaviour of people in general (Surgeon General's Scientific Advisory Committee

on Television and Social Behavior, 1972). The latter inquiry produced a five-volume report based on a wide array of studies conducted mainly in the United States, and it concluded cautiously that there was scientific evidence to support the assertion that television and film violence could affect the aggressiveness of viewers.

Not everyone agreed with the conclusion reached by the Surgeon General's Committee. The major US television networks commissioned their own studies during the 1970s, which produced varying degrees of support for the media violence effects position (Belson, 1978; Milgram & Shotland, 1973; Milvasky, Stipp, Kessler, & Rubens, 1982). Further research emerged over the next decade, mainly focused on televised violence, that generally concluded that it could contribute toward the development of individual aggression and create a climate that promoted the occurrence of crime and social violence across societies (Andison, 1977; Comstock & Fisher, 1975; Hearold, 1986; Stein & Friedrich, 1975).

The influences of media violence were believed to start among children by providing demonstrations of how to behave aggressively, offering justification for doing so and then providing a stimulus to react with aggression when antagonised by someone, with diminished concern for the consequences or outcomes. In other words, the use of violence was inserted through the media into the day-to-day early socialisation of children, and it could, in turn, counter the effects of more positive social conditioning provided by parents, teachers and other responsible sources of social influence. For some researchers, early media experiences with violence set up developmental conditions that increased the likelihood that the individual would engage in delinquent and antisocial activities later in life (Huesmann & Eron, 1986a, 1986b; Huesmann, Moise-Titus, Podolski, & Eron, 2003).

The concerns that were aired about violence on television migrated to debates about the potential influences of playing video games (see Anderson, Gentile, & Buckley, 2007). Largely anecdotal observations that video games often contained violence led to questions about how players could be affected psychologically both in the short term and long term. One acute concern about video games was that their interactive nature, whereby players could control events that occurred on screen, might render them more psychologically involving that watching television could. If this was true, then might the lessons the player learned from the content of these games also be stronger than similar effects from the comparatively passive activity of television viewing?

One challenge to this proposition was that video games were characterised by fairly crude production formats. In addition, the violence, when it occurred, tended not to involve human characters. Psychological involvement entails more than just physical interactivity in the form of manipulating a joystick and moving a mouse. It also includes becoming cognitively and emotionally engrossed by the content being viewed or played with. The more complex narratives and human characterisations of television dramas might be expected to pull viewers in and to invite them to identify with the on-screen events and actors in a way that the crude formats of video games could never achieve. As video games evolved, however, this defence also weakened. More video games featured human characters. More of these games comprised narrative structures in addition to simple fighting and racing formats. Players were increasingly invited to become 'characters' in the games and to engage with other virtual humans that came to look increasingly like flesh and blood beings (Anderson et al., 2007).

The debates about all forms of media violence, whether on television or in video games, have also taken on different perspectives in terms of whether scientific evidence has actually emerged to prove causal relationships between exposure and the way the individual later chooses to behave. The idea that the individual 'chooses' to behave in a particular way reflected a theoretical shift away from a concentration on simple behavioural effects to a more complex cognitive model that embraced notions of interpretation and storage of memories about behavioural experiences, both real and mediated (see Berkowitz, 1984; Bushman & Geen, 1990).

Even though most of the research literature has come down on the side of media violence as a potential or actual causal agent that can teach and trigger aggression, there have been dissenting viewpoints. Even in the earliest analyses of media effects, more cautious conclusions were proffered, embraceing the idea that, while some people might be affected by their media experiences, others are not (Schramm, Lyle, & Parker, 1961).

Another position was that, although media such as television could influence people, this influence tended to reinforce the status quo in society, and, as a result, it might not always be immediately visible (Klapper, 1960). It is also important to recognise that not all media 'violence' is the same. The depictions of violence found on television, for example, come in many different forms, occur in many different settings, and involve many different types of aggressors and victims. The role of displayed violence in the telling of a particular story is also important because this enables observers to judge why it occurred and whether it should have occurred

in the way that it did. Viewers draw upon these variances in making their own judgements about televised violence, and not all forms of violence are perceived to be equally serious (Gunter, 1985).

Cautious conclusions about media violence research also arose from concerns about limitations and weaknesses associated with the most often used methodologies (Cumberbatch & Howitt, 1989; Freedman, 1984, 1986). Survey studies rely on self-reports from respondents who are questioned about their media experiences, social attitudes and behaviours. Self-reports can lack accuracy because respondents simply cannot remember past media experiences or are reluctant to report on how they feel or behave socially. The question-and-answer formats constrain the responses people can give in a way that does not allow them to report with any degree of veracity about how they really behave in different settings. Even if the information provided by respondents is accurate, questionnaires can only show degrees of association between media experiences and social behaviour and not whether they are causally connected or the direction of causality.

On the other hand, theoretical models concerning media effects allow for both antisocial and prosocial effects to flow from media experiences. What is often not explored is whether one type of effect can and does offset the other. In the past most of the emphasis has been placed on adverse effects of media violence. Researchers sought out evidence for the antisocial consequences of media experiences, and yet, in doing so, they failed to construct behavioural-effect models that represented comprehensively the full range of potential media influences (McGuire, 1986). As we will see later in this book, research into video game violence has placed a greater focus on potential prosocial effects, and some studies have examined how violent video game content can promote both prosocial and antisocial tendencies among players, illustrating how video games with prosocial themes might trigger prosocial responses among players to counter games' alleged antisocial effects.

EXTENSION OF CONCERN TO VIDEO GAMES

Many of the claims made about violence on film and television have migrated to concerns voiced about video games. Much of the burgeoning research evidence on violent video games has occurred since the start of the twenty-first century, yet most researchers in the field have been quick to declare that video games have potentially harmful psychological effects on

players (Anderson & Dill 2000; Anderson et al., 2007; Huesmann, 2010). In making this case, proponents of the 'harmful effects' proposition have not always taken full account of opposing points of view. The latter, as we will see, derive both from critiques of the accepted evidence for harm and from empirical data that has shown other potential effects of playing violent video games (Anderson, Funk & Griffiths, 2004; Elson & Ferguson, 2013; Ferguson & Kilburn, 2010; Sherry, 2001, 2007; Ward, 2011).

In commenting upon and critiquing the wider debate about media violence, some scholars have argued that certain claims of harmful effects have been overstated because some scholars and policy-makers have taken an ideological stance on the issue. This has been illustrated through analogies that have been drawn between the alleged harmful effects of exposure to media violence and the effects of tobacco consumption on human health (Grimes, Anderson, & Bergan, 2008). The almost evangelical zeal with which this baton has been picked up has led some scholars to draw conclusions that are not always justified by the available data, tempting them to turn a blind eye to theoretical, methodological and analytical weaknesses in the arguments being made.

One observation that has been made about video games even from their earliest incarnations is that they have often been characterised by themes of violence. This feature has given rise to concerns, most frequently voiced by health professionals and public policy-makers, that this type of entertainment is potentially socially harmful. Sometimes, the reasons for this assumption have derived from little more than the distaste some professional communities seem to have for this type of entertainment. Sometimes, it has occurred because video games, along with other popular media such as television, have been easy targets for politicians seeking to attain visibility as champions of public-interest protection and deliverers of solutions to crime and violence in society. Without doubt, contemporary debates about the possible effects of playing video games represent an extension of earlier ones linked to violence in movies and television programmes. Indeed, it is not unusual for television and video game violence to be compounded in these debates (Kaplan, 2012).

Extreme real-life events have acted to crystalise concerns about video games. High-profile mass murders in which the perpetrators were found to have enjoyed violent video games has led to journalists identifying game playing as a potential causal factor, even though no direct clinical or scientific evidence exists in such cases to prove such a link. All too often, news reporters have failed to demonstrate a proper grasp of the nature of the

scientific evidence and have reached their own unsubstantiated conclusions (Bushman & Anderson, 2001). Nonetheless, the public horror triggered by such events—especially when dramatic news coverage can make them seem more prevalent than they really are—inevitably and understandably leads to a need to find explanations for their occurrence.

Identifying causes and explaining why individuals can inflict extreme aggression on fellow human beings are essential aspects of learning to cope with the disgust, distress and fear to which these actions can give rise. Finding ready-made explanations that place blame on a convenient target, when the real causes may be much more complex and difficult to resolve, can serve the political expediency of governments that are often called upon to take action on these cases. Yet, this type of explanation often does little to contribute to sensible debate and the development of constructive solutions that might actually make a difference in protecting the public from future atrocities. We will return to these debates and how they play out in terms of representing the nature of public concern and whether it is justified later in this chapter.

POPULARITY OF VIDEO GAMES

Playing computer or video games has become a highly popular pastime for millions of people around the world. The video game industry has become big business (Gartner, 2009). According to business analyst Gartner, the worldwide video games industry, including games and hardware, was worth US$93 billion in 2013. The market has been growing at a rate of around 20% per year, increasingly underwritten by the burgeoning mobile games market. Although much of the revenue was obtained in the United States and Europe, other emerging markets around the world have been accelerating in their growth (Gartner, 2013).

Video games are played by children and adults alike. In the United States, twenty-first century surveys revealed that virtually all children between the ages of 12 and 17 years and an overwhelming majority of those aged 8 years and over played video games across a range of fixed and mobile devices, with around half playing these games on at least several days each week (Gentile, 2009; Lenhart et al., 2008). These games have different themes and have evolved from crude video productions offering a limited range of on-screen action to complex productions with increasingly life-like characters and settings and ever more complex and involving storylines.

The two big brands, Sony PlayStation and Microsoft Xbox, are sold in volumes reaching tens of millions per year (Their, 2014). The competition between these brands for market supremacy has played a key role in driving forward advances in video game formats, and the products have become highly sought-after birthday and Christmas gifts. Parents are often pestered by their kids to buy the latest versions of these games. Specific games have attracted fan bases that often develop into loyal communities of players that foster game playing through a range of spin-off activities, enhanced, in particular, by the emergence of online social networks that have enabled these communities to be sized up to a global scale.

Genesis of Contemporary Video Games

Much of the early work that kick-started video games involved undergraduate or graduate students' computer-science studies and often entailed or spun off from their degree projects. For example, student computer enthusiasts at the Massachusetts Institute of Technology created the first computer game, called *Spacewar*. This game evolved into *Asteroids*, which became a highly popular arcade game (Laurel, 1993; Wilson, 1992). Another electronic, computerised simulation, called *Tennis for Two*, was developed in 1958, leaving video game historians disputing were the origins of these games really lies (Huhtamo, 2005).

Although these early game developments occurred within academic settings, the development of electronic games in amusement arcades occurred in more commercial environments and has a much longer history, spanning over 100 years (Burnham, 2001; DeMaria & Wilson, 2002; Kent, 2001; Kurtz, 1991).

Universities continued to be central players in the development of computer games in the 1960s and 1970s, largely because, outside of big business and military, they had access to the latest computing technology. The video game industry was not the only major commercial spin-off from the academy. Some of the biggest corporate names in the world—Facebook, Google, Yahoo—all started off this way.

As computer hardware evolved, so too did the complexity of software writing, and this, in turn, had a direct impact on the sophistication of new computer games. By twenty-first century standards, these early games were extremely crude. At the time, however, they were regarded as cutting edge. Once computer gaming moved off campus, its potential as a large-scale entertainment phenomenon caught the attention of

commercial interests. By the 1970s, the market produced the first games manufactured by electronics companies with profit motives. By the 1980s, computer-game manufacturing and distribution had become a major and highly profitable industry. The corporations that captured this market from early on emerged as among the most profitable and widely known brand names in the world.

As the size and profitability of the computer and video-game market grew, the range and complexity of games available to consumers also increased. The marketplace became highly competitive, and with this, the big brands were placed under increasing pressure to develop more and more advanced game formats. Consumers expected each new wave of products to offer something better and more complex and challenging than the previous generations. In addition to motivating enhancements to the interactive complexity of the games, which lay at the core of the player experience, players also expected greater narrative complexity and higher production values. The early games took on crude animate formats, but later games adopted more realistic visual production settings.

Electronic games can be regarded as an evolution of board games that became extremely popular across the twentieth century. The first games had simple formulae, while, later on, more complex narrative structures were developed, embracing both the competitive element and story-telling. Just like board games, electronic games have rules concerning the nature and direction of play, and they define the end-goals for players. Computerised games also provide players with a range of additional features designed to enhance the entertainment experience, however. The players can cause characters and objects displayed on screen to move according to pre-determined movement parameters and sequences, and, at the same time, further visual and sound effects are incorporated into the game to create a richer play experience (Walker, 1993).

Historically, computer or video games have frequently been characterised by themes of competition, including conflict and the infliction of violence—albeit in fantasy settings and not involving human characters on screen. The first commonly recognised games of this sort that surfaced in amusement arcades were *Computer Space* in 1971 and *Pong* in 1972. The first marketed home electronic games of this kind were played on the Magnavox Odyssey platform released in 1972. These games did not emerge from nowhere, however. There had been earlier developments in games and also in the computer software and hardware that underpinned them.

The predecessor to these early commercial products had been developed a decade earlier by students at the Massachusetts Institute of Technology, and it was called *Spacewar*. The game evolved through a series of iterations as successive players—all skilled in the programming languages of the time—modified earlier versions. Video-game historians have disputed whether this account of the emergence of video games is accurate, though. Rather than *Spacewar*, the first computer game might actually be *Tennis for Two*, which was created by a physicist named William Higinbotham in 1958 (Huhtamo, 2005).

Electronic games initially spread via amusement arcades. In due course, as home computing technology evolved, the games migrated onto devices that players could buy and keep within their own homes. Yet, gaming in public arcades has a history that far pre-dates the beginnings of home computer games (Funk, Germann & Buchman, 1997; Kent, 2001; Kurtz, 1991). The primary purpose of arcade games was not just to provide entertainment but also to persuade players to spend money. Many of these games were based on various forms of gambling (Fey, 1997). Other arcade games derived from board or indoor games that had formerly involved the movement of physical objects. Some games incentivised players with the opportunity to win money or other prizes; other arcade games were all about scoring as many points as possible, with players seeking to beat their previous 'personal bests' (DeMaria & Wilson, 2002).

One of the first games was Pong, which became established in arcades and then was installed on portable devices that consumers could own themselves. Pong was produced by Atari and was released in 1974. It was a game for two players and had a simple play format that was essentially a form of electronic ping-pong. Another American company called Magnavox released a different game around this time titled Odyssey. This game was stored on a console that could be plugged into and played on TV sets. Odyssey actually comprised 12 different games that had similar themes and formats.

During the rest of the 1970s, a number of iterations of Pong were released, with each including fresh enhancements such as nature of the playing area, the development of new sound effects for each on-screen action and a more sophisticated scoring system. The popularity of the first electronic games encouraged many new suppliers to enter the market. The technology developed rapidly, and suppliers created many new games that could be released on cartridges that could be inserted into a master console. Thus, a system emerged whereby the consumer could buy one piece of kit and then use it to play a wide range of games. Some of these

games needed to be partially programmed by consumers, however, and this requirement to engage directly with the setting up of electronic games particularly appealed to those people who felt comfortable with computer technology. By the end of the 1970s, electronic game playing, whether in arcades or at home, had become a lucrative industry in countries such as the United States, with US consumers alone spending billions of dollars per year on these games (Alperowicz, 1983).

The dramatic growth of this market was fairly short-lived, however, and by the early 1980s, it became saturated, flooded with many new games of poor quality that had been hurriedly rolled out and thus provided poor entertainment and customer value. By 1985, the computer games market in the United States had collapsed as consumers turned away from the crude new products being offered. It took an old Japanese playing card to enter the computer games market to save the day. Japanese company Nintendo introduced new video games that took advantage of computer hardware and software advances that had taken place during the period, and their games represented a big leap forward in terms of graphics production quality and the range and sophistication of on-screen action (Provenzo, 1991).

By the end of the 1980s, Nintendo had captured 80% of the American market. As it entered the next decade, however, it faced serious competition from a new entrant in the video games market in the form of Sega (Gunter, 1998). Indeed, despite the dominance of Nintendo by the close of the 1980s, within a few years, Sega had replaced it as the market leader, with its more sophisticated gaming systems best illustrated by the highly popular *Mortal Kombat* brand (Shaffer, 1993)

The increased sophistication of computer or video games in the late 1980s and early 1990s was not simply a consequence of more general advances in computing; it also resonated with the ever-growing adoption of computers for a range of applications by increasingly computer-literate populations. Children and young adults were especially quick to adopt these new technologies. They felt comfortable using them, and, in starting to use computers from a very early age, they came to accept computing as a normal part of life. Older generations in contrast often felt threatened by computers and were much slower to adopt these technologies and to adapt to the changes the technologies brought to everyday living. The computer literate welcomed and even expected more complex computer or video games, though (Leccese, 1989). By the end of the 1980s, in the United States, annual electronic games sales had reached $3.4 billion (Salas, 1990).

By the mid-1990s, a fall in the volume of game-cartridge sales signalled a second computer games bubble about to burst. As manufacturers fought to stay ahead of each other, their games became increasingly sophisticated and often called on players to display ever more complex computer programming skills. Despite the growth of computer literacy witnessed during this period, computer games hardware and software posed challenges even for early adopters, and only parts of the consumer market displayed an appetite to take up this challenge (Buchman & Funk, 1996).

The advent of the internet as a tool for public use in the mid-1990s drew fresh attention to the integral role that computers could and would play in people's lives, and the internet created a new platform for electronic games distribution and playing. From this point, the market picked up again, with many households in developed countries, such as the United Kingdom, United States and Western Europe, and also parts of East Asia, such as Japan and South Korea, displaying huge enthusiasm for stand-alone and networked electronics games (ITC, 1996; Steiner, 1996).

NATURE OF CONCERNS AND POTENTIAL EFFECTS

As with all media phenomena that reach a critical level of popularity and patronage, video games have also attracted publicly voiced criticism and concern. Critics have tended to highlight the prevalence of the violent themes that characterise so many of these games (Skirrow, 1986; Smith, Lachlan & Tamborini, 2003). Although video games can be divided into many different genres in terms of their thematic content, game-playing formats, and target consumer markets, there is little doubt that violent action is a feature of many of these games (Funk, 1992; Gentile & Stone, 2005). Yet, the growing public concern, expressed in calls for tighter product controls, has largely focused on the way the games have evolved into slicker, more complex and more life-like productions (Koop, 1982; Media Violence Commission, 2012).

In jurisdictions that place great value on freedom of speech, however, the idea of censorship of any form of entertainment is anathema. Instead, more emphasis is placed on helping consumers to decide for themselves what they want to watch or play with by providing information in advance about the type of content with which they might be confronted. As with movies made for cinema release, consumer advance warnings in the form of content ratings have been devised for video games (Walsh & Gentile, 2001). These ratings systems have been developed in particular to help

parents determine the suitability of specific games for their children (Walsh, Gentile, & van Brederode, 2002). We will return to a discussion about these consumer protection systems later in the book.

From the early days of the electronic games mass market, some critics have accused these games of being characterised mostly by destructive themes (Orlofsky, 1982). The US Surgeon General in the early 1980s, C. Everett Koop, described them as having '… nothing constructive. Everything is eliminate, kill, destroy!' (Mayfield, 1982). The on-screen 'characters', if they can be labelled as such, that represented and were controlled by players usually engaged in shooting at or eating other objects or characters designed to prevent the player from winning, usually by termination (Secunda, 1983).

The interactive nature of computerised games was also raised as an issue in need of close monitoring because it rendered players active participants in on-screen action. The factor that set games apart from movies and TV shows with violent content was that game formats were clearly not life-like in their appearance. On-screen characters were obviously animated or cartoon-like, and the physical environments in which these characters existed were obviously fantasy settings. Such features meant that video games were several steps removed from everyday reality in their veracity. Thus, this level of separation was believed to dilute the degree of psychological involvement of players with game settings and characters.

In relation to violent movies and TV dramas, there were accusations that these forms of entertainment could draw in viewers in a psychological sense, leading them to become aroused aggressively, to forget what they had learned socially about controlling their own impulses and to learn methods of violence and to internalise violent social-behavioural scripts that might be retrieved and re-enacted to guide their own behaviour in the real world. The early video games could certainly draw in the player's attention because they were invited to become active agents in the game playing scenario. This physical involvement in controlling on-screen action sequences was generally regarded as the extent of their involvement.

With on-screen settings lacking an identifiable social realism and the characters lacking human qualities, there was limited scope for players to learn ways of behaving as they might while watching movies or TV dramas featuring fictional characters who possessed the attributes of real people. As computer production techniques evolved, however, as game formats changed from simplistic competitive scenarios into more complex sequences of scripted narratives, and as player-controlled on-screen

characters appeared more life-like, a new level of psychological involvement with these games was conceived as possible. If players paid closer attention to actions in interactive games than they did to actions in a movie, and if they became psychologically involved with game characters to the same degree that they did with movie characters, the scene was set for a different level of psychological experience. What did this mean for the potential effects of contemporary video games on the psyches of regular players?

The latest game developments have been regarded by some commentators as even more invidious. One of the most widely used games, *Grand Theft Auto V*, released an enhanced version that contained sexual, as well as violent, content, with these sexual and violent themes being intermixed. The game includes sequences in which players can have virtual sex with characters depicted as prostitutes. In other scenes, players can torture virtual rivals by removing their teeth, as they writhe around in agony. As if all this was not enough, other scenes depict on-screen characters taking drugs (Waugh, 2014).

Anti–media-violence lobbyists have criticised video-game manufacturers and distributors for circulating their products on a mass scale as harmless entertainment material, even though these products might encourage players to behave inappropriately in a variety of ways. The sexually violent themes have struck a raw nerve with critics in light of the body of scientific evidence supporting the view that exposure to such content can change the attitudes of men toward women, contributing a climate of more relaxed opinions concerning rape and other sexually violent crimes (Malamuth, 1981, 1989, 1993; Malamuth & Check, 1980a, 1980b, 1981a, 1981b, 1985). Even apparently normal young men can develop violence-condoning attitudes and beliefs about women and sexual relations with them as a consequence of watching movies that depict female characters being sexually abused. Such effects can be magnified when the fictional female victims appear to eventually enjoy being forced to have sex (Linz, 1989; Linz, Donnerstein, & Adams, 1989; Linz, Donnerstein, & Penrod, 1984, 1987, 1988).

ARCADE GAMES

Much of the early electronic and computerised game playing took place outside the home in arcades. Many arcade games had exciting, competitive and violent themes and involved players competing in races or shoot-

ing matches. Points could be accrued from successful performance, which usually meant making it all the way to the end of a race, winning the race, or eliminating all opponents before they eliminated you. Even in racing games, players could use 'violent' means to beat their opponents, such as crashing into them or pushing them off the track.

In arcade settings, playing video games represented just one of a range of behaviours on display. Many young arcade-game players spent as much time on other activities, including direct social interactions with their friends, as they did actually playing electronic games (Brook, 1983). Other players went to arcades on their own or in the company of perhaps one other person and, engaging in solitary video-game playing for much of the visit (Braun, Goupil, Giroux, & Chagnon, 1986).

One of the earliest studies of arcade games examined the nature, contents and themes that characterised these games, in addition to observing teenage girls and boys in arcades in Canada. Arcade games were found to represent a range of themes and demanded a variety of cognitive and motor skills on the part of players. Most games were classed as having masculine themes, and this probably explained why the majority of adolescents playing them were male. Nonetheless, both boys and girls who went to arcades displayed equally strong appetites for playing these games. Most of the games needed more than one player and often encouraged cooperation between participants; relatively few required only solitary play (Braun & Giroux, 1989).

Despite some early criticism of the arcade video games, a number of scholars came forward to promote the positive side-effects, especially upon cognitive skills, that playing these games could have. The growing complexity of these games was recognised as stretching the mental faculties of players by requiring them to exercise certain cognitive faculties that other intellectual activities, such as reading, did not require. Arcade video games presented players with puzzles and challenges that required problem-solving, rational thinking, planning and trial-and-error learning (Greenfield, 1984). Some writers even went as far as proposing that video games could be used in formal instructional settings and as training aids for people suffering from some certain kinds of mental disability (Loftus & Loftus, 1983).

SIGNIFICANCE OF VIDEO GAME ADOPTION AT HOME

Game playing activities moved into the home with the introduction of the first portable games that could be plugged into any electrical connection or powered by batteries. For many people, these games represented

their first introduction to home computing in the 1970s. As distributed computing systems displaced mainframe computers in public and private sector organisations in the second half of the 1980s, business products spawned devices for domestic use. As this technology spread, so too did a range of associated applications, leading to a dramatic expansion of video games that could be played on these devices.

Although arcade games were popular, it was the advent of competitively priced video games for home use that really caused the mass market for these products to take off. The emergence of big Japanese firms such as Nintendo, Sega and Sony in the late 1980s transformed the video games market and turned it into a highly profitable industry that was able to plough very considerable resources into successive game upgrades. The latest games eventually emerged with a significant price tag attached, but, nonetheless, they were a 'must-have' in a market that valued possession of the latest versions of games above all else. So, consumers were willing to pay the price tag for the latest game challenge.

Video games eventually outstripped movies in terms of their income-generating capabilities. The profile attained by the biggest brands also gave them considerable cultural capital in their own right. Movie-makers recognised that, rather than competing with this 'new kid on the block', it might be more profitable to join forces. Video-game manufacturers therefore engaged in what some scholars called 'transmedia intertextuality', which means that characters and themes from movies found their way into video game scenarios. As a result, video games sometimes represented a narrative continuation of some well-known motion pictures (Kinder, 1991). Within this context, it is not surprising that the most popularly adopted themes of this sort were from action genres, and this usually meant the use of narratives permeated with violent sequences.

Children were enthusiastic adopters of computer technology. Some computer applications had distinctive educational purposes and grew in popularity as technology became an increasingly integral part of teaching and learning in school. On the home front, however, early computer experiences tended to occur in the context of leisure and entertainment, and video games were a central feature of these developments (Buckingham, 2002). Home computer access grew across the 1980s and 1990s in households in many western countries and also those rapidly developing economies in the Far East, but access could not always be equated with use (Livingstone & Bovill, 1999).

From early on as well, a gender divide was recorded for computer use, with boys representing a far larger proportion of the user population than girls did. The gender difference in the extent of computer and video-game use was also reflected in and perhaps reinforced by a divide in the perceived relevance and appropriateness of computer use as an activity for girls (Cupitt & Stockbridge, 1996; Funk & Buchman, 1996; Kubey & Larson, 1990). Indeed, boys and girls were found to confirm that computers were designed for boys rather than for girls (Bannert & Arlinger, 1996). During the early years of the twenty-first century, however, the gender divide appeared to be narrowing, with girls taking up computer activities as extensively as boys (Livingstone & Bovill, 2004).

Evolving Tastes in Video Games

During the 1990s, there was further growth in the personal computer market, as well as in the computer or video games market. New games emerged that benefited from advances in micro-computing. Portable computers got smaller and also more powerful. During this decade, there was another significant technological development that revolutionised communication everywhere—the emergence of the internet as a public communications system. The internet provided a communications system that could link together millions of distributed computers and open up a new world of accessible information stored on those devices. Larger computer devices also formed part of this network that stored huge volumes of content on what became generically labelled as 'websites'. Once these website-holding computers were plugged into a telecommunications network that provided the physical infrastructure for the internet, anyone with their own computer device that also had the ability to plug into this communications system could access the content of the websites. This opened up a whole new platform for the distribution of video games.

This new information society was enthusiastically embraced by video game players because it provided them with much more choice in terms of the games they could play. It also enabled them to establish new remote communities of like-minded people with whom they could play games, exchange games and engage in open discussions about games and game playing. As the temptations of this new information world flourished, concerns grew about the attractiveness of games for children and adolescents and about the amount of time some young people seemed to be spending

playing the latest games (Buchman & Funk, 1996). As we have already seen, the video games market grew quickly after the first products for mass consumption were introduced. Even when the initial market bubble burst in the mid-1980s, American children were reported to be playing video games around 4 hours per week (Harris & Williams, 1985). This figure included both home play and arcade play. By the early 1990s, American children were playing 2–4 hours per week just at home, with girls at the lower end and boys at the higher end (Funk, 1993).

(Excessive) Consumption of Video Games

There is no doubt that playing video games is both prevalent and popular as an entertainment form. There have been growing concerns that, for some players, these games can become too attractive, however. One specific concern is that players can develop a strong dependency on game playing to a point where game playing takes over a large part of their lives (Anderson & Ford, 1987; Shotton, 1989). Some players cannot go for long periods without playing these games, and if they stop playing for any length of time, they experience withdrawal symptoms (Soper & Miller, 1983). This has led to suggestions that video games can be addictive. Whether it is legitimate to talk about 'addiction' in this context has been debated, however (Griffiths, 1996).

Addiction has a specific clinical definition. So, it might not be the correct term to use in relation to playing video games. Despite any such semantic arguments, even from the earliest days of research into computer or electronic game playing, researchers have observed that some players will go to great lengths to fund their habit. For some, this might result in resorting to crime to fund it (Griffiths & Hunt, 1993; Keepers, 1990; Klein, 1984). Others may forego other expenditures, even if that means going hungry, or they might misbehave in other ways, such as refusing to attend school in favour of game play (Griffiths & Hunt, 1993; McClure & Mears, 1984).

Parents have expressed frustration and concern about their children's use of video games, but often, they are unaware of just how much their children are playing the games. This was found to be true even for those parents who claimed to supervise their children's video game playing. Although parents claim to know which games are their children's favourites, children, when asked directly, often nominate others, and often, the cild-nominated games have more violent themes than the games their

parents identify. Parents can also be ignorant of the nature of the games themselves. Once parents have actually tried playing the video games, their concerns can grow still further (Funk, Hagan, & Schimming, 1999).

Final Remarks

Video games have become a worldwide pastime enjoyed by millions of enthusiastic players. These games have evolved from simple computer programmes producing crude audio-visual formats and play narratives into complex creative forms with intricate storylines and the production quality of motion pictures. These computerised games can be played alone or with opponents at fixed locations, or online with thousands of other players. Game genres have expanded to incorporate many themes. Perhaps the most popular and prevalent theme of all involves games defined by violent play.

As the video game market has expanded and playing them has become so widespread, a number of concerns have arisen about their effects on players and the potential social costs for society. In some countries, especially in the Far East, governments and health authorities have displayed considerable disquiet over the extent to which young people spend time with these games. Internet use, much of which involves video game playing, has been observed to take on addictive qualities, potentially leading to disturbing side-effects among individuals who devote significant parts of their lives to these games (Ko et al., 2009a, 2009b). In addition to concerns about the time that players spend with video games, the public and professionals have also expressed worries about the violent nature of many games. Such concerns, in turn, represent an extension of earlier debates about the effects of violent portrayals in motion pictures and television programmes.

Thus, the biggest concerns about video games might relate to their frequently violent themes, which are present whether the games are targeted at adults or children. As these games have become more sophisticated, more realistic in their production formats and more psychologically involving because of increasingly complex narratives, concerns about the potential influences the games on the social behaviour of young players have also become magnified. These concerns have been enflamed by the occasional media coverage given to violent real world incidents in which the perpetrators were discovered to be enthusiasts of violent video games, and this media attention has led to "pop-science" on the part of journalists linking violent events back to violent game experiences (Reilly, 2014).

Voicing these concerns on the basis of anecdotal claims or informal observations of selected popular games is not the same as delivering scientific evidence that video games cause harm. We need to understand the psychological mechanisms that underpin players' reactions to these games. This book will examine research from different parts of the world that has tried to explain how players experience video games and what, if any, effects violently themed games can have on players.

Before we reflect on the science about violent video games' effects, we also need to establish whether video games do indeed contain worrying amounts of violence and the extent of players' exposure to this violence. We then need to be clear about the potential effects that might theoretically follow from playing violent video games. Much of the theory in this context derives from earlier research about violence in films and television programmes. These are the topics we will examine over the next two chapters.

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How Much Exposure Do Children Have to Violence in Video Games?

The fact that video games are widely played and are clearly well-liked by children and adults does not necessarily mean that video game use must be a source of social concern. Most concerns have been triggered by the observation that significant proportions of the games in the entertainment and leisure market have problematic themes, and many games are characterised by violent content. Although this observation does not need to invoke immediate concern, the factor that has raised more serious questions about potential undesirable effects of game play has been their interactive nature. Players do not simply sit back and passively watch events unfold before them on the screen, as they would when watching a movie or television programme. They can directly engage with and control what happens on screen. If there is violence featured within a video game, the player is often invited to become an active perpetrator.

Further evidence suggests that kids actually enjoy the violent aspects of video games. This has been found to be true whether they play these games at home or in arcades. Research conducted with children aged between 9 and 13 years of age in the United States found that both boys and girls nominated games with fantasy violence as their favourites more often than games that were educational or entertaining in a nonviolent way. In addition, games that featured more realistic human violence were extensively nominated as favourites by boys, though much less often by girls (Funk, 2000).

Have Video Games Always Been Violent?

There are many different types of video games. More than 40 different video game genres have been identified (Wolf, 2005). Some of these games were designed for educational and training purposes, others for therapeutic applications, and most as forms of entertainment. In the entertainment genres, some video games were adaptations of games from the analogue world, such as broad games, paper-and-pencil games and quizzes. Other games involved players in chases, catching and capturing objects, with the player often negotiating mazes or solving puzzles. Still other games were simulations of sports, or they involved races, shooting at objects or adventure narratives, which tended to include elements of violence (Wolf, 2005).

Violence has been a feature of video games from early in their history. The first video game recognised as 'violent' in terms of its primary theme was *Death Race*. This game was released in amusement arcades by Exidy Games in 1976. It was a car-racing game in which the player controlled a vehicle that could be used to drive over stick figures. Once the player hit one of these figures, it would turn into a gravestone, implying that the stick person had been 'killed'. This was the beginning of several subsequent 'eras' of violent video games that, in many ways, defined the evolution of the modern video game market. There is no doubt that violent video games have dominated the market as the most popular and successful video game products worldwide.

Gentile and Anderson (2003) identified three periods of violent video game developments, each of which was largely defined by the emergence and subsequent dominance of a particular brand. The first era ran from 1977 to 1985, and it was largely defined by games produced by Atari. The second era ran from 1985 to 1995, and it saw the emergence of Nintendo. The third era from 1995 onward witnessed Nintendo being overtaken by Sony.

During the first period, games were relatively simplistic in terms of their formats and narrative development. Production quality was crude, and the animation was defined by simplistic characters and limited movement and interactivity. With the arrival of Nintendo, the quality of video games improved in all key aspects—quality of graphics, versatility of on-screen character movements, narrative complexity of game structures and depth of characterizations. The virtual environments and animation became more life-like, and even though production quality did not attain that associated with movies or television programmes, it took a massive leap

forward from the Atari era. The graphic quality and narrative complexity of video games took a further major step forward after Sony entered the market. Sony's PlayStation used compact disk (CD) technology that enhanced picture quality and could deliver faster game action sequences.

Both Nintendo and Sony developed games that contained violence. In fact, the fighting games produced by Nintendo, including *Double Dragon* and *Mortal Kombat*, were defined by violence. Manufacturers of video games came to realise that violence was a popular game ingredient. With the arrival of *Wolfenstein 3D* in 1992, a new format was introduced in the shape of the 'first-person shooter' game. In this type of game, the player looks at the game world through the eyes of the screen perpetrator. The camera then becomes the eyes of the player in the virtual world of the game, and, as a result, the player becomes more deeply embedded within the game itself and thus more directly involved in the perpetration of the virtual violence. The new format proved both popular and shocking. These first-person shooter games were characterised by lots of violence, much of it bloody and gory in nature.

How Violent Are Video Games?

There has been a lot of discussion about the violent nature of video games. Assertions that these games are violent and therefore potentially harmful have become so commonplace that the concept has virtually been accepted as true. Yet, is there systematic evidence indicating that we should be concerned in this way? Many observations of the effects of video game violence have been speculative or hypothetical, rather than being built on a solid base of scientific evidence. It is important therefore not to be carried away by claims of harm, even when they originate from sources that appear to be credible and authoritative. Games centered on conflict, in which violence features heavily, have been accused of trivialising war and its horrors (Rogers, 1982). This claim might resonate especially strongly in these early years of the twenty-first century, during which the world has witnessed numerous violent conflicts and atrocities that have claimed millions of lives.

It can be misleading to focus on the most popular games in the market at any one point in time. Although there is no doubt that some violently themed video games have dominated the video game markets around the world, many non-violent video games have also proven highly popular and widely used. Such games demonstrate that players can be challenged,

aroused and entertained and that these responses do not depend exclusively on how much violence a game contains. Even games that have violent themes can demand many complex cognitive skills, equipping players to think in more sophisticated ways about the games themselves, as well as about the themes represented within these games (Granic, Lobel, & Engels, 2014).

The concerns about violence in video games represent an extension of similar observations that have already been made about violence in movies and television programmes. Such concerns had already triggered a great deal of social science research interest even before the earliest interactive electronic games had hit the consumer marketplace (see Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1971). Video games presented a new type of problem. On one hand, their interactive nature raised questions about the level of psychological engagement they could invoke in players, as compared with the relatively passive activity of watching a movie or television show. On the other hand, the early video games had crude production formats and seldom involved lifelike human characters. The initial games also largely lacked any narrative or story-telling aspects and so could not pull in players as well as dramatic plots with established characters with which viewers engaged 'parasocially' (Dominick, 1984; Gunter, 1998). In other words, video games, unlike movie and televised drama, did not present characters on screen with which players could identify and care about.

As these games evolved in terms their production sophistication, narrative themes, human-like characterisations, and more complex forms of player control over on-screen action, people began to ask more questions about their potential to change players psychologically (Provenzo, 1991). Given that games created computerised virtual realities or alternative worlds that players could enter, researcher became interested in the possibility that the games might ultimately exert more powerful effects on players than any previous medium. Games that invited role-playing effectively encouraged players to become the on-screen avatar that they could manipulate through manual controls. Games that included competitive elements focused on the idea of winning, and, in games of this kind that also had violent themes, players were presented with virtual lessons that winning could and perhaps even should be achieved at any cost, with no one getting in the player's way. By the early 1980s, it had already been noted that the majority of current video games required players to perpetrate virtual acts of destruction (Bowman & Rotter, 1983; Loftus & Loftus, 1983).

Loftus and Loftus (1983) even constructed a 'family tree' of video games that illustrated the commonality of violence-themed games. They initially divided these games into two broad categories of arcade games and games that could be played at home. The arcade games often entailed derivatives of pre-existing analogue games or had sports themes or gambling themes. Some arcade games had chasing, racing and war themes. Home-computer video games were initially more limited in type, but they increasingly diversified and became more complex as home-computing power increased and as players demanded more challenging game formats.

Although there have been concerns about the prevalence of violent themes, electronic games have varied greatly in their formats and content. Thematically, they have drawn upon other forms of cultural entertainment, including sports and competitive challenges that require good hand–eye coordination and, increasingly, themes that incorporate story narratives. These narratives are generally derivative and are influenced by stories normally played out in other, usually performance settings that do not require or invoke physical interaction on the part of the consumer. Among the myriad formats are those in which the player controls instruments or characters on screen who can inflict violence.

It was not invariably the case that video games were dominated exclusively by violence, however, and experts claimed that these games could be adapted to provide valuable, socially positive and constructive lessons to young players (Zimbardo, 1982). In fact, some early video games had prosocial themes running through them (Loftus & Loftus, 1983). We will pick up this theme again later in the book. Nonetheless, even when central characters of games such as *Donkey Kong*, *Frogger* and *Super Mario* engaged in constructive, altruistic activities that might teach positive social lessons to children, violence was never far away. Prosocial actions and ends were often backed up with the use of force and violence (Loftus & Loftus, 1983).

In addition, the non-violent games did not command market attention to the same extent that violent ones did. Observations of the spread of electronic games across the United States during the 1980s and 1990s, through interviews with arcade managers, revealed that the games that grew most in popularity were driving-type games, sports-based games (with the popular themes being boxing, wrestling, basketball and billiards) and puzzle games. Also emergent during this period were games with action-adventure narratives often based on violent movie themes such as ancient conflicts and Rambo (Michaels, 1993).

Other writers on this subject identified six main video game categories. There were games classed as 'general entertainment' that often had a simple storyline but usually no violence. There were 'educational' games that attempted to teach specific subject matter or skills, and there were two categories in which violence was prominent. The first category included 'fantasy violence' games featuring non-human player-manipulated characters that had to complete a course with obstacles, often requiring the forcible removal of objects or other animated creatures that would try to thwart the player's progress.

The second violent game type were 'human violence' games in which the player controlled a human character who had a set goal of completing a course, escaping from incarceration or rescuing another character, while again being confronted with challenges that often required violent resolution. Finally, there two sub-types of sports games—'non-violent' and 'violent'—that were defined by animated game play based on violent (e.g., boxing, martial arts) and non-violent activities (e.g., billiards, darts, basketball) (Funk & Buchman, 1995).

A British classification of video games identified nine types, some of which were violent in nature. Griffiths (1993) divided video games into sports simulations, racing games (usually involving car racing), adventure games (with role-playing in fantasy settings), puzzlers (based on puzzle games), weird games (a catch-all 'other' category), platformers (games in which on-screen characters run and jump over objects and from one platform or level to another), platform blasters (platform games with violent themes), beat 'em ups (player controls on-screen character that engages in violent fighting), and shoot 'em ups (player controls on-screen characters in settings involving armed violence).

Perhaps most significantly, the dominant brands that emerged during the late 1980s and 1990s increasingly specialised in the production and distribution of violent game franchises. In the 1970s, *Space Invaders* dominated the early video game market and had a science fiction or fantasy theme with a primitive narrative structure. The game was characterised by a basic code of violence, with the player being charged with protecting the planet from invading aliens. The aliens fell from the sky (or top of the screen), and the player was equipped with a crude weapon that could be fired at these falling objects, destroying them when on target. A base sound track further enhanced the drama of the game. The 'story' in the game was without end, however, in that the game would go on and on, and the aim for the player was to continue to improve upon his

previous best score (Poole, 2000). *Space Invaders* spawned further derivative video games such as *UFO Invaders* and *Space Commanders* (Malliet & De Meyer, 2005).

During the early 1980s, another game emerged that challenged the market position of *Space Invaders*, but had a theme grounded in 'feel-good' and friendliness. *Pac-Man* was created in Japan and launched in 1981. It quickly emerged as the arcade player's favourite (De Meyer, Malliet, & Verbruggen, 2001). The game's narrative was simple, with the *Pac-Man* figure entering a maze and eating all the little balls it confronted as it went along, while being chased by ghosts. The ghosts did not try to kill or harm *Pac-Man*, but, when they caught him, they simply sent him back to the start of the course. *Pac-Man* also broke the mould in demonstrating that video games could appeal to girls as well as to boys (Herz, 1997). The popularity of *Pac-Man* showed everyone that video games could be publicly well-received, commercially successful and non-violent (Poole, 2000).

With the entry into the market of two eventual giants of the industry, Nintendo and Sega, new game formats began to emerge. Both of these companies were driven to find original concepts, rather than simply producing further derivatives of the most popular formats to date. In the 1980s, they experimented with 'climbing' games. Although one might argue that these products were just another type of maze game, they were characterised by a number of new attributes. There was often a clearly defined course that players needed to complete, rather than simply wandering endlessly around a maze trying not to be caught. One primary aim was to complete the course as quickly as possible. Of course, obstacles were placed in the player's path, and these had to be avoided. Players could not only be delayed but also eliminated, and the further they progressed, the more points they would collect.

The first game of this type was called *Space Panic*, which was produced in Japan by Universal, an arcade manufacturer. It had adopted the space theme of *Space Invaders*, but the player had to proceed from the bottom to the top of the screen, using ladders, scaffoldings and platforms. Further games of this sort became hugely popular, including *Donkey Kong* and *Frogger*. Central to the development of *Donkey Kong* was a Japanese designer named Shigeru Miyamoto, who worked for Nintendo. *Donkey Kong* featured a character, initially called 'Jumpman' and later renamed 'Mario', who would become a household name and central figure in one of the most successful global video game franchises. Miyamoto's involvement

with *Donkey Kong* gave him a video game credibility that played a major part in facilitating Nintendo's breakthrough in the global market (Sheff, 1993). Meanwhile, although developed in Japan, the successful distribution of *Donkey Kong* in the large American market was handled by Sega.

One analysis of the most popular games produced by Nintendo found that these games invariably contained at least some violence (Provenzo, 1991). This was an important finding at the time not only because it was based on a systematic and formalised analysis of video game content, but also because the games that were placed under the spotlight were very popular with children. A central theme running through many of Nintendo's video games was martial arts. They were not simple shoot-'em-up games, but, instead, they had simple narrative structures and characterisations that allowed the playing out of a good-versus-bad scenario. These games were also defined by more than a hint of sexism. A frequent accompanying theme was victim rescue from the clutches of evil. The rescuer and principal on-screen protagonist tended to be male, and the victim in need of rescue tended to be female. For the on-screen protagonist to be successful, the use of violence was usually necessary. This protagonist was, of course, controlled by and, in a sense, therefore became an extension of the player.

An important question raised about this type of game is whether it psychologically pulls in players to the extent that their use of violent methods on screen, as defined by the game protocols, actually increases their aggressive arousal, or leads to an increased propensity to think aggressive thoughts, or to learn lessons that the use of violence to solve social problems is sometimes necessary and justified. Or, could such games serve as a more positive outlet allowing players to purge themselves of hostile feelings they experience in the real lives?

These are all questions to which we will return in later chapters when examining the different types of empirical evidence for the effects of video games. Another important question concerns the opportunities for young people to be exposed to such content. There is plenty of evidence, both anecdotal and scientific, that video games can be and often are violent in nature. This content can only affect people if they come into contact with it. Furthermore, the interactive nature of these games means that players can potentially get more deeply involved with the on-screen action and characters. Some protection was offered in the early games by the crude production values of these games and the fact that human characters were rarely featured. As video games have evolved with the development of computer technology, their formats have become more realistic in

appearance, a feature that now extends to the depiction of human characters. At the same time, simple game-play formats have evolved into more complex narratives in which on-screen characters can be guided through a range of challenges in which they overcome dangers and interact with others on screen in ways that increasingly resemble the story-telling scenarios found in motion pictures.

Gender and Violence in Video Games

For many years, video games were dominated by masculine themes and formats, with narratives targeted at male players. As human characterisations emerged in these games, the key roles were occupied by figures that were clearly male, while female figures were usually placed in more minor and supporting roles. When female characters did appear, they were often sexualised and stereotyped in ways that had previously been observed with their counterparts in mainstream media entertainment (see Gunter, 1995, 2014). Studies that conducted systematic analyses of female representations in video games confirmed that their narratives were heavily biased toward the masculine. This 'masculine' orientation was, in turn, frequently reinforced by the use of violence as an integral aspect of game play (Bryce & Rutter, 2002; Dietz, 1998; Greenfield, 1994; Kinder, 1991).

The representation of gender within violently themed video games is theoretically important because of the role modelling potential of on-screen characters. Although this may not have been such a significant factor with early video games, which featured crude narratives and non-human on-screen characters, it has hypothetically grown in importance as video games have advanced in complexity and format quality to almost movie-level standards of production, especially in respect to their characterisations and plot development.

When female characters were created within video games, their prevalence did not match that of male characters. One study into the most popular video games found that most (60%) had violence as a major theme, but, more significantly for the current discussion, seven in ten major characters and two-thirds of secondary characters were male (Dill, Gentile, Richter, & Dill, 2005). Their roles, however, were relatively passive compared to those of central male protagonists. They took the form of physically alluring characters in need of rescue or help by males, or they occupied support roles that were not central to the game play (Bryce & Rutter, 2002; Dietz, 1998). If they did display any special abilities or skills, these were usually

traditionally feminine in nature. Female video game characters were generally passive in nature and recipients of and dependent upon male actions (Gailey, 1993).

This blatant stereotyping within video games, characterised principally by the sexual objectification of female characters, led to calls for a re-think about genres, themes and characterisations, not least because of the need to explore ways of expanding the overall market. Indeed, the typically hypersexualised representations of female body shapes in video games were credited with sending highly stereotyped and unhelpful or inappropriate messages about women and girls. Their primary aim seemed to be to appeal to male players through the symbolic denigration of female characters and, in turn, the female gender (Dill et al., 2005).

If most video games were defined by themes designed to appeal to boys, despite the fact that girls were also known to be interested in playing these games, it would make good business sense to develop games that would appeal to the female market. In response to this call, Nintendo developed a female-oriented version of its *GameBoy* franchise, called, predictably, *GameGirl*. There remained a concern about this type of development because it was frequently underpinned by concepts—still gender stereotyped in their own way—of what would be an appropriate form of video game entertainment for female players. Who was to say that girls could not and would not enjoy action-adventure games just as much as boys? What was really needed was a paradigm shift in thinking about the spaces of activity that were deemed to be masculine versus feminine.

The stereotyping of gender frequently extended to and was openly manifest in the kinds of public spaces that were normally and historically dominated by males as opposed to females (Garfinkel, 1967). This 'bias' in the interpretation and recognition of gender-appropriate spaces was originally manifest in terms of the allocation of genders to work spaces (primarily male spaces) and the home (female spaces). Social situations that were connected to and initially emerged as extensions of these two spaces (work versus domestic) were further defined in terms of the gender of their usual occupants (McRobbie & Garber, 1976). Hence, women occupied social spaces extending from home life and men occupied social spaces that extended from work life. Over time, as gender roles changed, the re-definition of the gender appropriateness of different spaces did not always keep pace.

These observations can be extended from men and women to boys and girls. Even at early stages of development, gendered definition of spaces

emerges. One outcome of this phenomenon was the relative absence of female-versus-male youth sub-cultures (Hebdige, 1979). Hence, even in leisure-related spaces to which girls and women had access, they often found that they were not catered to by the producers of activities in those spaces, for whom the spaces remained predominantly 'masculine' in their orientation and appropriation (Hey, 1984).

This masculine definition of leisure spaces infiltrated early video-game production. Yet, evidence emerged that, in the home video-game-playing environment, female players were as enthusiastic about these games as males (Buchman & Funk, 1996; Griffiths & Hunt, 1995). There remained a prevailing dominant view that video games are mostly a male activity, however (Colwell, Grady, & Rhaiti, 1995). Girls were known to play with different kinds of games and toys than boys did, and the themes that defined their play behaviours tended to be more in tune with gender stereotypes concerning female social traits and roles—that is, seeking affiliation and conciliation rather than conflict, and being nurturing and supportive of males, yet also dependent upon them. Video game play was also initially regarded as a largely solitary activity that suited boys better than girls, who tended to place greater importance on socialising with their friends (Grusec & Lytton, 1988). Hence, video gaming came to be defined as a male domain, and it conveyed a social image that did not sit well with conventional ideas of being 'female'. This particular kind of social stigma that was attached to girl players but not to boys might have presented a disincentive to girls to play these games, or at least, if they did, not to perceive them as being as central to their social existence as did boys (Bryce & Rutter, 2002).

Given these observations about the gendered nature of video games, a particularly significant development in terms of genre has been the emergence of the female heroine in a world where male characters have dominated video game narratives. The launch of the *Tomb Raider* franchise by London-based Eidos created a no-nonsense, female adventurer, Lara Croft, who was as tough and fearless as any man. Although characterised by an exaggerated body shape that was slender and yet full bosomed, Croft was also highly athletic and skilled in armed and unarmed combat. She also had many of the qualities associated with male action heroes, in that she was single with no family ties, physically and psychologically strong, and financially and emotionally independent (Schmidt, 1999). In Lara Croft, we had a female action figure that boys respected and who provided girl game players with a violent role model.

The evidence that has accumulated so far clearly indicates that female players are as interested in and enthusiastic about video games as male players. Despite the early gender biases within the video game industry, there is a buoyant market for video games targeted at girls and women. In the context of violent video games, female players will engage with these products as well as male players, but it is more often the case that such games will have less appeal to girls than to boys. In one investigation of gender and interest in playing video games from different genres (e.g., general entertainment, educational, sports, games with animated fantasy violence themes, games with human violence themes), boys were more likely to opt for games with human character violence, while girls preferred games with animated fantasy violence (Funk, 1993).

Children have many different reasons for playing video games. Overwhelmingly, they say that they play because 'it's fun' and 'it's exciting', and it is something to do when bored. In addition, video-game playing has been recognised by children as having other more specific functional benefits. Video games often present puzzles to be solved and challenges to be overcome through the use of tactics and strategy. So these games are seen as learning experiences in which the player must 'figure things out' (Olson et al., 2007). There is also a social dimension to playing video games, and many young players get involved with these games because their friends also like playing them. Video games provide sources of conversation with their friends. They often exchange tips about game tactics with each other and compare notes in terms of their own performance (Olson, Kutner, & Warner, 2006).

In addition, playing video games often has a competitive element to it. Young players compete against the game in trying to improve on their previous best performance. They also compete with each other (Olson, Kutner, & Warner, 2008). This competitiveness and the boastfulness that can emerge from achieving a high score can become critical aspects of the social dimension of these games. This competitive aspect and the social status that can be gained through it are especially strong for male players. This effect occurs not just among children, but it can still be found among adult players and seems to represent an extension of a macho sub-culture that is found among male video game players (Cragg, Taylor, & Toombs, 2007). The attraction of the competitive aspect of playing video games is not lost on female players, though, and many relish beating their opponents (Olson et al., 2007). For a few children, there is also an explicitly named aggression dimension, and playing these games can help them get their anger out (Olson et al., 2007).

Further evidence has confirmed that being competent as a video-game player has acquired similar social capital to being the best in other social settings (Tarrant et al., 2001). In one study, respondents reported that being able to hold one's own in the competitive environment of the best video games was equivalent to being able to handle oneself in interactions with other children, and for boys, this often had the same social-status value as being physically dominant in rough-and-tumble play (Pellegrini, 2003).

The kids who were best at video games gained social status with their peers. This, in turn, could significantly enhance their self-esteem. Video game play could be particularly important in this respect for those children who were less successful academically or in sports (Funk, Chan, Brouwer, & Curtiss, 2006).

Playing some video games could pull young players into virtual situations in which the competition required them to fight others through their respective avatars on screen. Players could be confronted with a choice of strategies to adopt to promote successful play against competitors, and some strategies might involve being deceitful and unhelpful to others or creating barriers to their ability to proceed or survive in the game. As part of this environment, players might be equipped with actions or objects that, when used against other competitors, could be conceived as 'aggressive' in nature (Barnet & Coulson, 2010; Searle & Kafai, 2009). It would be misleading to focus on the more aggressive strategies that players can adopt in video games, however, because so many game-playing tactics involve more constructive actions and cooperation between players (Kutner, Olson, Warner, & Hertzog, 2008). Many young players in multi-player settings share tips on play strategies and pool their experiences and their knowledge to promote more effective game play for everyone (Steinkuehler & Duncan, 2008).

An aggression-related component to playing video games has also emerged through analysis of play motivations in the form of mood management and control. Some players have talked about using video games as an escape from everyday pressures, a device for switching off from problems that confront them in the real world, and as a release from daily frustrations that sometimes spill over into feelings of anger (Cragg et al., 2007; Olson et al., 2008). *Grand Theft Auto* was confirmed as the most popular video game among teenage boys and one of the most liked even among teenage girls (Olson et al., 2007). Both genders enjoyed being able to act out scenarios that included the use of violent methods in safe setting, in which no one got hurt and in which they would face no retribution for

committing 'violent acts', unlike, of course, in their real world (Jansz, 2005). Video game violence was also found to pose a lower risk to child players, as compared to movie and television violence, because the on-screen targets in games classified as suitable for children tended to take non-human form. The same could not be said of video games produced specifically for adult players.

Ultimately, though, any violence in a video game must not be examined as a stand-alone attribute. Invariably, in modern video games, 'violence' is integrated with other content and game-playing formats that often encourage children to think in non-violent ways in regard to play strategies. The creative and problem-solving aspects of many video games are the key to their appeal to children (Przybylsky, Ryan, & Rigby, 2009). There has been mixed evidence that violence specifically pulls young players toward these games, and this appears to be true even for children who already display more pronounced aggressive tendencies in their personalities (Markey & Markey, 2010; Olson, 2010; Olson et al., 2008, 2009).

A Diet of Video Game Violence

Having examined how much violence a typical video game contains and the nature of that violence, we also need to consider the level of consumption of this material. This evidence indicates that young players, particularly in their pre-teenage years, might be drawn to video games with violent themes. This finding by itself has been a source of concern to some social commentators and policy-makers because of the possibility that, by being drawn to violent game themes, children could be socially conditioned to regard violence as an acceptable way to behave, not just in a game setting, but also in other settings as well. Even by the 1980s, troubling evidence suggested that video games with violent themes had reached such popularity that they provided frequent opportunities for violent vicarious experiences among pre-adolescent and adolescent children.

In the United States, one survey of video games reported that over eight in ten had violent themes and provided players with opportunities to engage with on-screen objects or characters in violent ways. Violent actions involved the simulated destruction of objects, the infliction of violence on animated characters and even the elimination of characters by vicariously killing them (Bowman & Rotter, 1983). By the beginning of the 1990s, further American research reported that one in three homes had video games and that, once again, at least eight out of ten of these games had violent themes (Milloy, 1991).

Video-game playing was not only prevalent by the 1980s, but it also occupied an increasing proportion of players' time. In the United States, for instance, one estimate put video game playing at around 4 hours per day on average (Harris & Williams, 1985). By the 1990s, the popularity of these games seemed to drop off, with average amounts of playing time falling below the level recorded during the previous decade (Funk, 1993), and, by the turn of the millennium, still lower levels of video-game playing were recorded, with averages of around 7–9 hours per week being reported for school-age children in the United States (Gentile & Wlash, 2002; Woodard & Gridina, 2000). However, it was also noted that video-game playing started early in life, with pre-schoolers taking up games before the age of five and spending half to three-quarters of an hour per day playing them (Gentile & Wlash, 2002; Woodard & Gridina, 2000).

One more reassuring finding from the same research was that, as they grow older, children spend less and less time playing video games. In fact, for boys, the average time playing electronic games, in hours per week, almost halved from fourth grade to eighth grade, and this time more than halved over the same developmental period for girls (Funk, 2000). There has been some disagreement over exactly how the amount of time devoted to video-game play evolves over a child's development. One observation placed the peak of play at around 8–9 years of age, after which it decreases (Buchman & Funk, 1996). Other evidence has indicated that video-game playing does not peak until age 12. It then drops off for a few years before increasing again in late teens (Keller, 1992). There can be a wide variance in the amount of time young players devote to video games. By the end of the 1990s, American children and adolescents aged 8 to 18 years were found to play these games for an average 1 and 8 hours per week (Roberts, Foehr, Rideout, & Brodie, 1999).

Gender and Exposure to Video Game Violence

Both boys and girls play video games, but in differing amounts. Gender differences in the amount of video-game play tend to characterise pre-adolescent and adolescent children, however, and before they reach their teens, boys have been found to devote far more time to video games than do girls (Dill & Dill, 1998; Funk & Buchman, 1996). This gender difference persists into the teen years, although, with a general decrease in video-game play during the teens, this difference reduces. From around the age of eight through to early teen years, American boys were found to

play video games around twice as much as did girls. Boys also spent over 7 hours per week playing video games, while girls managed around 3.5 hours (Roberts et al., 1999). These findings were confirmed by additional research, in which teenage boys were found to be much more likely than girls of the same age to report playing video games every day or most days of the week, and many boys in the study reported playing video games for at least 15 hours per week (Olson et al., 2007).

One approach to examining gender differences in exposure to violently themed video games has been to get children to name the video games they play, and these games are then classified in terms of the established industry content ratings system. In one study of this kind in the United States, named video games were categorised according to the Entertainment Software Rating Board's ratings of M (mature themes, suitable only for adults), T (themes suitable for teens), and E (suitable for everyone). The study showed that boys aged 12–14 (68%) were far more likely than same-age girls (29%) to name M-rated video games as being among their five favourites. The most named M-rated games included video games known for their violent content, such as *Grand Theft Auto*, *Halo*, *Def Jam*, *True Crime* and *Driver* (Olson et al., 2007).

Moving Forward

The classification of video games in terms of genre and more refined content and format types is important for a number of reasons. Not only can this exercise reveal the diversity of video games in the marketplace as a point of interest in its own right, but it can also provide context for understanding the nature of video-game-playing populations and markets and the potential of these games to trigger specific psychological and physical responses in players. In the context of video-game violence, there is a particularly strong need for a taxonomy that can recognise and categorise different types and forms of violent or aggressive behaviour. Research with televised violence has revealed, for instance, that viewers are sensitive to variances in the nature of violent acts, as determined by the physical nature of the aggression, whether it causes harm (and how much), whether it was justified, the specific motives that underpinned its occurrence, the types of people involved as perpetrators and victims, and the physical settings in which it occurred (Gunter, 1985).

As we will see in the chapters to follow in this book, there have been dozens of independent studies of violently themed video games and their

effects on players and on people watching the players. These effects can occur in the form of internalised thoughts, feelings and mood states, levels of physical arousal and the overt display of different kinds of behaviour. Some studies have worked with specific video game content to which the individuals being tested have been exposed. Other studies did not show specific video games, although they may have mentioned them by name. Other studies made only generalised references to 'video game play' and assessed 'exposure' through personal or other-person estimates of amount of video game playing.

Even in studies that have selected specific video games to introduce to participants, the researchers often made fairly broad distinctions between the games used in terms of their intrinsic contents. Although one game might be classed as 'violent' and another as 'non-violent', there is not usually any attempt to further break down the category of 'violent' into different types and forms of aggressive activity on screen, defined, for example, according to its potential to cause or trigger specific human responses. Video games have been classified as adventure games, chasing games, catching games, climbing games, maze games, puzzle games, racing games, role-playing games and so on. Yet, given the concern about video game violence, is there not also a need to differentiate between games in terms of the types of violence they contain (Smith, Lachlan & Tamborini, 2003; Thompson, Tepechin, & Haninger, 2006).

We need to know more about the production formats as potential mediators of effects, such as whether the violence involves human or non-human characters. We need to know whether there is a developed story narrative in which the reasons for the violence are articulated. We need to know how much devastation or harm is caused by the violence. Does the violence involve hand-to-hand combat or the use of weapons such as guns, knives, sticks or clubs, or explosive devices? How graphic is the violence? All these factors are known to mediate audience perceptions of filmed and televised violence, as well as the strength and types of emotional and behavioural reactions triggered by exposure to it. By extension, we might hypothesize that different reactions could result from varying forms and types of video game violence. Yet, the literature lacks a comprehensive classification of content types that could be relevant for more detailed empirical investigation of video game effects (Gentile, 2011).

Another important variable in the equation 'video game violence exposure = enhanced player aggressiveness' is the nature of the game play. Differences between video games, as defined by whether the on-screen

avatars or characters are human-like or not, have already been noted. These differences are important in the context of video games' potential effects on players because they can mediate the degree of psychological identification of players with the game's virtual world and the fantasy people that populate it. Identification with characters acting out scenes on screen can enhance their influence because, if viewers perceive something of themselves in those depictions, they may regard the game characters as having greater relevance to their own lives (Espinosa & Clemente, 2013).

In addition to this factor, video games also vary in terms of whether the player controls an on-screen character but remains separate from that character, such as when a puppeteer pulls the strings to make a puppet perform specific actions, or whether the camera operates as the eyes of the player who witnesses events unfold as an embedded part of the game. The latter game type is generically referred to as 'first-person shooter' because the player enters the game as an active participant in his or her own right, and often the game involves firing weapons at other objects and characters. The more deeply and directly embedded a player becomes in a video game, the greater its potential impact, because the player is no longer watching as a third-person puppeteer, but, instead, he or she is actually positioned within the game environment at ground level (Browne & Hamilton-Giachritsis, 2005).

Another important feature is whether the individual plays the video game alone or in the company of other players. In the online world, video games are played by many thousands or even millions of players. Massively multi-player online (MMO) games, such as *World of Warcraft*, can accommodate large numbers of players simultaneously. Players do not invariably operate as opponents, but rather they often team up and work in partnerships or cliques. These groups or 'guilds' of players sometimes establish distinctive identities that are underpinned by formalised rules, norms and values. It is difficult to say how the effects of video game playing on individual players is mediated by guilds, but it is possible to imagine ways in which the effects of violent themes could be both enhanced or diminished through these group memberships (Gentile, 2011). Belonging to a clique that operates as a support system could teach individual players how to play more successfully, however, and more effective play strategies could emerge from creative cognitive interplay between clique members (Steinkuehler & Duncan, 2008).

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What Are the Effects That Cause Concern?

The concerns about video game violence echo those that have been widely debated and empirically investigated in relation to violence in other media, most especially in films and television programmes. The literature on film and television violence stretches back to the 1920s when the first studies addressed the potential effects of early motion pictures. The approach taken at that time was to examine the themes depicted in the cinema films of the day, supplementing this information with the views of various professionals in the fields of education, psychology and sociology concerning the possible individual and social effects of this widely consumed source of public entertainment. One of the findings that emerged from this endeavour, which was published as a 10-volume set, was that many story narratives in early movies were characterised by themes of crime, violence and sex (Dale, 1935).

The social science techniques, research design and data analysis of the time limited attempts to establish that exposure to such themes in entertainment could change viewers, especially youngsters who were psychologically not yet fully formed. One problem that remained unresolved by this ground-breaking and multi-faceted study was the precise nature and magnitude of movie effects on audiences' attitudes and behaviours alongside other important potential causal agents, such as the family structure and physical environment in which children were raised, the rules and behavioural examples set by parents and other family members, and the social groups with which young people interacted.

Research relevant to video game violence emerged in the 1980s. Some of the earliest studies concentrated on establishing the nature of the playing experience, the types of people who were drawn to video games, and the possible psychological changes that such entertainment experiences could bring about, potentially contributing to dispositions that could promote various types of overt behaviour—some of which might be antisocial in nature (Braun & Giroux, 1989; Braun, Goupil, Giroux, & Chagnon, 1986; Egli & Meyers, 1984; Funk & Buchman, 1996; Kubey & Larson, 1990; Linn & Lepper, 1987; Mehrabian & Wixen, 1986). Other researchers who were early to investigate the effects of video games recognised the prevalence of violent themes and asked questions about the potential effects of this content, not least as compared to other violent media that had, by this time, been much more widely studied (Anderson & Ford, 1987; Ballard & Weist, 1996; Cooper & Mackie, 1986; Dominick, 1984; Fling et al., 1992; Irwin & Gross, 1995; Scott, 1995; Schuttte, Malouff, Post-Gorden, & Roadasta, 1988; Silvern & Williamson, 1987; Winkel, Novak, & Hopson, 1987).

There have been a number of helpful reviews of research evidence about the effects of violence-themed video games. Emes (1997) examined the evidence from 13 studies concerning video games and aggression in children, published between 1984 and 1995. His review was primarily addressed at mental health professionals, but he also reviewed around 20 additional publications that examined children's use of video games, their game preferences and other physical and intellectual effects of playing video games. He concluded, at that time, some evidence suggested that video games could have physical effects on young players, and that video games could distract children from their schoolwork—especially when they were first introduced to these games—with consequent knock-on effects on performance on some tests. He also concluded that research indicated that playing these games was associated with propensities toward aggression, especially among younger children. The studies Emes reviewed by no means produced consistent evidence on this last point, however.

The first comprehensive review of the evidence regarding the effects of violent video games was written by Dill and Dill (1998). This discussion placed research into video games and aggression in the broader context of media violence research and drew, in particular, on the theoretical literature developed through research into televised violence in order to provide an explanatory basis for that data on video games and aggression. There were a number of psychological mechanisms through which violent video games could potentially influence players. These included the priming of aggressive thoughts, weakening of socially conditioned inhibitions against

behaving aggressively, the provision of role models that could induce imitative behaviour, decreased emotional responsiveness to violence and reduced empathy for victims of violence, the creation of a more cynical and frightening view of the world, and the potential to release aggressive impulses through game playing as a form of vicarious catharsis.

Dill and Dill further acknowledged the importance of a number of mediating factors that comprised specific characteristics of performed screen violence. These factors included the perceived justification for the violence, rewards or punishments resulting from the violence, the level of realism in the setting, and the attributes of on-screen characters depicted as perpetrators or victims of violence. Dill and Dill differentiated empirical studies of video games and aggression in terms of their methodologies, broadly distinguishing between experiments and surveys, but also, more usefully, in terms of the types of measured psychological (and sometimes physiological) reactions to playing violent video games. In their review Dill and Dill examined behavioural effects, emotional arousal effects and cognitive effects. Behavioural effects included aggression and prosocial behaviour. They also found that there was mixed evidence for specific behavioural, emotional arousal and cognitive outcomes.

Overall, the majority of experimental studies reviewed by Dill and Dill indicated that aggressive reactions to playing violent video games could be detected among players, including children. Playing violence-themed games could generate greater arousal and excitement than non-violent games, promote aggressive thoughts, increase the rate of aggressive responding (albeit under artificial and controlled conditions) and reduce the propensity to behave in a prosocial manner. Having said all this, not every experimental study confirmed these findings, and not every study was without methodological problems.

Dill and Dill used the term 'descriptive studies' to describe the self-completion questionnaire surveys that provided much of the evidence that many young people enjoyed playing video games and could develop a particular liking for violentce-themed games. Some studies asked players to report back on how these games made them feel, and different reactions were reported, ranging from feeling more aggressive to feeling more calm and relaxed. Other research found statistical links between playing violent video games and independently derived evidence of propensities to misbehave in different settings.

Evidence also emerged that personality factors were related to playing violent video games and that playing these games was related to self-concept and perceptions of self-worth. Youngsters with low self-esteem

might turn to video games as an escape, and players who became highly competent at these games could even gain some self-regard. Once again, though, these findings were not always consistent. There was still plenty of scope at this time for more research to be carried out using all available methods to explore these different issues in greater detail, while also benefiting from the methodological lessons that had been learned since research into video game violence had begun.

Griffiths (1999) reviewed a similar body of evidence to that examined by Dill and Dill (1998). He differentiated between studies using self-report methods (i.e., surveys with questionnaires), experiments, observational studies, and other studies that examined specific cases and used qualitative psychological tests. Griffiths identified nine self-report studies that were published between 1983 and 1993; eight experimental studies (1987–1996); four observational studies (1986–1995); and three other studies (1985–1991).

Griffiths noted that the self-report studies revealed some degree of statistical association between playing video games with violent themes and player aggressiveness, but also cautioned that the evidence was restricted to correlations rather than direct tests of causation, leaving it open to reverse interpretation, whereby already aggressive types were attracted to playing violent video games. Furthermore, there was insufficient use of controls for other relevant variables that could explain both aggressiveness and the appeal of violent video games.

The experimental studies were methodologically equipped to explore causality in relation to video game playing and subsequent aggression, but the evidence that derived from this body of literature did not always produce consistent findings. Furthermore, the measures of aggression varied from study to study and often entailed analogues that were designed to represent the expression of hostile urges without actually invoking real aggression in participants, which would, in turn, create ethical problems for these studies.

Observational studies, which were few in number at the time of Griffiths' review, generally adopted experiment-like paradigms, but attempted to measure the effects of video game play in more naturally occurring aggression among children. The latter behaviour was assessed via observations of children at play.

The fourth category of investigation reviewed by Griffiths used a mixture of methodologies and sometimes incorporated tried-and-tested psychological techniques for measuring aggressiveness, such as projective tests and

clinically validated questionnaires and verbal scales. The interesting departure of the 'other' studies category was that evidence from these investigations indicated that some players could purge any pent-up hostilities through their interactions with these games. Griffiths did not discuss background psychological theories of video games' influences of player's thoughts, feelings and behaviour with the detail of Dill and Dill, but he did consider the different categories of video game and the need to recognise that video games were diverse in their subject matter and production formats, as well as the kinds of entertainment they provided to players. Video games could variously have positive and negative effects on players, depending on the nature of the game itself. Griffiths concluded that future research should therefore focus on the effects of video game playing based on the types of games being played and the kinds of social messages they might convey to players.

A number of early reviews of evidence concerning video game effects in the southern hemisphere emerged, leading to different overall conclusions about the status of the evidence (Durkin, 1995; Durkin & Low, 2000; Griffiths, 1999; Unsworth & Ward, 2001). When these reviews were written, much less empirical evidence existed on the aggression effects of playing violent video games. These other early reviews were more circumspect in their conclusions, and, while noting the existence of some empirical findings that indicated the potential aggression-triggering effects of video games, these studies also identified a number of weaknesses in research designs and the measurement of key variables such as 'aggression' and 'violent video game exposure', as well as analytical limitations, which meant that the case on violent video games could not yet be closed.

A review from Japan indicated that, although similar concerns about violent video games existed in that country, the research evidence confirming the harmful effects of playing such games with violent themes had thus far proven elusive. Although some research studies did indicate that there might be a relationship between aggressive propensities and playing violence-themed games, proof of a causal connection had not emerged (Sakamoto, 2000).

Kirsh (2003) presented a discussion of violent video game effects that drew extensively on the general aggression model (GAM) developed by Anderson and Bushman (2002a, 2002b). This reviewer noted the popularity of video game playing and, in particular, its prevalence among adolescents. While recognising that biological and psychosocial factors influenced the development of aggression across childhood, video game playing was also acknowledged as an increasingly important aspect of the developmental environment for many children (Abbott, Palmisano &

Dickerson, 1995; Bailey, West & Anderson, 2010, 2011). Many of the most widely played games had violent themes, and this opened up obvious questions about the role they might play in the socialisation of aggression in people as they are growing up. Children might have many different reasons for playing these games, but there was compelling empirical evidence that specific exposures to violent video games could increase levels of personal aggressiveness in players (Griffiths, 2000; Uhlman & Swanson, 2004; Polman, de Castro & van Aken, 2008).

Research conducted with the framework of the GAM indicated that aggressiveness could be increased at different psychological levels—cognitive, affective (or emotional) and behavioural. It was important to better understand how playing violent video games was integrated with other social and environmental factors, as well as biological factors, to shape the propensity toward aggression that individuals might come to display (Gentile, Groves & Gentile, 2013). Some researchers accepted the empirical evidence for the ability of violent video games to trigger aggression in players, but they recommended more work in order to understand in more detail how important playing these games might be in their social and psychological influences on players at different stages of development (Bender, Rothmund, & Gollwitzer, 2013; DeLisi, Vaughn, Gentile, Anderson & Shook, 2013).

Swing and Anderson (2007) reviewed the evidence for the effects of playing violent video games on children, and they differentiated between behavioural effects, focusing on affective responses, cognitive influences and influences indicated by neurological measures of brain activity during and after violent video game play. This review was guided by the so-called 'best practices' judgements made by one of the authors in earlier reviews of the evidence (Anderson, 2004; Anderson et al., 2004). The resulting analysis and interpretation of the evidence were framed within the GAM developed by Anderson and his colleagues (2007) and discussed in more detail later in this chapter.

Classifying Effects of Violent Video Games

As the discussed literature reviews have indicated, the research community has achieved a consensus that playing violent video games can trigger aggressive thoughts, feelings and behaviour in players. Many critics of video games and policy-makers, who are responsible for writing codes of practice to control the games, have focused on *behavioural* effects. Broad conclusions about harmful effects flowing from these games, however,

often fail to take into account the diversity of psychological, physical and social reactions that might result from playing them. This limitation in the debate is not unique to the subject of video game violence. It has also characterised the earlier debate about other forms of media violence, particularly those forms of violence occurring on television.

Taxonomies of media violence effects can be articulated through descriptive frameworks that categorize the different ways in which players might be influenced, psychologically, by playing video games with violent themes. It is important to reflect on these variances in psychological responses and other associated reactions on the part of players if we are to fully understand the overall impact of playing violence-themed video games. One group of authors writing on this subject helpfully distinguished between four types of effects, differentiating them based on the nature of the on-screen actors involved in violence. The four types of effects were labelled as 'aggressor effect', 'victim effect', 'bystander effect' and 'appetite effect' (Donnertsein, Slaby, & Eron, 1994). It is useful to consider what each of these effect types means in terms of potential responses of media consumers or 'players' to on-screen violence.

The aggressor effect focuses on the individual as an 'aggressor' and claims that people who consume regular violent entertainment can become more prone to act out aggression themselves. This outcome is likely to follow from lessons learned from on-screen perpetrators of violence who act as role models or sources of justification for behaving aggressively. These lessons can be internalised as behavioural scripts that individuals can call on at future dates to guide their responses to different social situations.

The victim effect proposes that regular exposure to violent entertainment can also teach each media consumer lessons about the risks and threats that exist in society. In these entertainment experiences, such lessons derive from the display of violent victimization. If the media world—whether experienced at the movies, on television or in video games—is permeated with characters portrayed as victims of violence and if certain kinds of violence frequently occur in this virtual world, observers may come to translate such experiences into thoughts about risks in their own reality. For some individuals, this interpretation of mediated or virtual worlds can result in enhanced sensitivity to risks in their own lives and to heightened anxieties about sources of danger or threats to their own personal safety and well-being. This experience, in turn, can result in changes in their behaviour as they seek to protect themselves from often-exaggerated social risks (Shafer, 2012; Ramos, Ferguson, Frailing & Romero-Ramirez, 2013).

The bystander effect emerges from experiences of media violence that might involve mediated perpetrators and victims of violence. For many people who have been brought up in settings where violence is not generally present, its appearance can be regarded as both unusual and disturbing. Emotional reactions can become magnified as the seriousness of the witnessed violence becomes more pronounced. Regular exposure to violence can also invoke coping mechanisms in individuals, however. These mechanisms are designed to reduce the unpleasant arousal experiences that can be caused by directly witnessed and graphic violence. Such habituation or desensitization to violence means that the individual learns to control his or her reactions to violent episodes, thus becoming less likely to experience unpleasant feelings (Funk, Baldacci, Pasold & Baumgartner, 2004; Funk, 2005; Arriaga, Esteves, Carneiro & Monteiro, 2008; Arriaga, Moneiro & Esteves, 2011; Bushman & Anderson, 2009; Gretiemeyer & McLatchie, 2011). The social concern associated with this effect is that individuals who experience a lot of mediated violence become less concerned about social violence and less sympathetic toward victims of violence.

The appetite effect posits that the more people see violence in their entertainment content, the more they develop a taste for it. In effect, individuals develop an appetite for violent forms of entertainment that grows stronger as exposure to it increases. This taxonomy can be borne in mind as we consider some of the effects that have been most widely investigated by media violence researchers.

IMITATION OR COPY-CAT EFFECTS

One of the most influential early theories about media violence effects is the social learning model. This idea was informed, to some extent, by behaviourist psychology. Unlike classic forms of behaviourism that focused almost exclusively on externally observable behaviour patterns and responsiveness to environment stimuli, the social learning model also embraced concepts related to the internalisation of behavioural learning, whereby behaviour could be conditioned not just by direct application of rewards and punishments, but also indirectly through the observation of the behaviour of others (Bandura, 1973, 1986, 1994). Such 'observational' learning among children, for instance, could result from a child witnessing the behaviour of his or her parents, siblings or other people in their immediate environment. It could also occur by observing the behaviours performed by actors on a screen.

Bandura and his colleagues provided early demonstrations of social learning from filmed actors in a series of experimental studies published during the 1960s (Bandura, 1965; Bandura, Ross, & Ross, 1961, 1963; Bandura & Walters, 1963). Social learning theory was adopted as a mechanism that could explain the potential effects of playing violence-themed video games on players' subsequent aggression (Brusa, 1988; Chambers & Ascione, 1987; Graybill, Kirsch, & Esselman, 1985). One view that asserted that, in the context of playing video games, social learning could be at least as powerful as it was assumed to be in relation to learning social behaviour lessons from television viewing. Although watching television programmes is a relatively passive activity, video game players engage directly with events on the screen and can exert a high level of control over those events. Such interactivity was seen as having the potential to draw in players psychologically in an even more powerful way than television could (Lin, 2013).

Imitation effects related to watching aggressive actors on screen were usually measured among children in free play settings. In these settings the children could determine their own behaviour, although specific options were sometimes encouraged by the strategic placement of toys that invited aggressive behaviour or other types of action. Identification with the on-screen characters could further enhance the copy-cat outcomes. Any opportunity to engage directly and interactively with on-screen characters might create a more psychologically involving experience with knock-on effects on potential imitation (Bensley & van Eenyk, 2001; Krahe & Moller, 2010).

Directly engaging with and controlling the aggressive actions of on-screen characters therefore represented a potentially powerful learning experience in which the aggression was not simply a behaviour performed by another actor, but an on-screen character who was an extension of the player. Given the importance of rewards in strengthening copy-cat behaviour, if the player performed well in a video game, the reward was not simply awarded to his or her on-screen manifestation, but was experienced as a direct reward to the player (Winkel, Novak, & Hopson, 1987). Other researchers also observed children's free play after they were assigned to play differently themed video games, and they found that aggression was more likely to occur among those children who played a violent video game. In addition, play equipment that was thematically related to objects witnessed or used in the game drew children in and served to further enhance aggressive play (Schutte, Malouff, Post-Gorden, & Rodasta, 1988).

Weakening Impulse Control

In civil societies that value openness of thought and speech, altruism, and cooperative, conciliatory social behaviour, children are taught to control selfish drives that might lead to hostile impulses and outbursts. In this way, codes and rules of conduct are internalised to enhance individual self-control and to keep social violence in check. Although all human beings are hard-wired to potentially behave in an aggressive manner, such behaviour cannot be allowed free and uncontrolled expression, because this would have disastrous consequences for the fruitful coexistence of peoples. Such natural urges must therefore be inhibited. Societal laws set external parameters that define how individuals are expected to behave, as well as punishments for those who breach these rules, but individuals are still expected to take personal responsibility for their actions. If these socially conditioned inhibitions against behaving aggressively are weakened or rejected, the risk of uncontrolled violence increases.

One key concern about media violence has been that its behavioural portrayals can provide continuing justification for the use of violence in different social settings. Even though many video game settings are make-believe, they may nonetheless bear sufficient resemblance to everyday realities that observers can draw lessons from them. This type of media effect goes beyond the implanting of specific ideas about behavioural acts, as posited by the imitation hypothesis of social learning theory. The aggression that individuals could display after witnessing violent portrayals in a film or television programme might be similar to or quite different from the media violence itself. The key mechanism in this context is that the viewer learns from watching on-screen violence that aggression in any form can be justified, despite what the viewer may have learned to the contrary from parents, teachers or other influential people.

In this context, a second behaviourist-based model of media violence effects emerged in the 1960s, shaped by the work of Leonard Berkowitz and his associates. While Bandura researched mainly children, Berkowitz focused his attention on young adults, usually males. His theory was that observing filmed or televised violence did not simply provide behaviours that the viewer could later copy or re-enact, but, rather, it had a broader impact. The wider implications of mediated violence for viewers included the perceived justification it might provide for using forms of behaviour in social settings that normal social mores would class as inappropriate and antisocial.

Most people are brought up in family settings in which they learn 'right' from 'wrong' and in which the use of violence to solve social problems is frowned upon. Aggressive impulses represent a naturally occurring aspect of a human being's behavioural repertoire, and these impulses originally formed an important part of an individual's survival arsenal in times when lifestyles were more primitive and more fraught with danger. In modern, civilised societies, aggression is not needed on a day-to-day basis, and the survival of a 'civil' society depends on its constituents finding non-violent methods to resolve disputes. Natural aggressive urges therefore need to be reined in and controlled—even suppressed. An important social learning process must be completed to ensure that 'civil' individuals control their hostile impulses even when frustrated by others.

Witnessing others using violence on a regular basis might cause an individual to re-think these social rules. If violence is perceived to be effective and socially appropriate because it is normative, then reasons might be found to turn off internalised controls over aggressive impulses. Berkowitz believed that this 'disinhibition effect' could underpin the propensity of viewers to behave more aggressively after watching filmed or televised violence (Berkowitz, 1965).

Media violence was thus imbued with the capacity to trigger aggression in viewers if the portrayed violent episodes contained features suggesting that aggression was appropriate under specific social conditions. In fact, the social conditions under which aggression might be deemed appropriate by a viewer of filmed or televised violence did not have to be the same as those depicted by the viewed media. Hence, exposure to a film sequence of a boxing match in which one contestant inflicted serious injury on the other could trigger viewers to subsequently behave in a more aggressive manner toward another person, even though the viewer-initiated aggression was different in kind (Berkowitz & Alioto, 1973; Liebert & Baron, 1972; Walters & Thomas, 1963; Walters, Thomas, & Acker, 1962).

Playing violence-themed video games has been found to increase aggression arousal, which could, in turn, promote the likelihood of subsequent aggressive responding in situations in which such behaviour is encouraged. Furthermore, exposure to video game violence has been shown to render players more punitive toward another person in a reaction-time task in which poor performance could be penalised with a loud and unpleasant blast of noise (Carnagey & Anderson, 2005). Other research with children reported more aggression in free-play settings by those youngsters who

had played a violent video game, as compared with those who played a non-violent game (Cooper & Mackie, 1986; Irwin & Gross, 1995; Silvern & Williamson, 1987).

INSTALLING AGGRESSIVE THOUGHTS

The initial disinhibition hypothesis focused on externally displayed and measurable behaviour. As a result, the early experiments constructed settings in which mainly young male students at American universities were variously exposed to scenes of screen violence or other non-violent scenes, before being placed in a situation in which they could deliver a 'punishment' to another person whom often they could not see. The key dependent variable was the delivery of this punishment and, when the magnitude of punishment could be controlled by the participant in the study, the strength of punishment (or aggression) that was delivered to another person.

Across a series of experiments conducted by Berkowitz, his colleagues and other researchers inspired by this work, evidence emerged that even apparently normal young men were willing to deliver what they believed to be painful stimuli (either loud noise over earphones or electric shocks) to another person when that individual made mistakes on a task they were given to complete. The willingness to deliver these stimuli, despite audio or visual feedback from the recipient indicating extreme discomfort, was enhanced if the experimental participant had earlier viewed a violent film or television scene, as compared to watching a non-violent scene. The punishment handed out also usually depended on whether the recipient had earlier behaved in a way toward the participant that had caused the participant to become angry or upset. However, although revenge might have influenced participant actions in these experimental settings, the observation of mediated violence made an aggressive response all the more likely.

In a later theoretical development, Berkowitz (1984) recognised that the learning that could result from watching violence in films or television programmes might not necessarily produce immediate aggressiveness in the viewer. Indeed, the need or opportunity for a violent response might not arise immediately after this viewing experience has occurred. Such opportunities were created in laboratory settings for the expediency of the research. In reality, viewers might watch and enjoy televised violence without immediately committing acts of aggression. If the opportunity and, more especially, the provocation to do so did arise, however, the question

was, 'Would they be more likely to behave aggressively contingent upon the nature of their prior viewing experience?'

If the viewer acted aggressively despite the fact that time had elapsed since the last experience with screen violence, this would imply that the 'aggression lessons' learned from that violence had been internalised. The violence seen on screen could therefore be considered to trigger aggressive thoughts in the minds of viewers, which might, in turn, become associated with specific social scenarios. These aggressive thoughts might be reinforced and become more strongly conditioned through repeat exposures to various forms of screen violence. As a result, the thoughts might then become more available for retrieval from memory by the individual, and, if primed strongly and often enough, they could be placed at the head of the list of behavioural choices for the individual when placed in real situations that caused frustration or irritation (Berkowitz & Rogers, 1986; Jo & Berkowitz, 1994).

The process of increasing a player's tendency to consider aggression to solve social problems was termed 'priming'. If a violence-themed video game primed thoughts about aggression and the player subsequently found himself or herself in a social setting in which further aggression-related cues occurred, these factors could provide further reminders of the potential need to adopt an aggressive stance in that setting (Anderson & Ford, 1987; Anderson & Morrow, 1995). Research evidence has been published on this subject, leading to conclusions that violent video games can produce aggressive thoughts in the minds of players, at least when they are tested soon after they have finished playing (Anderson & Dill, 2000). Further evidence has indicated there could be longer-term effects, but this assertion was derived from correlations between self-reported exposure to video games with violent content and scores on psychological tests designed to measure the likelihood of using hostile responses in specific social situations (Anderson et al., 2007).

Scripting Behavioural Repertoires

Behavioural theories about the effects of media violence have acknowledged from early on that internal, cognitive processes have a critical part to play in underpinning overt responses. Social learning theory recognised that learning through observation did not automatically result in immediate behavioural reactions. Instead, internalised representations of observed violent actions could be established, before being further associated with observed experiences relating to whether

the mediated aggression had been rewarded, punished, or otherwise deemed appropriate given the social circumstances under which it occurred (Bandura, 1973). Similarly, with aggression that was triggered through disinhibition, the original mediated experiences could be internalised, creating thoughts about specific violent acts that the individual had previously witnessed (Berkowitz, 1984).

In an extension of this cognitive-behavioural model of how mediated violence might condition aggressive behaviour, research further noted that, in popular fictional sources of inspiration for violence, such as movies and television programmes, aggression tended to form part of the storyline. Aggressive behaviour was therefore scripted, and, as such, it became an integral part of the narrative. It was probably over-simplistic to presume that viewers internalised isolated violent acts. More likely, they absorbed the story being told, and any aggression that occurred as part of the plot was cognitively processed within that context. The end result was that viewers could potentially learn behavioural scripts or sequences of action performed by individuals under specific story-telling circumstances.

Other research evidence suggested that an important part of making assessments about televised violence was whether the viewer could identify and link actions, motives and consequences. The ability to make these judgments emerged during childhood. Very young children, under the age of seven, might lack the cognitive abilities to fully make these links, whereas older children gradually acquired this cognitive competency (Collins, 1979). Hence, as viewers mature, they acquire the ability to internalise behavioural scripts (Rule & Ferguson, 1986).

If viewers repeatedly watch specific types of storylines and see similar violent behaviour scripts acted out, these scripts are rehearsed and can become consolidated in memory. A repertoire of such scripts can be developed that the individual is then able to draw upon to guide his or her future behaviour in different social settings (Huesmann, 1986; Geen, 1994). The likelihood of violent behaviour is enhanced if the individual enters social settings that bear a striking resemblance to ones seen in fictional narratives on television (Josephson, 1987; Guerra, Huesmann, & Hanish, 1995; Huesmann, 1988).

As we will see later in this chapter, one theoretical model has proposed that playing violent video games does not simply trigger isolated aggressive cognitions, but it might also establish more extensive aggressive scripts (Buckley & Anderson, 2006; Anderson et al., 2007). Regularly playing with violent video games can result in players receiving drills in aggressive coping strategies to deal with specific problem-solving scenarios. Violent

video games contain cues to aggression in the form of weapons and specific point-scoring incentives to use them, but they can also create aggressive narratives in which players can become psychologically involved, thereby offering behavioural scripts that can be internalised for future reference (Anderson & Bushman, 2002a, 2002b; Anderson et al., 2007).

SENSITIZATION AND DESENSITIZATION TO VIOLENCE

It has long been acknowledged that experiencing media violence can generate arousal in viewers. This arousal can be measured via physiological and psychological techniques. This response takes on a generalised form and creates an open-ended 'drive state' that renders the individual more prepared to display overt behaviour that might reflect the nature of the content that first gave rise to that feeling (Tannenbaum & Zillmann, 1975). Such generalised arousal would not automatically trigger aggression in the individual, but it could do so if environmental cues identified aggression as an appropriate or relevant behaviour to perform in a post-viewing social setting. Thus, a person watching a television programme with violent action sequences might become excited by this form of entertainment, and this would be underpinned by an aroused physiological state.

This state of physical arousal can be measured by changes in heart rate, blood pressure, electrical conductance of the skin and brain wave patterns. Whether such internal arousal is psychologically interpreted as anger, however, depends on whether a subsequent social situation contains cues that lead the individual to reach this judgment. Thus, if the individual is subsequently placed in a situation in which another person annoys him (or her), his media-triggered arousal could be interpreted as feelings of anger. In this aroused state, the individual could then be primed to behave aggressively (Doob & Climie, 1972; Rule & Ferguson, 1986; Zillmann, Bryant, Comisky, & Medoff, 1981).

In addition to enhancing emotional sensitivity in such a way as to promote aggression, mediated experiences of violence can also reduce emotional reactions to aggression. Individuals who witness aggression, and for whom this is an unusual experience, are likely to display strong and often unpleasant emotional reactions to it. This type of emotional arousal is regarded as healthy because its unpleasant nature will likely lead the individual to take steps to reduce that feeling by avoiding the experience that caused it. Hence, violence is classed as unpleasant and undesirable.

Over time, human beings have developed built-in mechanisms that allow them to learn how to cope more effectively with unpleasant experiences.

These mechanisms are especially important in the case of experiences that prove to be largely unavoidable. In the case of experiences of mediated violence, any initially unpleasant feelings can become reduced with repetition as this coping response kicks in. In consequence, the individual displays weaker emotional reactions to violent sequences or becomes habituated or desensitized to them.

Research with both children and adults has confirmed that desensitization to televised violence can occur in this way (Bjorkqvist & Didriksson, 1985; Cline, Croft, & Courrier, 1973; Osborn & Endsley, 1971; Thomas & Drabman, 1975; Thomas, Horton, Lippincott, & Drabman, 1977). For instance, children were found to display reduced physiological arousal to televised violence if repeatedly exposed to violent scenes (Cline et al., 1973). The level of physiological arousal to a scene that apparently depicted real violence was lower among children and adults who had earlier watched fictional film violence, when compared to others who had earlier watched a non-violent scene (Thomas et al., 1977).

In another study, boys were shown either a short violent or a short non-violent film sequence, before watching a full-length violent or non-violent movie. The participants were then viewed the original scenes a second time after the movie had finished. Their physiological arousal to the short scenes was measured on each occasion they were viewed. The boys were also all pre-classified as 'aggressive' or 'non-aggressive'. Boys shown the long violent film exhibited reduced physiological arousal to the second showing of the short violent film clip, as compared to their reactions at the first time of viewing, and as compared to boys viewing it for a second time after they had seen a full-length non-violent film (Bjorkqvist & Didriksson, 1985).

Another concern about the desensitization effect is that it might not only result in people becoming more callous about real violence, but this mindset might also render them more likely to use violence themselves. Research evidence has emerged to reinforce this hypothesis. Individuals who had been habituated to violence and then were induced experimentally to behave aggressively were more likely to display aggression than individuals who had not previously been desensitized (Thomas, 1982).

Relatedly, some studies of video game playing have measured the emotional responses of players to subsequent images of violence, using measures of brain waves, and these studies have indicated that violent video game players exhibited reduced cortical reactions to violent stimuli after playing, as compared to those who played a non-violent video game. This evidence was consistent with the concept of desensitization to violence caused by

mediated violent experiences (Bartholow, Bushman, & Sestir, 2006) As shown later, these effects have been observed among video games players (Greitemeyer, 2014a, 2014b; Greitemeyer & McLatchie, 2011).

Cultivating a Distorted World View

Much of the early research into the possible effects of media violence on audiences directed its attention toward the specific influences of portrayed aggressors. Researchers sought empirical evidence to show whether exposure to on-screen characters behaving in an aggressive way could provide lessons in violence to viewers, or simply enhance the likelihood of viewers behaving aggressively themselves, if provoked, perhaps by arousing their passions or presenting justification and legitimation for the use of violence. In a different perspective, a group of scholars led by George Gerbner, and based at the Annenberg School of Communication, University of Pennsylvania, suggested that there were equally influential effects that could flow from lessons learned by observing victims of portrayed violence (Gerbner & Gross, 1976; Gerbner et al., 1977; Gerbner, Gross, Jackson-Beeck, Jeffries-Fox, & Signorielli, 1978; Gerbner, Gross, Signorielli, Morgan, & Jackson-Beeck, 1979).

Patterns of victimisation in televised dramas were singled out as having the potential to be especially influential. This was because victimisation on televised dramas tended to display demographically biased patterns that symbolically revealed something about power hierarchies and relationships in fictional society. Certain types of actors tended to be featured as victims of violence disproportionately more often than others, given their overall frequency of appearance. Others were much more likely to represent aggressors. In reinforcing still further where social power resided, some character types were disproportionately more likely to be killed as a result of on-screen violence.

Viewers in the audience who took their ideas about occurrences of specific types of events from the way such events were depicted on television might be prone to a television influence. If the world of television presented an exaggerated or distorted view of the world, this is the view that might come to dominate the thoughts of viewers, even when they were thinking about the real world. This effect could be especially powerful among people who were the heaviest consumers of television. It could also be further magnified among people who identified closely with the predominant victims of violence on the screen (see Wober & Gunter, 1988).

Gerbner and his colleagues produced a series of studies based on their analyses of secondary data from national public surveys conducted in the United States to provide an empirical demonstration of such influences. They found that people who watched large amounts of television tended to display different perceptions of the real world from those who watched relatively small amounts of television. In particular, as compared to light viewers, heavy viewers regarded certain kinds of crime and social violence as being statistically more prevalent than they actually were in society. Heavy television viewers also developed a stronger sense fear of crime and violence than did light viewers (Gerbner et al., 1977, 1978, 1979; Gerbner, Gross, Morgan, & Signorielli, 1980). Thus, Gerbner and his colleagues concluded that television could 'cultivate' a distorted world view.

Other researchers challenged these initial findings, and methodological faults were found by critics in the United States (Hawkins & Pingree, 1980; Hirsch, 1980, 1981a, 1981b; Hughes, 1980). While not dismissing the hypothetical possibility of cultivation effects, other researchers suggested that the apparent relationships between television viewing and social beliefs, as stated by Gerbner, were perhaps over-simplistic, not least because overall amounts of television viewing disguised variances in individuals' viewing diets that could, in turn, result in variances in the kinds of social messages being received from television (Wober & Gunter, 1988).

Later research attempted to provide psychological explanations for the occurrence of cultivation effects. Why do we develop distorted perceptions of the frequencies of events? If television displays a fictional world in which behaviours that are relatively rare for most people in everyday reality appear to be commonplace for the fictional populations, why do some viewers adopt a 'television-centric' view of the world? One of the factors at play here could be the 'availability heuristic' (Tversky & Kahneman, 1973, 1974). This theory proposes that our judgements of occurrences of events are more often based on our memories of the most recent or salient samples of them, rather than any precise mathematical calculation of their actual frequencies.

This concept was revitalised in the context of cultivation research in the 1990s in relation to the concept of 'construct accessibility'. Thus, heavy viewers perceive regularly occurring incidents on television as being more frequent in reality than do light viewers because they receive more exposure to these events and this renders the events more accessible in memory (Shrum & O'Guinn, 1993). In an experimental test of this hypothesis, Shrum (1996) presented participants with a series of cultivation-type questions about real-world phenomena, such as prevalence of crimes, marital breakdowns, and various occupations.

In typical cultivation measures, respondents are invited to choose between two statistical frequencies (one high and the other low) for each item with respect to the event's rate of appearance or occurrence in real life. The higher frequency usually represents the 'television world' answer. In the Shrum study, the key measure was how long it took each respondent to make a choice. Those who chose the higher option and did so more frequently were expected to be heavier television viewers. This expectation was borne out by the results. What this finding indicated was that, for heavier viewers, these frequencies were more readily accessible from memory because they received constant reminders of them on television and this, in turn, accelerated their speed of response (Shrum, 1996). Research with video games has found that exposure to violence-themed games might influence players' perceptions of social risk (Buchman & Funk, 1996). These effects of mediated violent themes can depend a lot on whether those who experience the violence can perceive connections between their own lives and the events depicted on screen. As the distance between these two factors grows, the possibility of a cultivation effect weakens (Gunter, 1985; Wober & Gunter, 1988).

Discharging Aggression via Video Games

As an alternative to the position that exposure to violent video games can produce aggression, distressing emotional responses, and antisocial thought and behaviour patterns in players, some suggest that these games can actually provide outlets through which individuals can purge themselves of their hostile urges. In this context, aggression is conceived of as a biological drive state that underpins behavioural responses in threatening situations. It frequently occurs as a reaction to frustration that arises in settings in which the individual's personal safety comes under threat or in which the individual's goals are thwarted. Aggression is not unique to humans, but occurs across many species and plays a critical part in the survival of individual organisms and ultimately the species (Ellis & Walsh, 1997).

The triggering of aggression creates an uncomfortable state that needs to be released. The hostile impulse must therefore be purged for the organism to return to a state of calm. This 'cathartic' response can be achieved by acting out aggression (Feshbach, 1961). It has also been argued that catharsis can be achieved in less direct ways through fantasy, as well as through overt behaviour (Feshbach, 1955, 1961). If that is true, then it leaves open the possibility that, when a viewer engages psychologically with mediated violence, an indirect pathway for the release of internal hostility might be activated (Feshbach & Singer, 1971).

This suggestion that video games can have a cathartic effect has been discussed in the context of the potential outcomes of television and filmed violence (Feshbach, 1955, 1961; Gunter, 1980). Empirical support for this hypothesis has been limited, but some have hypothesized that the ability to purge oneself of aggressive feelings through violent entertainment is not the same for everybody.

The theoretical debate about catharsis grew when its key protagonists presented a modified view that recognised two forms of purging of hostile impulses—a strong form and a weak form. Under the strong form of catharsis, they proposed that aggressive urges could only be released via the actual performance of aggression by the individual. The weak form argued that this type of release did not require open enactment of violence, but could be achieved through vicarious violence experiences, provided the individual could attain a high level of psychological involvement in the violence being witnessed (Feshbach & Singer, 1971; Singer, 1966).

This new idea about catharsis opened up, in theory at least, the possibility that the experience of mediated scenes of violence, such as those seen in movies or television programmes, might be sufficient to enable angered individuals to achieve some kind of hostility release (Gunter, 1980). Some individuals might be better equipped, potentially, to experience this release of aggressive emotion than others. This catharsis effect largely depends on whether the viewer is an adept fantasizer with the capability to get deeply involved in scenes of mediated violence. Certainly, this ability was found to enhance the cathartic outcome of violent film experiences for children (Biblow, 1973).

The notion of catharsis has been extended to the playing of video games. Thus, a number of scholars working in this field have considered whether a person who is angry and therefore physiologically primed to behave aggressively may be rendered less so, thus becoming less likely to act out the anger after playing a violence-themed video game (Calvert & Tan, 1994; Graybill et al., 1985; Kestenbaum & Weinstein, 1985; Silvern & Williamson, 1987).

Some media violence researchers have challenged whether catharsis can occur indirectly through engaging with violence played out on a screen (Geen & Quanty, 1977). Others have argued, in the context of video game playing, that the jury is out and that better evidence is still needed before this hypothetical outcome can be completely dismissed (Sherry, 2007). Among children, heavy video game players reported that, in playing these games on a regular basis, their primary aim was to improve their

performance. Compared with lighter players, those who played these games a lot described the experience as relaxing and as a useful device for relieving tension in their lives. The authors interpreted these findings as showing the cathartic potential of playing video games by acting as constructive channels through which to discharge negative energy (Kestenbaum & Weinstein, 1985).

Qualitative research evidence from a small sample of boys shows that the participants reported feeling less angry and aggressive after playing violence-themed video games (Olson, Kutner, & Warner, 2008). Such evidence was derived from a research design that was not equipped to test causality, however, and it needs to be backed up with research uses controlled measures validated to represent aggression release in a consistent and measurable way (Ferguson & Rueda, 2010). Ferguson and Rueda also made a useful point that other research showing the stress-releasing qualities of playing video games would suggest that they are capable of exerting a calming effect on players when they have experienced unpleasant arousal from difficult social circumstances. This opens up the possibility that emotional releases could be possible through video game play, but better evidence is needed to confirm these findings.

Managing Mood States

Another more positive view of video games and their effects stems from the hypothesis that they can help players adjust their mood states and that this can often result in constructive attempts to turn a negative mood state into a more upbeat one (Zillmann, 1988). People who feel depressed, for instance, have been found to use media entertainment to lift their mood. As a result, people with depression can deliberately seek out violent media themes, but if these mediated experiences can distract their attention from personal problems, they can serve as a form of escape or mental readjustment, so that life's challenges are diluted, at least momentarily (Dillman-Carpentier et al., 2008). Certainly, this outcome has been associated with listening to music, watching television and finding enjoyable video rentals to watch (Chen, Zhou, & Bryant, 2007; Nabi, Finnerty, Domschke, & Hull, 2006; Strizhakova & Krcmar, 2007).

Depression is often characterised by feelings of both sadness and powerlessness (Healy & Williams, 1988). It has also been linked to feelings of hostility that can be conditioned during childhood, especially if there has been a family history of depression (Keltikangas-Jarvinen & Heironen,

2003). Playing video games, unlike watching television or listening to music, can trigger feelings of control because of the interactive nature of playing, whereby the player can affect the actions of on-screen characters and the outcomes of events (Ferguson & Rueda, 2010). Hence, video games with violent themes could provide a device for altering and managing negative mood states by restoring the player's perceived ability to influence events (Colwell, 2007; Olson et al., 2008).

An Overarching Theory of Aggression

The theories discussed previously have each identified a specific type of effect of media experience that potentially conditions the way individuals use or respond to aggressive behaviour in their own lives. These various effects comprise behavioural, emotional and cognitive responses. Some theories have considered a combination of these effects, but in each case, they have offered a fairly narrow view of the nature of psychological change that might occur in individuals as a result of their exposure to media violence. It has been suggested that, through their media experiences, individuals can learn specific acts of violence that they might subsequently copy for themselves, that they have their socially conditioned inhibitions against behaving aggressively weakened or switched off, that they internalise aggressive thoughts or entire behavioural script repertoires, that they display enhanced or reduced emotional sensitivity to real world aggression, and that such changed emotional responding might then affect the way they behave in relation to aggressive episodes.

Is it not possible that viewers of screen violence experience all these effects, however, or that the combined effects represent a broader change in the character of a person. It seems perfectly reasonable to presume that we all collect ideas and thoughts about violence through the mass media, that we all experience shifts in our emotional reactions to violence through such experiences, and that, ultimately, our behavioural repertoires, which are stored internally in ways not visible to us, are also enriched by our media experiences.

Craig Anderson and his colleagues, including Brad Bushman, Douglas Gentile and others, have drawn up a more comprehensive theory of human aggression and how it might be influenced by media experiences, calling it the general aggression model (GAM). This model was influenced by the behaviourist and cognitive theories of media violence already discussed, in addition to other theories of cognitive information processing

(Crick & Didge, 1994), affect and aggression (Geen, 1990), and the transfer of arousal from media to the individual (Zillmann, 1983). This model attempts to embrace cognitive, affective and behavioural responses to mediated violence and how these might be conditioned to promote short-term and long-term changes in the behaviour of individuals, contingent upon their media experiences (Anderson & Bushman, 2002a; Anderson & Carnagey, 2004; Anderson & Huesmann, 2003).

At the core of the GAM is the observation that overt aggression is underpinned by internalised cognitive structures that contain memories about aggressive behaviours, the forms these behaviours can take and the settings in which they can occur. Attached to these core ingredients may be other memories concerning why such actions might be used, the kinds of problem solutions they can produce and the consequences of the use of such actions for self and others.

In effect, these aggression memories and other associated memories comprise a knowledge structure that resides within the individual. In other words, these memories or 'nodes' are linked together within the individual's brain, and the more often this repository of memories is activated, the stronger the memories become. Furthermore, if they are activated more often in relation to a range of different situations, the network of nodes expands, and the connections between them also become stronger. The latter response is referred to as 'priming', a process by which such knowledge becomes more prominent and readily accessible to the individual. If this is the case, then those behavioural scripts or thoughts might be more available to determine how the individual overtly responds across different social settings.

It is not necessary for individuals to regularly behave aggressively in their own lives for aggression scripts or thoughts to become more primed and ready for use in the future. Virtual reminders of the use of aggression can be received through media experiences. Thus, an individual who frequently plays video games with violent themes is engaging in experiences that could hypothetically strengthen his or her aggression scripts and thoughts, priming the individual and rendering the scripts ready for use in real life (Anderson & Bushman, 2001).

The GAM allows for the role played by internal (personality) and external (environmental) factors, and, in the case of internal factors, it allows for those that are genetically determined and those that are learned via the social and physical environment in which the individual lives or was raised. The GAM also recognises that the effects of media violence can be both

short-term and long-term. Central to the entire model, however, is the important role played by cognitive processes and structures.

As individuals progress through their lives, they encounter many different social events and episodes. Each of these encounters represents a potential learning experience. An episode might be one in which we actively engage, such as a social interaction, or it might occur in relation to cognitive problems or behavioural tasks we have to complete. In addition, episodes might be relatively passively experienced, with the individual occupying the role of a passive bystander or observer of other people's actions. Whether we are passive or active, each episode can teach us valuable lessons that we encode and internalise in our memories. Thus, these overt experiences become symbolic representations or nodes within a networked cognitive system underpinned by the neurological apparatus of our brains.

Whenever we encounter a violent episode, whether as an actor or a passive observer, we can internalise that episode, just as we would any other social episode, and it then becomes an aspect of our learned knowledge—a facet of our episodic memory. This internalised event may also have additional meanings attached to it, such as how effective the violence was in solving a problem, why it occurred, what consequences it produced, whether the consequences were expected or unexpected on the part of the actors, and how other observers—if any were present—might have reacted to it.

The GAM therefore provides a multi-faceted model for the analysis and explanation of the role played by media violence in the development of human aggression. In the words of Anderson et al. (2007), "The General Aggression Model highlights the fact that a wide variety of factors influence the development and expression of aggressive tendencies at multiple levels of analysis, from the individual to societal patterns" (p. 45). This means that, in trying to understand how aggressive tendencies evolve and emerge during childhood, we need to consider a wide range of factors, even when our primary concern is the analysis of the effects of specific types of mediated violence, such as violence-themed video games. It is important to examine the playing patterns associated with these games in this context, but we also need to understand as much as possible about the family setting and neighbourhood environment in which the children have been raised, their performance at school, the kinds of people with whom they interact, and also their personalities, which are, in part, determined by their inherited genetic codes. We need to know about the breadth of their social histories, such as their past activities, interests and hobbies,

and the diversity of experiences, mediated and non-mediated, that have contributed to their social learning.

As Anderson and his colleagues (2007) noted, severe forms of aggression tend to be rare, even though the public profile they can attract sometimes makes them appear otherwise. Their rarity means that a combination of conditions must be present to trigger them. These conditions comprise a range of social situational factors related to aggressive events and their triggers, and the personal characteristics of perpetrators may also have placed them at greater risk for reacting aggressively given the social situational conditions that arose at the time of their severe aggressive outbursts. Among a range of potential contributory factors, we can then consider the perpetrator's media entertainment experiences and the part that these experiences might have played in the broader mix of social and psychological ingredients that catalysed the aggression.

The complexity of the genesis of interpersonal aggression can be such that the same arrangement of environment factors could give rise to quite different behavioural responses across different individuals. In such instances, we need to examine the personal characteristics of individuals that determine whether they will respond emotionally or behavioural in aggressive or nonaggressive ways to specific social situations. We also need to consider differences in the way their cognitive networks and behavioural repertoires are constructed and have previously been primed. In this context, an accurate historical account of the individual's experiences with violence, including violent entertainment, could further contribute to our understanding of that person's unique aggressive response. If similar forms of aggressive responding to specific social settings recur across individuals who also display similar histories of consuming violent entertainment, then we might conclude that such mediated violent experiences might have helped underpin or promote their aggression (Anderson & Huesmann, 2003).

The GAM, the theoretical thinking linked to it, and its associated empirical research have collectively sought to identify a range of 'risk factors'—both personal and situational—that include fixed characteristics of individuals and social settings, as well as transient personal and social states, that could create conditions under which specific or generic aggressive responses are enhanced.

Anderson and his colleagues (2007) also employ a developmental perspective on the effects of mediated violence on human aggression. The aggressive potential of children can change over time as they grow

up and mature, and it is dependent not just on their genetic codes but also their life experiences. These experiences can be narrow or broad. They may also teach children how to select from a range of behavioural options when confronted by challenging, frustrating or threatening situations. Life events can also influence the degree to which children are taught and effectively internalise impulse control. A child's developmental history will therefore determine how much contact he or she has with violence, and it will be characterised by differing opportunities and levels of encouragement or discouragement to behave aggressively. Thus, some children will be more at risk than others for displaying aggression because of their distinctive developmental histories.

An interesting and possibly critical aspect of this developmental orientation is the concept of cumulative risk (Masten, 2001). Over time, some youngsters may be exposed to a range of factors that encourage aggression, and the effects of these different experiences can aggregate to create an individual with a strong aggressive disposition. Such a person will display a readiness to use aggression under conditions in which most other people would choose a different kind of (non-aggressive) behavioural response. Most children may encounter specific risk factors in the form of experiences that promote the use of aggression. They will also encounter as many, if not more, settings in which aggression is discouraged and punished when it does occur. But, for those children whose early life experiences were littered with examples of aggression, through which they internalised many aggressive behavioural scripts, there could be a cumulative effect that results in an individual who is prone to behave violently (Belsky & Fearon, 2002).

Many risk factors are linked to an individual's early family background and the nature of the neighbourhood in which that person spent his or her early life. Children from poorer households, broken families and neighbourhoods in which crime and violence are rife are exposed to multiple risk factors that can promote the development of aggressive behavioural thoughts and scripts. Even then, not all children respond to these conditions in the same way, and some will display greater resilience than others when faced with the negative social and psychological effects of living under these conditions (Masten et al., 1999). Even under the most trying of environmental circumstances, the child might be able to cling and respond to a source of positive influence. For children whose personalities provide them with a cognitive and emotional apparatus to develop positive and prosocial, rather negative and antisocial, thoughts and to control

their emotional impulses, a resilience to deprived social circumstances can be conditioned, enabling them to mature in a socially and psychologically healthy fashion (Masten & Reed, 2002)

This discussion of why developmental factors can shape the character of young people is important in the context of any analysis of the effects of media violence, because commentaries about the vulnerability of 'childhood' articulate an oversimplified representation of children who can, as individuals, vary widely in their idiosyncratic vulnerabilities. Those children who develop immunities to real-world pressures to misbehave have internalised different behavioural script repertoires than those used by youngsters who fail to develop the same kind of psychological resilience (Rutter, 2003). These two kinds of children are, therefore, also likely to display varying reactions to mediated portrayals of violence.

If children are exposed to risk factors early in their lives, when their behavioural repertoires are very malleable and under development, they are placed at greater risk for developing into individuals with antisocial tendencies later in life (Dodge & Petit, 2003). Each child will likely be exposed to a variety of risk factors ('Risk' refers to a condition that both encourages the individual to choose aggression as acceptable behaviour and frequently provides opportunities to make that choice). Children's varying behavioural experiences with violence will result in different levels of cognitive aggression priming, distinctive mental orientations toward aggression, and different kinds of emotional adaptation to violence in its various forms, as well as the harm that violence can cause.

As a consequence of their developmental histories, a continuum of risk for aggression will emerge, with some children displaying wholly non-aggressive behaviour, impulse control and respect for others, and other children being likely to engage in the most extreme acts of aggression, with little or no concern for the disruption or harm those actions cause. Many children will be positioned somewhere in between these two extremes, however, varying between thinking but not acting on aggressive thoughts and occasionally being verbal or physically aggressive (Gentile & Sesma, 2003).

A further developmental aspect of the GAM recognises that children proceed through a number of stages of cognitive, emotional and social development. In their very early years, they depend on a primary caregiver, usually their biological parents. During this stage, it is important that firm bonds develop between parent and child and that these bonds continue and change in appropriate ways as the child grows older and becomes

more cognitively and behavioural competent and independent. In the earliest stages of child development, children depend on their caregiver for physical help and support. But, as they mature physically, this bond must transform to enable the child to develop his or her behavioural skills, while learning to recognise that their needs and viewpoints are not the only ones that exist or that are important. Hence, emotional and behavioural control must be internalised, and the child must be taught to realise that, if he or she fails to acknowledge the rights of others or to comply with external rules, there will be penalties imposed.

As the child increasingly engages with other people, initially other children in their own age group, these rules are further enforced by other adults in positions of authority (e.g., teachers), as well as by the way their immediate social network (i.e., their friends and peers) respond to their actions. Media experiences are mixed in with these social influences. In particular audio-visual media that provide visual enactments of behavioural scenarios can feed children's ideas about how to behave in different settings. Yet, the influences of mediated experiences must be set alongside children's real world experiences with family, friends and other people with whom they interact. In its acknowledgement of the broader range of social-developmental factors that shape a child's psyche, the GAM presents itself as a particularly powerful model of analysis of the effects of media violence (Anderson et al., 2007).

The Catalyst Model

An alternative theoretical position to the GAM is provided by the catalyst model (Ferguson et al., 2008). This model places emphasis on the biological attributes of the individual and the motivations that drive his or her behaviour, coupled with environmental factors that can include the individual's media experiences, but with additional emphasis on family and peer group influences. The genetic and biological make-up of the individual is believed to play a major part in establishing whether or not that person is prone to developing aggressiveness or not. The individual's family experiences in early life and his or her later social experiences with peer groups provide further incentives for or restraints on aggressiveness. In addition, the stresses and challenges presented by different environmental conditions provide further reasons for the developing individual to display aggression.

The catalyst model also allows for behavioural influences resulting from media experiences. For instance, an individual with a disposition to behave violently may be drawn to violent media content as a source of ideas

concerning how and when their urges can be enacted. In the case of interactive media such as video games, the style of aggressive play in violence-themed games might take its lead from how the individual might behave in the real world. Although such mediated experiences might shape the style of violence that an aggression-prone individual might display, they do not function as motives to behave aggressively in the first place. The catalyst model therefore does not reject the hypothesis that mediated violence can influence aspects of the display of aggression in an individual's regular life, but it does recognise that any observed statistical relationship between personal aggressiveness and consuming media violence could reveal a tendency for selective media use as much as showing an effect of media violence.

The GAM represents an improvement on previous theories by integrating many different potential causal and moderating factors in the search of an explanatory framework for media violence effects. Some critics have argued that it places excessive emphasis on cognitive factors, however, and it does not give sufficient credit to the personality characteristics of individuals, which are largely genetically determined. In addition, although it is reasonable to hypothesize that people can absorb behavioural scripts concerning aggression from their media violence experiences, it is equally true that non-violent scripts can also be learned. This then raises the question of whether, to what extent, and under what conditions prosocial schemata might counter antisocial schemata in shaping broader ideas about the most appropriate and effective ways to behave in different social settings. The downplaying of personality factors has led some critics to claim that the GAM is little more than an enhanced script theory of human behaviour (Ferguson & Dyck, 2012).

What Does Theory Tell Us?

With the spread of video games, it is understandable that societies might ask questions about potential spin-off effects and influences of this type of leisure-time activity on those who indulge in it. Such questions might be particularly pertinent in the case of players who spend large amounts of their spare time playing these games. Even more concern might then be reserved for those who play these games all the time and not just in their spare time. Apart from possibly gaining weight through lack of exercise, ignoring or withdrawing from family and friends, and failing to attend class or work, what are the risks?

The amount of time spent playing these games is specific to the individual player. If playing these games does more than preoccupy their time

to an unhealthy degree and influences even those players who control how much time they play, what kinds of consequences are we talking about? The concern about video game violence, which is an extension of a longer-running public debate about violence in other media, focuses on the possibility that specific psychological changes could occur in players as a result of their repeated exposure to mediated violent experiences. All players might potentially, in theory at least, be susceptible to certain kinds of psychological effects linked to content experiences, and not just those who play for 8 hours or more per day.

As the literature examined in this chapter shows, psychologists and other social scientists and health scientists who have worked on this subject have identified a variety of possible effects, and they have provided explanations of how these effects might work. Violence in video games might normalise violence in society and make it seem more acceptable. This kind of effect might be expected to occur primarily among those who play the games a lot. In addition, the intensity of the effects depends on video game players recognising some relevance of their playing experiences to the real world in which they live the rest of their lives. Violent video games might trigger violent impulses in players by getting them excited through violence, or the games might teach them forms of violence that they might copy in their own lives. Some theorists have also argued that, perhaps most importantly, players can internalise the stories that video games tell about violence, committing them to memory and then retrieving them at appropriate moments to guide their own conduct under different social conditions.

Theories are important because they attempt to provide explanations of human behaviour and how it might be influenced by specific experiences such as playing violent video games. Theories are not evidence, however. They must be investigated through the use of appropriate research techniques that generate data on relevant variables, such as exposure to video games and subsequent post-playing thoughts, feelings and behaviour. Research methods vary as much as research theories. The next few chapters will examine different kinds of research evidence in order to assess whether certain explanations of violent video game playing can be proven. At the same time, any evidence that is presented must be closely assessed to determine whether it can be accepted as valid and relevant to the issue being investigated.

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Is There a Link Between Playing Video Games and Social Violence?

There is ample evidence that many of the most popular video games contain violence, and that these games are played extensively around the world. Furthermore, some players engage with these games on a regular basis, and game playing can occupy a substantial proportion of their waking hours. As we saw in the previous chapter, there are a number of theoretical reasons to believe that violent video games could exert a range of specific influences on players in terms of their propensities to become aggressively aroused or primed to respond in an aggressive manner; and that this might also teach longer-term lessons, which might encourage people, who play these games a lot, to internalise socially violent behavioural scripts, or justifications, for using violence, while also becoming less concerned about its consequences for others or self.

The question of whether video game violence can, and does, *cause* players to become more aggressive in their regular lives is one we will return to in the next chapter. The further question as to whether video game violence can affect real social aggressions and levels of crime, delinquency and other antisocial conduct in societies will be discussed in Chap. 6. As we will see, evidence that precisely plots how playing violence-themed video games serves as an agent of causality, contributing to wider social problems, is unclear (Ferguson, 2009; 2010; Ferguson & Garza, 2011; Ferguson, Gurza, Jerabeck, Ramos & Galindo, 2013; Sherry, 2007; Ward, 2011). There are many factors that come into play to influence the occurrence of social violence in people's everyday lives. Attributing shifting

crime and delinquency trends to a single causal agent, such as playing violent video games, can, therefore, prove very tricky.

Before examining the questions on causality and the effects of real social violence , it is relevant to ask whether there are associations between playing these games and the behavioural tendencies of players, which might lead us to acknowledge the possibility that such causal connections could exist. Finding that there is a statistical *association* between the amount of violent video game playing in which a person indulges, and their propensity to display aggression in their regular lives does not, by itself, prove that these two variables are causally connected. It certainly does not, by itself, prove that playing violent video games makes a player a more aggressive person (Ferguson & Savage, 2012). It nevertheless opens up the possibility that such a link might exist (Barlett, Anderson, & Swing, 2009). This link then needs to be explored in a more controlled and systematic way, in order to establish its veracity.

Survey studies can be broadly divided into cross-sectional and longitudinal. The former entails collecting data through self-completion questionnaires, or structured interviews from large samples of respondents at one point in time. The latter collects data, using the same methods, on more than one occasion. Longitudinal studies have the added benefit of enabling researchers to track changes in respondents' social behaviours over time, and to adopt a developmental perspective during their search for explanations of evolving behaviours, in relation to other variables on which information has been collected. In looking at possible relationships between playing violent video games and the onset of aggressiveness in individuals, longitudinal studies can find out whether early video game playing habits are related to later developments of specific social behaviour patterns, and also whether earlier established social behaviour patterns are related to later video game playing preferences.

There are two important concerns about survey research and the effects of video game violence. These concerns are related to the methods of measurement of the two key variables: video game playing habits and social aggressiveness. Measures of violent video game playing tend to depend on respondents' self-reports on how often they play video games (utilising a pre-determined frequency scale devised by the researchers), or on how much time they devote to playing these games (usually over a specified time period, such as the 'average week' or the 'past month'). They also depend on short lists provided by the respondents of their favourite video games. These favourites are then classified as 'violent' or 'non-violent' either by the researchers, experts, players (other than those surveyed), or

by content analysis, which formally counts up the amount of violence in the video games.

In the burgeoning research literature on the effects of violent video games, which has appeared in the twenty-first century, the most commonly used measure of violent video game exposure is a method adopted by Anderson and Dill (2000) which utilises frequency scores multiplied by violence ratings for the five favourite video games named by survey respondents. Despite its popularity, this violent video game exposure measure has been critiqued as problematic in terms of its likely accuracy (Ferguson & Savage, 2012; Fikkers, Valkenburg, & Vossen, 2012). More will be said on this, in Chapter 7.

The other key variable is 'aggression'. Over the years, researchers studying the effects of media violence have presented many different definitions of aggression, and have used a multitude of methods to measure it. Whereas experimental studies have been able to adopt specific measures designed to represent aggressive behaviour, without actually allowing participants to perform harmful actions, surveys have had to rely on the respondents' self-reports, or the reports of other people (such as parents or teachers, who are believed to know the respondent well), on how they might actually behave, or do behave, in specific social settings. Researchers have developed standardised scales to support this type of measurement. Otherwise, they are dependent on self reports, or reports made by others, on the frequency of certain verbally described aggressive behaviours that a specific respondent performs. Critics have challenged the validity and veracity of these measures, especially when they are not validated against actual observations of real aggressive behaviour (Ferguson, 2009; Ferguson & Rueda, 2009; Fikkers et al., 2012; Ferguson, San Miguel, Garza & Jerabeck, 2012).

Some research, therefore, has explored whether people who play video games can recognise for themselves that they have been affected by these games. Children who have played video games with violent themes seem able to sense that these games can make them feel more aggressive (Konijn, Bijvank & Bushman, 2007; Ballard, Visser & Jocoy, 2012). In one study, young players were found to believe that they had behaved more aggressively after playing violent video games (Fling et al., 1992).

In a survey carried out with video game-playing teenagers in Britain, respondents were asked whether they believed that playing games with violent themes could make them more aggressive. It emerged that these teens believed this could, and did happen, to them. Further, the more often they played video games, the more likely these adolescents were to

believe they were encouraged to act more aggressively in their own lives (Griffiths & Hunt, 1993). With any evidence of this kind, of course, we must ask further questions about what such an opinion really reveals to us, if anything, about the effects of playing violence-themed video games. We are invited to take at face value the teenagers' self-reports about how these games make them feel, even though these kinds of judgements might not always be accurate or given honestly. Moreover, even if kids who play more video games do display more aggression in their social interactions, the direction of any causality between these variables is not demonstrated by this data.

Other research has asked people to report on the frequency of their video game playing and the types of games they play, and then to separately report on their attitudes toward aggression and their own propensities to use aggression in different social settings. In this last context, some researchers have utilised previously developed, and clinically tested, instruments designed to measure human hostility levels. Despite the suggestion above that the Violent Video Game Exposure measure might lack accuracy, it has been widely used, usually to indicate for specific samples of teenager or young adult samples; and a number of studies have reported significant statistical associations between the amount of violent video game exposure and self-reported propensities to display physical or verbal aggression on specific occasions (Anderson & Dill, 2000; Anderson et al., 2004; Bartholow, Sestir, & Davis, 2005).

One early survey reported that there was a statistically significant association between how often teenage girls and boys claimed to play video games, whether at home or in arcades, and their propensities to react in an aggressive manner in a number of specific social situations that were described to them. Relationships were also examined between reported video game playing and television viewing preferences, and the delinquent tendencies of the teenagers. Respondents in this survey were American, and between the ages of 15 and16.

The teenagers who liked to play video games with violent themes in arcades also tended to watch more violent television programmes. This finding was true of boys and girls. Those who liked to play violence-themed video games at home also watched more television programmes that were violent in nature, but this was true only for boys. Initial zero-order correlation coefficients emerged between the reported frequencies of violent video game playing, and the different measures of personal aggressiveness and delinquency used in this study. These statistical relationships were

significantly weakened when the school performance of the respondents, and their television viewing habits, were controlled (Dominick, 1984).

In a survey of over 600 teenagers between 13–14 years of age, Lynch, Gentile, Olson, and van Brederode (2001) collected self-reported data about exposure to video games with violence, attitudes and beliefs concerning social violence, and their personal propensities to get into arguments with other children, their teachers or get involved in physical fights. Reports of playing with violence-themed video games were positively correlated with a greater propensity to get involved in physical fights, after statistically controlling for the child's gender, his or her usual background hostility level and his or her overall frequency of playing video games. One factor that seemed to be able to offset this effect was parental involvement in the child's video game playing, which researchers have claimed might act as a protective factor.

Further research evidence has been produced in North America, which initially suggested a link between video game playing habits and the aggressiveness, or delinquent tendencies, of young people. With some of this evidence, however, closer inspection revealed that the association was not always simple and straightforward, and might even be questionable. A Canadian study of children between the ages of 12–14 found that those who went to arcades a lot to play video games also disclosed a more pronounced propensity toward delinquency. What was less clear from this study was whether the children's involvement with video games could legitimately be identified as a potential causal agent in any antisocial behaviour that they displayed. Further analysis, in this case, revealed that those youngsters who went to arcades a lot also tended to stay out later at night. Staying out later was, in turn, related to the likelihood they would get into trouble (Ellis, 1984). In another survey, the video game playing of boys, between 11–16 years of age, was found to be linked to their attitudes toward war (Rushbrook, 1986).

It is not just players themselves who admit to being affected by playing violent video games. Others who know them well have been found to make similar observations. Thus, school teachers, commenting on the behaviour of 10–12 year-olds in their care, have noted that regular video game players displayed greater impulsivity in class (Linn & Lepper, 1987).

Before we get too carried away with the alleged negative effects of playing video games, it is important to note that not all the scientific evidence is negative. Some researchers have reported no statistical relationship between children's reported video game playing and the psychological measures of their proneness toward hostility (Gibb, Bailey, Lambirth, & Wilson, 1983).

Some researchers have even reported that playing video games could have a calming effect on teenagers (Kestenbaum & Weinstein, 1985).

Gentile, Lynch, Linder and Walsh (2004) surveyed 600 children, between the ages of 13–14, about their violent video game exposure, trait hostility, parental control over their video game use, grades at school, arguments with teachers and their propensity to get into fights in the past year. Trait hostility was related to the self-reported frequency of exposure to violent video games, and their liking of violence in video games. Children who self-rated as being more prone toward hostility clearly had a taste for violent video games. In addition, those youngsters who reportedly played violent video games more often were also more likely to get into fights with others and arguments with their teachers.

What was less clear from these findings was whether more hostile children got this way because they also played violent video games more often, or whether their pre-existing hostile tendencies drove them toward greater levels of consumption of these games. Any direction of causality could not be disentangled with the data produced by this study. However, one indicative finding that flowed from further analysis of the data was that, among the children rated as lowest in personal hostility, the ones that played violent video games the most were more likely to report having been involved in physical fights in the previous year than those children rated as high hostile, who exhibited low levels of violent video game exposure. Therefore, this result indicates that playing violent video games might represent a risk factor for future aggression that is independent of a child's general disposition toward hostility, and may be conditioned by other social and environmental factors.

Not all survey research of this type has produced clear-cut evidence of associations between reported violent video game playing and the aggressiveness, or antisocial dispositions, of players. Several studies failed to find a significant statistical relationship between the Violent Video Game Exposure measure and trait aggression, measured with psychologically tested instruments (Ferguson et al., 2008; Ferguson & Rueda, 2009; Ferguson, San Miguel, & Hartley, 2009; Puri & Pugliese, 2012). Other researchers failed to find relationships between self-reports of violent video game exposure and more general reported tendencies toward the display of delinquent, or violent, social behaviour (Ferguson, 2011; Gunter & Daly, 2012; Von Salisch, Vogelgesang, Kristen, & Oppl, 2011).

Ferguson et al. (2009) recruited more than 600 Hispanic youngsters, between the ages of 10 and 14, from South Texas and administered a

battery of questionnaires and psychological tests that were designed to measure their experience of negative life events; their family environment; symptoms of depression; exposure to media violence (including video game violence); self-reports, parental reports and teacher reports of aggressiveness; and their propensity to display bullying behaviour and delinquent behaviour. Multivariate statistical tests revealed that personal aggression, bullying and delinquency were closely interrelated. The appearance of high scores on one of these dimensions was associated with high scores on the others. Other factors, such as depression, poor relations with members of their own family, and the presence of psychological abuse in their families, also exhibited statistically significant relationships toward measures of aggressiveness. Self-reported exposure to violent video games was only significantly related to the measure of bullying, and not to any of the other measures of youth social violence.

Zhen, Xie, Zhang, Wang and Li (2011) studied how playing violently themed video games in China affected adolescents' orientation toward aggression. Nearly 800 participants were recruited, at 10, 13 and 16 years-old, and provided data about their violent video game playing habits, beliefs about aggression, expectations about being hostile and empathy towards others. There were positive paths from the amount of violent video game playing to having a stronger acceptance of the use of violence, although having stronger empathy could temper this relationship, especially among girls. In this study, the relationship between playing violent video games and personal aggressiveness was also stronger among younger, rather than older, participants. This could indicate that, as a developmental process, the potentially harmful effects of playing violent video games might be weakened as other social constraints on displaying, and accepting, violence become more powerful.

Prospective Studies

Longitudinal studies of media violence have generally been fairly rare because they tend to need substantial resources to fund them, and a long-term commitment from the researchers and participants. The advantage of longitudinal studies is that they enable researchers to examine two distinct hypotheses. There is the usual hypothesis of interest that initial exposure to media violence leads to the subsequent development of aggressiveness. The alternative hypothesis is that pre-existing aggressiveness promotes stronger taste for mediated violence.

The first of these hypotheses promulgates the idea that experiences of media violence have a socialisation effect on its consumers, teaching them about social aggression, demonstrating how and when it can be used, reducing adverse emotional reactions to violence that might provide a disincentive to use it, and conditioning a sense of normality about it. The second hypothesis posits that aggression in the individual is conditioned through a range of social experiences, most of which have nothing to do with media. Individuals, therefore, vary in their predispositions to engage in aggression, and those who use and feel comfortable with it tend to also seek it out in the entertainment they enjoy. Hence, any statistical relationship, found between the exposure to media violence and the personal aggressiveness of an individual, can be explained in terms of a selection bias, whereby aggressive people like to watch, and deliberately seek out, violence-themed entertainment.

Research evidence derived from studies of televised violence has produced mixed results for both hypotheses. Most studies of this type have concluded that an early history of exposure to televised violence can lead to stronger propensities to display aggression throughout childhood and adolescence, and even into early adulthood (Eron & Huesmann, 1984; Eron, Lefkowitz, Huesmann, & Walder, 1972; Huesmann, 1984; Huesmann & Eron, 1986a, 1986b; Huesmann, Lagerspetz, & Eron, 1984; Huesmann & Miller, 1994; Huesmann, Moise-Tutus, Podolski, & Eron, 2003; Lagerspetz & Viermero, 1986; Lefkowitz, Eron, Walder, & Huesmann, 1977).

Some longitudinal research found no evidence that children's early exposure to televised violence was related to later levels of personal aggressiveness (Milavsky, Stipp, Kessler, & Rubens, 1982). Although in the latter instance, some scholars critiqued the same data and found that some links did exist between exposure to televised violence and personal aggression (Cook, Kendziersky, & Thomas, 1983).

Further evidence has emerged to support the selection hypothesis. Atkin, Greenberg, Korzenny and McDermott (1979) conducted a panel study with American children over a 12-month period and found that those youngsters who initially displayed the strongest attitudes toward aggression, also displayed greater preferences for watching television programmes with violence later on. Yet, there exited no relationship between earlier viewing of violent programmes and later aggressiveness. A few studies of this sort have been carried out to examine the effects of violent video games. Much of this evidence has supported a socialisation of aggression

position as a result of extensive violent video game playing. There have also been some dissenters from this conclusion.

Slater, Henry, Swaim and Anderson (2003) collected data from adolescents between the ages of 13–14 on four occasions over two years on their physical aggression and exposure to media violence. 'Media violence' in this instance was comprised of exposure to violent video games, films and web sites. Slater and colleagues found that earlier exposure to media violence was significantly related to later physical aggressiveness, and also that earlier physical aggressiveness predicted later consumption of media violence. When they aggregated the early scores on trait aggressiveness with media violence consumption, only the path from media violence consumption to later aggressiveness remained significant. They put forward a 'downward spiral' concept to explain this outcome. They believed that trait aggression predicted a preference for media violence at one point in time, but that media violence could predict aggressiveness at the same time, and at a later time. The missing element from this study, which dilutes its value to the current discussion, is that the researchers failed to separate out video game violence exposure from exposure to other types of mediated violence.

Prospective Research with Violent Video Games

Longitudinal studies have been used to investigate the potential influences of playing violent video games on players' aggressiveness at cognitive, affective and behavioural levels. These studies adopted similar basic designs to those that have investigated the influences of televised violence on viewers.

A number of longitudinal studies were reported by Craig Anderson and his colleagues that derive from children and adolescent samples in the United States and Japan. Anderson, Gentile and Buckley (2007) discussed a study of American 8–11 year-olds based on self-reported measures of violent video game play as well as peer and teacher ratings of the target children's propensities to display verbal and physical aggression of different forms. This was also supplemented with the children's own reports of how many squabbles and fights they had gotten into recently. Those participants that reported greater amounts of violent video game playing in the early part of the year were more likely, compared with children who played with these games fairly rarely or not at all, to display greater verbal

and physical aggression when surveyed again later in the year. This result persisted even when all the children's initial aggression levels were statistically controlled.

Gentile and Bushman (2012) surveyed a sample of 430 children, between the ages of 7 and 11 years, and their teachers on two occasions separated by 6 months. The aggressiveness of the children was assessed in three ways using self-reports, peer reports and teacher ratings. The researchers eventually combined these three measures together to create a single score for aggressiveness for each child. The teachers also provided data on whether each child tended to be a target of physical victimization. The children completed a hostile attribution bias test in which they read and evaluated a series of scenarios that described incidents in which a person may have been provoked by another. The situations described in this test were designed to be familiar to the children. In each case, the child had to make judgements about the intentions of the person responsible for the action that could have caused provocation (e.g., someone spills milk on you while having lunch). Respondents could choose between benign and hostile responses.

Further measures determined the children's exposure to media violence. Each child was asked to list his or her three favourite television shows, movies and video games and say how often they watched or played it, using a pre-designed frequency scale. Their choices were assessed by the researchers for their violent content. The children also provided estimates of the total amount of time each week they spent engaged in these media activities. Finally, the children were asked how often their parents watched television with them, and discussed the content of the programmes.

In the analyses of the emergent data, the researchers began by classifying each child as high-, median- or low-risk in terms of their likelihood of being involved in aggression. These calculations were made for both times data were collected. Understandably, the probability of being engaged in aggression the second time was linked to its probability the first time. When controlling for this risk factor, a number of factors were found to predict involvement in fighting on the second survey. One factor that made a significant difference as to whether a child was at high- or low-risk of being involved in a fight on the second survey was prior involvement in fighting. Media violence exposure emerged as another powerful predictor. Other factors of significance were gender, low parental involvement in television watching and,hostile attribution bias, as well as teachers' observations of children being physically victimized.

Boys were more likely to be aggressive over time than were girls, while children whose parents accompanied them while watching television showed less personal aggression. Overall, these risk factors had an additive effect. As the number of risk factors characterising each child increased, so too did the probability that they would behave in a physically aggressive manner. The important finding here was the specific role played by media violence as a risk factor. In the context of the theme of this book, however, the measure of the exposure to media violence comprised an aggregation of self-report watching of television shows and movies as well as the playing of video games. No data were produced from this study that separated out violent video games as a distinctive risk factor.

Anderson and his colleagues reported a series of studies in a single report that derived from research conducted in Japan and the United States (Anderson et al., 2008). These studies ran for longer durations than the previous study reviewed here, and lasted anywhere between 3 and 6 months. Samples of 181 12–15 year-olds and 1,050 13–18 year-olds were surveyed in Japan, and 364 9–12 year-olds were surveyed in the United States. Different measures were used in each of these studies to measure violent video game exposure.

The American sample named their three favourite video games, and provided personal ratings of how violent they were. The younger Japanese sample stated how often they played with each of the eight video game genres. Separate content analysis data for popular video games in Japan were used to weight the games selected in terms of their violence content. In the Japanese study with a slightly older sample, the participants listed their favourite video game genre, and three other genres that they also liked, and the researchers assigned violence weightings to each genre. The claimed frequencies of playing different types of games were multiplied by subjectively- or objectively-measured violence content measures in order to produce an overall measure of the exposure to video game violence.

Measures of participant aggression also varied between these three studies. For the Japanese study with the younger sample, a pre-established, self-report inventory, designed to measure aggressive propensities, was utilised. With the older Japanese sample, a simple single-item, self-report measure of hitting or kicking someone in the last month was used. For the American sample, self-report, as well as peer and teacher ratings of the aggressiveness of each participant, was used.

The results indicated that greater amounts of video game play earlier in the school year predicted aggression levels later in that year. This finding

applied to both Japanese and American samples, and occurred regardless of the nature of the measures of personal aggression or video game violence exposure used. The relationship between video game violence and personal aggressiveness was somewhat weaker among the older Japanese sample than the younger sample, but was statistically significant in both cases. The overall weighted correlation coefficient across all samples and measures was 0.28. This indicates that if these two sets of variables were causally connected, violent video game playing would have accounted for nearly 8% of the variance in personal aggressiveness. Structural equation modelling revealed that the beta coefficients for the link between these variables was greater (0.152) for the American and younger Japanese samples than for the older Japanese sample (0.075). It is not clear whether these differences reflect developmental changes in the sensitivity toward video game content, or arise out of research design artefacts. Some critics have also called into question the validity of the aggression measures used in these studies, and whether they truly represent the actual aggressive predispositions of the research participants (Ferguson, 2011; Ferguson & Olson, 2014).

In another Japanese study, Shibuya, Sakamoto, Ihori and Yukawa (2008) studied 591, 12 year-old children. They surveyed these children on two occasions spaced 12 months apart. They also took into account the gender and type of area in which the children lived, as control variables. As in their earlier research, a pre-developed trait aggression instrument was used to measure the children's inherent aggressive tendencies. An interesting finding emerged here with boys differing from girls. It seemed that girls were unaffected in their aggressiveness by their video game playing patterns, while boys who reported heavier violent video game exposure were later found to be less aggressive than those with low exposure.

A number of studies from Europe conducted longitudinal analyses of links between violent video game play and aggressiveness in children. Hopf, Huber and Weiss (2008) studied children between the ages of 12–14 and obtained data from them at two points in time, 2 years apart. Self-reports of the amount of violent video game play during the first survey were significantly related to aggression levels measured during the second survey. This relationship remained significant even after the researchers had controlled for possible effects of attending a poor school, and having physically violent parents.

In a German study with a fairly modest recruitment sample of 295 teenagers, with an average age of 13 years, data were collected over a period of

two and a half years (Moller & Krahe, 2008). By the second wave, sample erosion had occurred and data were collected from only 143 of the original contact sample. In order to measure video game violence exposure, the first wave participants were given a list of 40 electronic games, and were asked to indicate which ones they knew about, and how often they had played with them. Other more general measures of video game play were also obtained. All the listed games had been pre-rated by adult experts for their violence content. Violence content weightings were then used, along with the teens' self-reports of game playing to establish a composite measure of violent video game exposure. By the second wave, the researchers discovered they could not simply repeat the same video game exposure measures again because the available games and favourite games of participants had changed. They introduced a new list of 15 electronic games with which participants indicated their familiarity and patronage. These games had been evaluated earlier, like before, by an expert adult panel for their violent content.

Aggression was measured using three different instruments. A normative beliefs instrument invited participants to read a vignette that described a situation in which a person with the same sex as themselves was provoked. They then had to decide how that person should respond. A hostility bias instrument again used vignettes to evaluate the situations described, either in an aggressive or nonaggressive way. These situations were ambiguous, as the idea of this measure was to find out whether participants would differ in the extent to which they chose to place hostile or non-hostile interpretations on them. This latter measure actually provided two different indicators toward identification of hostility: leading to physical harm or hostility, and leading to relationship breakdown. Finally, an established psychological inventory, which has often been used to measure personal aggressiveness, was administered. A distinction was again made between administering direct and potentially harmful aggression toward another person, and indirect aggression (such as by spreading malicious gossip about them).

During the first survey wave, the researchers found that some of the aggression measures were interrelated, and also exhibited some statistical relationships with violent video game play. The propensity to display physical aggression was predicted by holding more aggressive beliefs, displaying hostility bias in the interpretation of ambiguous vignettes and reporting violent video game playing. Looking at relationships between key variables over the two survey waves, the researchers found that reported playing

of violent video games during the first wave was significantly related to physical aggression during the second wave. The reverse relationship between physical aggression, during the first wave, and violent video game play, during the second wave, was non-significant. It also emerged that violent video game playing during the first wave was also predictive of stronger normative aggression beliefs and hostility bias during the second wave, with the former, but not the latter, measure also being predictive of physical aggression during the second wave.

A Dutch study surveyed adolescents at two points in time, 6 months apart. They found that there was a significant relationship between self-reported violent video game use during the first survey, and aggressiveness during the second survey. The reverse relationship between aggressiveness during the first survey, and use of violent video games during the second survey was not significant. The significant link between earlier violent video game playing and later aggressiveness occurred for both girls and boys even though girls generally played with video games much less than boys (Lemmens, Valkenburg, & Peter, 2011).

Further German research confirmed statistical links over time between violent video game exposure and personal aggressiveness, and also found that a growing interest in playing these games magnified the level of aggressiveness subsequently displayed. Krahe, Busching and Moller (2012) collected data from male and female German teenagers with an average age of 13 years at the start of the study. Respondents were surveyed three times over 2 years. Data were collected about patterns of video game exposure and was designed to also indicate the level of exposure to violence-themed games. Rather than ask respondents to indicate how often they played with specific, named video games, however, the researchers constructed a list of 11 video game genres, along with ten movie genres and ten television programme genres. Respondents indicated, along a five-point scale, how frequently they watched or played with each genre in each medium. Expert judgements were used to weight each genre in terms of how violent it usually tended to be. In all, six television series, seven video game genres and eight movie genres were rated as violent; and exposure levels to all these genres were aggregated to provide an overall exposure to media violence measure.

The main dependent measure of aggression was comprised of self-reports and teacher reports for each child in terms of how often they had performed specific described aggressive behaviours in the previous 6 months. Further moderator measures were taken of respondents' propensities to display empathy toward others, normative acceptance of

aggression in society, parental monitoring of media use and the quality of school they attended as assessed by their teachers.

Media violence exposure was found to be related to both self-report and teacher ratings of personal aggressiveness for both girls and boys in the sample at the time of the first survey. Media violence exposure at the time of the first survey was also significantly related to both personal aggressiveness measures at the time of the third survey, even after controlling for personal aggressiveness at the outset of the study, and other moderator variables. Use of non-violent media was not related to personal aggression.

The researchers also wanted to know whether any changes in the patterns of exposure to media violence would produce different outcomes, in terms of the development of personal aggressiveness over time. They divided their sample into those who consistently displayed low levels of exposure to media violence across all three survey waves (38% of boys and 91% of girls), those who exhibited consistently high levels of exposure (55% of boys and 8% of girls) and those who started high and then exhibited a decline in exposure (7% of boys and nearly 2% of girls). Children that exhibited stable, high level exposure of media violence (including violent video games) generally tended to also score higher on physical aggression, while scoring lower on empathy. They also attended schools with lower achievement levels and experienced higher parental attempts to restrict their media consumption. These teens also watched more non-violent media content, which indicated they consumed more media in general.

Those who started out as high level consumers of media violence, and then turned away from it over the following 2 years also watched more non-violent content, reported greater parental restrictions over their viewing, were lower on empathy and had a higher acceptance that the use of violence was socially normal. What was also notable was that teens, who turned away from media violence, also showed a progressive decline across survey waves in their propensities to use aggression in their own lives, and they came to resemble the stable, low level media violence consumers in their physical aggressiveness.

Although its researchers offered these findings as a further contribution to the literature showing that higher levels of exposure to violent video games were linked to greater physical aggressiveness, we need to treat this conclusion with caution. The main reasons for this are because video game violence exposure in this study was not separated out from reported exposure to other types of screen violence (as seen in movies and television programmes); the measures of exposure were dependent on

self-guestimates of exposure to genres comprising movies/programmes/ games with varying amounts and types of violence; and that weightings of violence in these genres were based on genre-level subjective ratings that were not validated by actual entertainment unit content analyses.

European research has also emerged and has failed to find any significant relationships between the exposure to violent video games and personal aggressiveness. In this case, German teenagers, between the ages of 12–13, were surveyed twice over a 12 month period. Not only did initial violent video game playing fail to predict aggression at the time of the second survey, but early aggressiveness did not appear to lead to a growing taste for violent video games a year later (Staude-Muller, 2011).

WHAT CAN ASSOCIATION TELL US?

In this chapter, we have begun to explore the empirical evidence about relationships between playing video games with violent content, and the subsequent psychological reactions among players. Such evidence is essential for testing various theories about how violent video games might influence the people who play them. The evidence examined so far has been derived from studies that restricted their analyses to the study of degrees of association between reports of playing video games and reports about personal thoughts, feelings and behaviour. Some of these analyses of association took place at one point in time, while others obtained relevant data from respondents at two or more points in time. Whatever the time frame, this type of research generally consisted of surveys, with large samples of individuals who completed questionnaires about their involvement with video games, and about how they might behave in specific situations. Much of the research evidence has derived from the United States, although studies from other parts of the world were also examined.

By its very nature, survey research in which reports about playing video games are correlated with measures of attitudes toward violence, or about behaving aggressively in different settings, cannot prove causal relationships between the measured variables. What this research can do is identify the possibility that a causal link might exist between specific variables. Some researchers have claimed that longitudinal studies, collecting self-reported data from respondents at more than one point in time, can yield former evidence of possible causal links between variables. For example, if the frequency of reported violent video game playing was found to correlate with a propensity to display aggression in difficult social

conditions, and this relationship was found to exist over time, it would strengthen the interpretation that these variables are causally linked.

If it transpired that claims of more frequent violent video game playing, at the time of the first survey, were statistically related to a significant degree to aggressive behaviour dispositions, at the time of the second survey, but that reported aggressiveness during the first survey exhibited no statistical relationship with self-reported frequency of violent video game playing during the second survey, it would suggest that the relationship between these two variables flows in one direction more than the other. In this case, it would suggest that violent video game playing is more likely to be the causal variable, and aggressiveness in the player is the outcome of that variable.

Even if we have evidence that indicated a one-directional relationship between two variables over time, we still cannot conclude causation. We would need to know that sufficient variables, which might be relevant to the onset of aggression or to a liking for playing violent video games, have been controlled. If they have not been controlled, these variables could provide alternative explanations of the apparent 'relationship' between violent video game playing and player aggression. In addition, we must have confidence that each of these measures is valid, that is, that it really does measure the variable it claims to measure. In surveys in which respondents are often asked to report the frequencies in which they perform certain behaviours, they may give inaccurate answers. Sometimes, these inaccuracies might be given deliberately to create a more positive impression of one's self, or they might be given accidentally because the respondent can only vaguely remember how he or she normally behaves.

The survey evidence obtained so far has yielded some evidence that playing violent video games is linked to players' dispositions toward personal aggression, but not all studies have produced consistent findings on this point. Furthermore, not all studies have been controlled to the same extent for possible influences or extraneous variables, or even controlled for the same extraneous variables. We must also be cautious about the validity of some of the key measures used in this body of literature. In giving out these warnings, the aggregation of empirical evidence here is not being totally dismissed. Nonetheless, there are sufficient question-marks over important points of methodology, and we must, therefore, take care over how these data are interpreted. In general, there is evidence to suggest that playing violent video games might have links to the aggressiveness of players, but the direction of this relationship could flow more ways than one. Moreover, more work is needed to examine

the individual differences between players, in terms of their psychological profiles, in order to determine whether some players are more at risk than others in developing antisocial behavioural symptoms as a function of the types of video game playing in their histories.

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Can Playing Video Games Really Trigger Aggression?

The question of whether video games with violent themes can trigger aggression in players has been addressed through experimental research. Experiments have generally been undertaken under controlled laboratory conditions in which the researchers determine, in advance, what the video game participants will play, and then create a number of further conditions in which each player's subsequent aggression is measured. 'Aggression' in these contexts does not usually take the form of typical aggressive behaviour. Situations are not created in which the individuals recruited for a study are given genuine opportunities to hurt, or harm, another person; although, through subtle deceptions on the part of the experimenters, they might believe they are inflicting real pain to recipients.

The studies that populate the research literature here adopt methodologies designed to test cause-effect hypotheses. The primary aim of researchers who use experiments is to demonstrate that a specific mediated violence experience can cause subsequent aggression to occur in the individuals being observed. This approach toward the investigation of video game violence derives from the behaviourist experiments of the 1960s and 1970s into film and television violence effects. These studies focused mostly on televised violence, and found that conditions could be created in the laboratory that would encourage individuals to deliver what they believed to be harmful or painful stimuli to another person. These conditions were established, in part, through the prior behaviour of the target

of the participant's aggression toward the participant designed to make the latter feel antagonistic which was designed.

Conditions hypothesized to be conducive to the promotion of participant aggression also included exposure to specific controlled media violence episodes. This basic experimental design was adapted by researchers to investigate the potential trigger effects of video game violence. The experience of television violence in the experiments of an earlier generation was replaced by video game violence. Studies of this type were initially conducted in the mid-1980s. They can be differentiated in terms of whether they were carried out with children or adults, as well as in terms of the types of responses that were measured—behavioural, emotional arousal and cognitive. Some researchers also manipulated other mediating factors, such as whether participants played competitively or cooperatively with each other. We return to this topic in Chapter 10. A further important distinction was whether the measured 'aggression' comprised specific tasks created by the researchers to represent intention to inflict harm under controlled conditions versus observations of the natural behaviour of players after video-game playing has finished. Finally, some experiments examined internal emotional and cognitive responses to violent video games that were conceived to play important roles in creating a psychological condition within the player that could enhance the likelihood of overt aggressive behaviour on their part in the future.

The remainder of this chapter will therefore review research evidence in four areas of outcome:

1. Behavioural effects based on observed interactions involving the players.
2. Behavioural effects based on analogue measures of aggression.
3. Emotional effects representing hostile feelings that were experienced internally, and detected either through physiological measures of verbalised responses.
4. Aggressive cognitions that were either consciously vocalised, or detected through projective and other psychological tests.

Behavioural Effects Based on Observed Interactions

Although analogue measures of aggression used by experimenters are not real, they have been defended as valid indicators of aggressive or hostile intent (Berkowitz & Donnerstein, 1982).

Research has been carried out with children that was inspired by the 1960s experiments designed to investigate the social learning effects of filmed and televised violence. In these studies, children were recruited to play video games, which varied in terms of whether they contained violence or not. After a controlled period of video-game playing, which lasted the same amount of time for all the child participants, the children were then taken to a different room in which they were observed, without their awareness, as they interacted with other children and/or played with toys and games. During this period of social interaction and play, the researchers code any spontaneously occurring behaviour that is aggressive in nature. The aim of this type of investigation was to find out whether children who played video games with violent themes displayed more subsequent free play aggression than did children who had previously played with non-violent video games.

In one of the first studies of this type with video games, children, aged 10, were assigned at random to conditions in which they played with video games with violent or non-violent themes (Cooper & Mackie, 1986). In another feature, some of the children played with video games, while others simply watched. Here, the researchers wanted to find out whether playing or just watching others play with video games made a subsequent difference in how the children behaved. As it turned out, whether a child played or just watched another child playing with a video game made little difference to the observed outcomes. The type of video game being played or viewed, however, did make a difference. The outcomes were comprised of the children's play behaviour later on, when they were placed in a room full of toys.

Perhaps the most surprising finding was that the hypothesized outcome, that playing violently themed video games would enhance the level of aggressiveness in children's subsequent play behaviour, occurred mostly for girls rather than boys. Girls who had played a violent video game, or watched another child playing a game of this type, later displayed a higher level of play activity and more aggressiveness in their interactions, and chose to play more with toys that invited aggressiveness in play. Although boys generally preferred to play with aggressive toys more so than did girls, this preference was not further motivated by playing with, or watching, violent video games. The researchers speculated that by engaging with violent video games—something that was less usual for girls than boys—they may have subsequently felt a greater sense of release from their normal styles of play.

In a follow-up study that was similar in nature, Schutte, Malouff, Post-Gordon and Rodasta (1988) randomly assigned boys and girls between 5 and 7 years of age to play with video games, either with or without violent themes. Afterwards the children were observed in a playroom in which they could interact with different kinds of toys. In the violent game (Karateka), players controlled an on-screen protagonist in a narrative that involved saving a damsel in distress from villainous characters by fighting and defeating them. In fight scenes, the protagonist had to hit other characters more than they hit him or her in order to survive. In the non-violent game (Jungle Hunt), the on-screen character controlled by the player had to jump from one virtual vine to the next while swinging through the jungle, and the challenge was to survive to the end without falling off a vine.

Subsequent observations of the children at play revealed that those who had played with the violence-themed video games were more likely to play aggressively than were those who played with the non-violent video game. This effect was not gender specific on this occasion. Both boys and girls displayed a tendency to be more active in an aggressive fashion if they had previously engaged with a video game that contained violence. Furthermore, the type of violence depicted in the video game appeared to shape, to some extent, the styles of aggression displayed by the children at play. Indeed, there was also some non-aggressive behavioural modelling evidence among the children who played the non-violent game. Subsequently, the latter were more likely to play with a jungle swing game in the playroom.

In a further investigation from the mid-1980s, pre-teenage children were assigned randomly to either watch a cartoon (*Roadrunner*) that contained violence, or to play with a video game, called *Invaders* that also had violent elements in it. The children were observed in free play afterwards, and their behaviour was coded by the researchers for its manifestations of physical or verbal aggression toward another child, or an object in the room. The children's behaviour was also coded for the display of fantasy story-telling to each other, and positive and constructive interpersonal behaviours.

The researchers believed that social learning theory could explain the effects of the violent cartoon, in that some of the behaviours they observed among the children at play resembled ones seen in the cartoon. The animated characters also possessed 'human' qualities that may have invited children to identify more with their behaviours. With the video game, the events that appeared on the screen and those that were controlled by the player were far more abstract in nature, and it was believed that any effects

on subsequent play behaviour were underpinned more by general arousal than by social learning (Silvern & Williamson, 1987).

In a different orientation of media intervention by researchers, Robinson and his co-workers (2001) asked a sample of children, with an average age of 9, to reduce their use of television and video games over a period of several months. A series of pre-intervention and post-intervention measures of aggression were taken to assess whether the experimental group differed from the control group of same-aged children, who were not asked to change their media habits or make any change in the nature of their naturally occurring social behaviour over time. The measures devised by the researchers included peer ratings of each participating child's verbal and physical aggressiveness at school, parental ratings of their child's aggressiveness, and independent observations of the children's play behaviour on the playground.

Over time, the researchers found that significant changes in aggressive behaviour occurred only for children in the reduced media use group, but only in respect to peer ratings of aggression. The other aggression measures indicated no behavioural change. It is also important to note that requests to change video game habits represented a part of broader media-related behaviour changes, and that this data does not allow us to separate out potential effects of reduced play with violence-themed video games. These limitations, therefore, make it difficult to draw any compelling conclusions about the possible role violent video games might play in the aggression of children (Goldstein, 2005).

Behavioural Effects Using Analogue Measures

Studies interested in the potential social learning and aggression instigation effects of mediated violence have adopted experiments in which 'aggressive' behaviour is carefully controlled by researchers so that participants do not actually deliver harm to another person, even though they are led to believe that they have.

Research among university students found that their propensity to display hostility in different social settings was positively correlated with playing video games with violent themes (Anderson & Ford, 1987). The researchers conducted an initial experiment in which sub-groups of undergraduate students were assigned to play with 11 video games, which they then rated on a series of evaluative scales. This exercise was designed to differentiate between video games in terms of their violence content.

In a second experiment, another sample of students was assigned with three conditions: to play a highly aggressive video game, a mildly aggressive video game or no video game. After playing their assigned video game each participant completed the Multiple Affect Adjective Checklist, which was designed to measure their mood state at that moment. This instrument was used in this study to measure any levels of hostility, anxiety or depression that the individual may have been experiencing at that time.

Playing with aggressive video games produced higher hostility scores than playing no video game. The amount of hostility reported was found to depend, to a small degree, on the level of aggression in the video game, with the more aggressive games producing slightly higher hostility scores. Playing a highly aggressive (but not mildly aggressive) video game triggered stronger anxiety responses than no video game play. Depression scores showed no easily interpretable findings. The authors concluded that playing video games with violent themes can influence a player's emotional state, and has the potential, in the short-term at least, to trigger hostile feelings.

Mehrabian and Wixen (1986) replicated this finding. They invited their participants to play with a number of arcade video games with violent themes, and to register their feelings and their general mood state about these games after they had finished playing. Playing these games in an arcade setting resulted in the most dominant post-play feelings, taking the form of anger and hostility. In a follow-up study, players that reported the greatest feelings of pleasure during game play also exhibited enhanced preference for playing games of this type. The research indicated that if players are pleasantly aroused by video games that also contain violence, they can become more accepting of violent themes in these games. One approach in countering such effects is to ensure that there are equally arousing and pleasing games available with non-violent themes.

Anderson and Morrow (1995) looked at the mediating influences of the nature of game play. Some video games invoke competitive urges in players, while others are built on cooperation. When players engage with games with violent themes, can the reactions they have be influenced by whether they are playing in a competitive or cooperative mode? These authors were influenced by competition theory, which posits that most people regard competitive situations as being inherently more aggressive in nature (Deutsch, 1993). It was therefore relevant to ask whether this perception extended to video-game play styles. Anderson and Morrow found that by introducing a competitive element to video-game play in a

controlled experiment, they were able to trigger more aggressive video-game play among young adult players. Those players, placed in a competitive play mode, 'killed' more characters on screen than did those placed in a cooperative play mode.

In an earlier discussion of the general aggression model (GAM), we examined the importance of developmental changes that can occur across childhood, and the possibility that a child's unique socialisation experiences could render them more resilient, and able to resist temptations to act openly upon any hostile impulses that might be motivated by specific behavioural episodes in which they take part. The fact that young children display an enhanced tendency to act aggressively at play with other children after playing with violence-themed video games does not mean that this type of behavioural effect will persist into their later years.

Under the GAM, aggression that follows violent video-game play could take a similar form to that witnessed in the game, or might take on a quite different form. The precise form that subsequent aggression takes might depend upon the game experience, or the nature of the subsequent setting in which players find themselves and their general state of mind at that time.

Aggressiveness in laboratory settings has either adopted verbal scales to measure hostility levels of participants or created so-called 'analogues' of aggression. These are measurement devices that invite participants to perform a simplistic behaviour, perhaps involving the pressing of buttons or pulling on a lever, to deliver stimuli, defined as either pleasant or unpleasant to other individuals. Often these other individuals are not seen, although in some studies they are. In reality, no severe stimulus is actually delivered, but the experimental participant is led to believe that it is.

In early media violence research conducted under laboratory conditions, participants' behavioural aggressiveness was measured via a device that allegedly enabled them to deliver electric shocks to another person. This behaviour was generally performed within the context of a learning task with electric shocks being delivered as penalties for mistakes on the part of the other person. The participant could determine the magnitude and length of the shocks and by implication the severity of pain inflicted upon the target person. In fact, often there was no other person and even when there was, no actual electric shocks were delivered even though the participant was made to believe that they were.

In a new twist to this scenario, much research on video games have adopted a new task called the Competitive Reaction Time Task (CRTT),

which was developed by Taylor (1967). In this task, the experimental participants play out a number of trials with another person who is unseen, which involves recognising words correctly, or performing an arithmetic test. Mistakes are punished, not by electric shocks, but by the delivery of a powerful blast of noise. In the case of the participant, this is delivered over headphones they wear while performing the task. In a role reversal, the participant plays the part of the learner, and then later on of the tester. The key measure is the strength and duration of the noise blasts that the participant chooses to deliver to the other person each time they make a mistake. Comparisons on this measure of 'aggression' are made between participants who vary in their trait aggressiveness, and who played either a violent or non-violent video game before testing the other person.

With the CRTT, a decision must be made by the researcher about when a specific response represents 'aggression'. While participants in different experimental groups might display differences in the average noise blast intensities that they choose to deliver, when does such a noise blast reach a threshold that can be deemed unpleasant or harmful? The experimenter can hint to the participant the level at which the noise blast becomes distinctly unpleasant if one is on the receiving end of it. What happens, though, if different researchers set different thresholds in this context? How comparable are the findings of different studies then?

Anderson and Dill (2000) constructed a series of studies with American college students and adopted a number of verbal and non-verbal behavioural measures of aggression. The key measure of aggression used here was comprised of the delivery of an unpleasant blast of noise by the participant to another person. The application of this noise blast was contingent upon performance in a reaction time task in which the participant competed with another unseen opponent. If the participant won a specific trial, or task, they could press a button to deliver the noise to their opponent as a punishment. If they lost a trial, they would receive a blast of noise themselves, thus giving them a sense of the nature of the punishment that they could deliver to the fictional other person. They could also choose to select a higher intensity of noise than the one they received, and they could choose the duration of the noise delivery time. In these ways, the intensity of their personal aggressiveness at that time could be assessed in specific quantitative terms.

The key manipulation was the nature of a video game that they were given to play with before the reaction time task. Each participant took part in three, 15-minute video-game playing sessions. They were assigned

to play with either a violence-themed game or a non-violent game. Participants that had played with the violent video game delivered longer, but not significantly stronger, noise blasts to their opponent than did those playing the non-violent game.

Critics of the CRTT have made much of the lack of standardization of the CRTT across the studies that have used it (Breuer, Elson, Mohseni, & Scharkow, 2012; Elson & Ferguson, 2013; Ferguson & Rueda, 2009). Questions have also been raised about the validity of the CRTT in light of findings, which show no significant statistical relationship between this measure and self-reports of use of violence by test subjects in their own lives (Krahe et al., 2011).

Another dependent measure of aggression used in laboratory experiments is the hot sauce paradigm. In this test, the participant is invited to prepare a hot sauce for another fictional person to consume, and can decide on the amount of chili they wish to add (Lieberman, Solomon, Greenberg, & McGregor, 1999). The principle here is that making the sauce very hot is a form of hostility. Some studies of the effects of video game violence have used this measure, and reported that participants who played a violent video game tended to make their sauces hotter than did those who played a non-violent video game (Barlett, Anderson et al., 2009; Fischer, Kastenmuller, & Greitemeyer, 2010). Some dispute has arisen about whether this effect represents a response to the violence in video games, or is an outcome of the competitive scenario that exists in many of these experiments. Being placed in a competitive situation can make some individuals more aroused, and also more ready to display aggression (Adachi & Willoughby, 2011). A more fundamental question is whether the hot sauce test is a valid measure of aggression (Ritter & Eslea, 2005).

Other studies have used other aggression analogues, such as intentions to aggress, and withdrawal of rewards. In one study of young adult video game players, tried and tested personality and mood tests were administered to experimental participants to measure how they felt. Whether the participants played a non-violent video game, or one with moderate or more severe forms of violence made little difference to their intentions to behave violently afterwards (Scott, 1995).

In a study with male university students, Ballard and Lineberger (1999) utilised the traditional disinhibition of control over personal aggression instigation design. In this, the participants played either a violence-themed video game (*Mortal Kombat II*) or a non-violent game judged to be exciting (NBS Jam) for 15 minutes. Then they took part in a

separate teacher-learner scenario with another young adult male or female. In this exercise, each time the other person got a correct answer, they were rewarded (with jellybeans), and each time they made a mistake in a learning task, participants had the option to penalise the learner. It emerged that male video game players issued more rewards for good performance after playing a non-violent game than after a violent game, but they did this only for male, and not for female, learners. Punishments were more likely to be issued after playing a violent video game, regardless of the gender of the learner.

Another 'behavioural' measure of aggression adopted an aspect of game-playing itself in this context (Ask, Autoustinos, & Winefield, 2000). In this case, the researchers carried out their inquiry with players in a *Mortal Kombat III* tournament. At the end of each round of this competition, the winner was given the opportunity to 'kill' or not to kill the opponent's on-screen fighter. The researchers asked the teachers of these players to provide character references in terms of their inherent real-life aggressiveness or misbehaviour. In an initial study, 16 male players competed for cash prizes. Six of these players never used the kill option, either in the competition itself or in pre-competition trials, which were also monitored. Among those students who did use the kill option, the prevalence of doing so increased significantly from the trials to the competition itself. The researchers suggested that the potential to win cash rewards might have motivated already aggressive players to be more so. As the competition was also played out in front of an audience, the researchers also proposed that the arousing nature of this setting could have also promoted aggressive play. The contestants who were the most aggressive game players were also the ones rated as most aggressive by their teachers.

Two further experiments produced mixed evidence on the propensity toward aggression in game play in a competitive, as opposed to a non-competitive, setting. What did emerge was the finding that more experienced players tended to use kill options more often when playing competitively, compared with when they played by themselves.

Research with children has had to adopt safer analogues of real aggression in its attempts to demonstrate how playing with violence-themed video games can trigger hostile intentions. Researchers have, therefore, developed ingenious methods of representing 'aggressive behaviour' without actually encouraging children to commit real aggression or other harmful behaviour. Some researchers have devised paper-and-pencil tests to assess the disposition to behave aggressively. Others have adopted other behavioural

measures. The emphasis here has been placed on finding ways of detecting aggressive 'intent', rather than creating opportunities for children to actually hurt each other. The use of such methods, while ethically sound, has raised issues about the validity of the research measures used, and has led to questions of whether they truly represent aggression. The use of these 'safe' forms of aggression has been defended in the sense that they can reveal the manifestation of hostile impulses (Berkowitz & Donnerstein, 1982). Leaving this debate to one side, even if we accept these ethically approved analogues of aggression, or aggressive intent, at face value, the findings that emerge from them have not always been consistent.

One method that has been used has entailed getting children to press buttons that they believe deliver rewards or punishments to an unseen child. In one study using this technique, no effect of the type of video game played emerged in the children's behaviour (Graybill, Strawniak, Hunter, & O'Leary, 1987). Another early study, conducted with children between the ages of 14–15 years old, found that, in an experimental setting, they exhibited no increased tendencies to behave aggressively toward someone else of the same age as themselves as a result of having played with a violent video game (Winkel, Novak, & Hopson, 1987).

Irwin and Gross (1995) provided empirical evidence that confirmed some of these findings with adult players: that involvement with a video game with a violent theme could promote an intention to inflict harm on another person among children. When boys, 7 and 8 years of age, were observed after playing either a violent or non-violent video game, they displayed greater aggressiveness after playing the violent game, but this manifested as more object aggression in free play and interpersonal aggression in a contrived situation, which was designed by the researchers to be frustrating to them. The reason why this study is interesting here is that it indicates how other potential control variables might further influence children's aggressive behaviour, regardless of the type of video game they played. In free play, they can select their own forms of aggression, and chose to aggress against an object more than against another person. This might indicate a perception that interpersonal aggression might result in painful retaliation or possible punishment from an authority figure (e.g., the researcher). When placed in a situation in which they were invited to aggress against what they believed was another person (but was in fact simply a computer program) they did so, not just because they had played with a violent video game, but also because they had received tacit authorisation to do so from an authority figure.

Kirsh (1998) studied boys and girls between the ages of 8 and 11 years. These young participants were randomly assigned to play with one of two games. One game, *Mortal Kombat II*, was classed as very violent, and the other game, NBA Jam, was classed as exciting but non-violent. After they had played the video game to which they were assigned for a short time, each child was presented with a number of stories that described events that had happened to a child. In each event a child experienced an incident involving another child that could have triggered them to respond either in an aggressive or non-aggressive manner. The children in the experiment were invited to say what emotions the child in the story might have experienced, and how they thought that child should respond to this provocation. The aim was to find out the extent to which the children being studied would suggest a violent response, and whether playing a violent, as opposed to a non-violent, video game would increase the likelihood of suggesting a violent retaliation.

The findings revealed that children who had played *Mortal Kombat II* did suggest a more negative retaliatory response for the provoked child in the story than did those who played NBS Jam. When asked how seriously they thought the provoker deserved to be punished, however, there were no significant differences between the children in the two game-playing conditions.

Bushman and Gibson (2011) used the competitive reaction task to represent aggressiveness in experimental participants. As usual with this task, the participants were led to believe they were interacting and competing with another person (who did not really exist). In the task, if the opponent lost, they could deliver a punishment in the form of an unpleasant blast of noise. The intensity of this noise blast could be controlled by the participant, and setting it at a higher level signalled increased 'aggression'. The participants were female and male college undergraduates at an American university. They were assigned at random to play with either a violent or non-violent video game. Several games of each type were used in this experiment, and each were well-known and available on the open market. After 20 minutes of playing with their assigned game, participants rated it along a series of evaluative scales (e.g., absorbing, action-packed, exciting or violent). The competitive reaction task did not occur until the next day. Between the first and second days, however, some participants were encouraged to think back about their video-game play and how they might improve it, while others were not given these instructions.

Although the violent video games were consistently rated as being more 'violent' than the non-violent video games, they did not invariably

produce greater subsequent aggressiveness across all participants. This effect of violent video-game play was restricted to male participants, and among these players, the effect of the video game violence was stronger still among those who had been asked to think (or ruminate) about their game play overnight. For the authors, the importance of this study was that it was the first to demonstrate that violent video-game playing might stimulate aggression over an extended period, as well as immediately after game play has ended.

Engelhart, Bartholow and Saults (2011) assigned college men and women, aged 18–22, to play with either a violent or non-violent video game before performing a task on which they could behave in an aggressive way. All the video games were played on a Playstation 3 platform. Before playing a video game, all the participants completed a trait anger instrument. They were then told they would, at some point in the session, take part in a competitive reaction test with another participant. In fact, there was no other participant. The experimenter, engaged in communication with this fictional 'other' person in order to establish a pretence.

Participants played with their assigned video game for 20 minutes before being moved on to the competitive reaction time task. For this task, they had to react as quickly as they could to words presented to them. For this, they had to press one of two buttons to say what colour the word was written in. The speed and accuracy of their responding would determine whether they won or lost each trial. The loser on each trial would receive a blast of noise as a punishment. If the other person lost, the experimental participant could administer a noise blast, and set the level of its intensity. The more intense the noise blast, the less pleasant it was for the recipient. The aim of the study was to find out how much punishment the participant would deliver to the fictional other person, whom they believed to be really there. Would the type of video game played make a difference to this response?

The results showed that participants who recorded the highest levels of trait anger at the outset were more likely, than those registering at lower levels, to administer intense noise blasts, but only if they had also played a violent video game. The latter effect did not occur when participants played a non-violent video game. In general, men were also more likely than women to administer unpleasant levels of punishment to the others they were evaluating. According to the authors of this study, its results confirmed the proposition that individuals who are already aggressive in nature are inclined to think aggressive thoughts that are rendered more accessible by violent media experiences, such as playing with a violent video game.

Such aggressive predispositions mean that such individuals are more likely to display overt 'aggressive' behaviour when given the opportunity.

Williams and Skoric (2005) recruited 213 people whom they then assigned at random to an online video-game playing condition or to a control group, which did not play the game. The game itself was called *Asheron's Call 2*. In this game, the player is assigned an avatar to which he or she can allocate specific attributes and skills. The avatar is then steered through different tasks in a virtual fantasy world that involves battling and defeating other on-screen characters, defending itself against others that might stand in its way and using violent means where necessary. Measures of violence included a scale that measured participant's beliefs about the use of aggression, as well as self-reports about the use of verbal aggression in different situations. In other words, how often did participants get into arguments with other people or engage in name calling? No statistically significant differences were found between the experimental and control group on the aggression measures one month after video-game play had occurred. This effect emerged even after the participants' previous experience with this game had been cancelled out.

The Williams and Skoric study has been critiqued and found unreliable as an indicator of real social violence effects from violent video-game playing. The beliefs measures might bear little relationship to how aggressive the participating individuals might have become (Savage & Yancey, 2008). Even the verbal aggression measures were fairly mild in nature, and therefore, reveal nothing about how playing with violence-themed video games might play a part in conditioning more serious and harmful forms of aggression (Ferguson, 2011).

Whitaker and Bushman (2012) had participants allocated to play either a violent shooting game, which encouraged headshots at humanoid targets, or a non-violent, non-shooting game that involved shooting at a bulls eye. Subsequently, when given the opportunity to shoot a pistol at a mannequin, those participants who played the shooting game with humanoid targets fired many more headshots than those assigned to the other game playing condition.

Teng, Chong, Siew and Skoric (2011) studied the effects of playing *Grand Theft Auto IV* in Singapore. This study was different in that it devised a longitudinal approach within an experimental framework. Participants were assigned to an experimental or control condition. In the experimental condition, they played with *Grand Theft Auto IV* for a total

of 12 hours spread over 3 weeks. Controls did not play any video game. Measures were taken on trait aggression, attitudes toward violence and feelings of empathy with victims. There was no evidence that playing the violent video games in this case increased personal aggressiveness over a several weeks period, or that it made players more cynical toward others. There were some shifts toward greater acceptance of some types of violence, however.

Emotional Arousal Effects

Emotional arousal can be assessed and quantified using psychological and physiological measurement techniques. Psychological techniques tend to involve verbal responses that describe the way the individual is feeling after a specific video game experience. Many researchers have used, established and clinically or empirically verified verbal tests of current psychological states to measure whether players experienced increased hostile feelings shortly after playing violent video games (Anderson, Deuser, & DeNeve, 1995; Arriaga, Esteves, Cameiro, & Monterio, 2006).

Physiological responses comprise a battery of different indicators such as heart rate, electrical conductance of the skin (i.e., galvanic skin response or GSR), blood pressure, pupil dilation and brain wave patterns. The research evidence for the triggering of emotionally aggressive reactions is mixed. Some researchers have reported greater arousal contingent upon playing video games with violence that could, in turn, create the psychological conditions rendering an individual more prone to display aggressive behaviour. Others have found little evidence for specific arousal effects of violent content in these entertainment media.

The evidence concerning the instigation of aggressive emotions by violent video games is conflicted, although, a majority of the studies of relevance here have indicated that violent video-game playing can give rise to more pronounced aggressive feelings, as measured by verbal hostility tests, than playing with non-violent video games (Arriaga et al., 2006; Bartlett, Branch, Rodeheffer, & Harris, 2009; Carnagey & Anderson, 2005; Ihorie, Sakamoto, Kobayashi & Kimura, 2003; Saleem, Anderson, & Gentile, 2012; Sestir & Bartholow, 2010). Some studies reported no such effects (Ballard, Hamby, Panee, & Nivens, 2006; Ferguson & Rueda, 2010; Ivory & Kalyanaraman, 2007; Valadez & Ferguson, 2012; Guo, Zheng, Wang, Zhu, Li, Wang et al., 2013; Hollingdale & Greitemeyer, 2013).

Anderson and Ford (1987) examined the short-term effects of video games that varied in the level and type of violence they contained. These researchers were interested in the emotional reactions of players that arose from engaging with video games, as well as the nature of the feelings and mood states that games with varying violent themes could generate.

Ballard and Weist (1996) studied the effects of the most popular video games in the market at the time. They examined the emotional and physiological responses of young male players while playing *Mortal Kombat*. Using cardiovascular measures with adolescents aged 12–16, Lynch (1994) found no difference between players of violent or non-violent video games in the nature, or strength, of their physical reactions.

The local environmental condition under which video-game play occurs has been found to influence the degree to which players respond in an aggressive manner after the play has finished. Researchers found that by raising the temperature of the room in which college undergraduates were playing a violent video game, they could further enhance their aggressive mood state and thoughts after the play had ended (Anderson et al., 1995).

Calvert and Tan (1994) assigned a small sample of American female and male college students to three different conditions in which they either played a video game, observed someone else playing a video game, or were led through the typical motions of playing one of these games, but did not actually play it (a simulation condition). The game that was used in this study was violently themed. Those participants who actually played the game subsequently displayed significantly greater increases in physiological arousal than those in the other two conditions. The actual players also produced more aggressive thoughts than those in the view-only, or simulation conditions.

Brady and Matthews (2006) used both verbal and physiological measures of hostility arousal in an experiment that compared the reactions of male college students, aged 18–21, after playing with a video game judged as either high in violence content (*Grand Theft Auto III*) or low in violence content (*The Simpsons: Hit and Run*). Physiological arousal was measured by monitoring blood pressure and verbal mood. Hostility and attitudes toward violence scales provided psychological measures of emotional reactivity. The authors found that those young men who played with *Grand Theft Auto III* displayed significantly greater changes in blood pressure than did those who played the relatively low violence video game.

The violent video game players also exhibited greater hostile mood changes, and developed more permissive attitudes toward violence on the verbal scales than the low violence video game players. Participants' prior

experience of violence in their own communities also made a difference in emotional reactions to playing video games. The greatest changes in increased arousal and verbally expressed hostility occurred among those men who have lived in high violence neighbourhoods. The findings, therefore, indicate that violent video game experiences resonate with real-life experiences of violence, and jointly prime increased emotional aggressiveness.

Valadez and Ferguson (2012) examined the effects of playing violent video games on hostile feelings, depression and cognitive abilities. Participants were young adult, Hispanic students. Participants were pre-tested and post-tested before and after playing with a video game. There were three levels to the game playing: violent video-game playing, non-violent video-game playing and playing with a violent video game in a nonviolent way. Half the participants in each of these video game playing conditions played for 15 minutes, and the other half played for 45 minutes. Tests were run for depression, hostile feelings and visuospatial cognition. The cognition measures involved tests in verbal reasoning, pattern recognition and manipulation of shapes. Pre-established tests were used throughout for each dependent measure. A serial number addition task was also used with all participants to increase their frustration levels. They were also asked to provide data on their usual video-game playing habits. The findings gave no indication that playing a violent video game produced increased levels of hostility in players. Indeed, hostility levels over time tended to decrease regardless of the game played. The results for depression and visuospatial cognition largely mirrored those for hostility.

Research with pre-teenage children, aged 8–12, has found that, while exposure to a violent video game can give rise to arousal as playing takes place, this does not invariably translate into an aggressive mood state after play has ended. In this case, girls and boys were assigned to play with a paper-and-pencil game, a nonviolent video game or a violent video game. Girls displayed greater arousal than did boys while playing the violent video game, and indeed, the violent game lifted the positive mood state of both genders, but did not make them feel more angry or hostile (Fleming & Rickwood, 2001).

The emotional effects of playing video games do not only take the form of increased arousal, which might, in turn, promote the likelihood of aggressiveness displayed in social settings containing further relevant triggering cues, but might also take the form of reduced arousal. In this case, repeated exposure to video game violence might initially trigger emotional arousal—and this arousal might be unpleasant for the individual—and then, over

time, coping mechanisms kick in to reduce this type of response. As a consequence, rather than experiencing violence as unpleasant and disturbing, the individual becomes immune to such effects, and in the process displays less concern about the use of violence and about its consequences for victims. Such desensitization effects have been measured in relation to repeated exposure to film or television violence (Drabman & Thomas, 1974, 1975).

Carnagey, Anderson and Bushman (2007) assigned young adult participants to play with either a violent or nonviolent video game selected, in each case, from among four of each type. After they had finished playing, the participants watched video footage of real life violent incidents, while having their heart rate and electrodermal conductance measured. The latter physiological measures were used to indicate affective responding. Those participants who played a violence-themed video game exhibited weaker emotional responses to real violence than those who played a nonviolent video game, as evidenced by lower heart rate and electrodermal reactions. This finding was interpreted as consistent with the notion of desensitization, whereby, a person who has had a recent violent experience becomes emotionally habituated to other similar events.

Engelhardt, Bartholow, Kerr and Bushman (2011) examined desensitization effects and the promotion of aggressive responses contingent upon playing violent or nonviolent video games. Their participants were assigned to play with a third-person, one of three first-person shooter action genre games, or one out of two nonviolent platform and two sports games. After play had finished, the participants' brain wave patterns were monitored while they watched either violent, or aggression neutral images. In the final phase of the study, they took part in a competitive reaction time task with another unseen person. In this task, the participant and the other person took turns to perform a reaction time task, where failure to successfully complete each trial resulted in the tested person receiving a blast of noise, which could be fixed at varying levels of intensity. The decision about the level at which to fix the intensity on the part of the experimental participant was used as the dependent measure of aggressive behaviour.

The key result here, in the context of aggressive affect, was that brain-level responses to violent images were weaker after a participant had played with a violent video game than after a nonviolent, but equally exciting, game. This finding was interesting because it appeared that it was the thematic content, rather than the level of excitement created by the game, that was important to the response. The finding of lowered brain potentials to violent stimuli was interpreted as consistent with the notion of desensitization to violence.

Chittaro and Sioni (2012) conducted a further study of the desensitization effects of playing violent video games, similar to Engelhart et al.'s in its key design configuration, although, differing from it in many other details. Chittaro and Sioni assigned their young adult participants to play with violent or nonviolent video games, and deployed a number of physiological measures of emotional reactance. The two conditions were established with different versions of essentially the same game—*Whac-a-Mole*. In the violent version of this game, virtual ants are shown eating away at a chair. The task for the player was to squash the ants by pressing on them on the screen. Each time they did this, a sound effect occurred, followed by an image of a squashed ant, which then disappeared after a few moments. The player must squash ants quickly enough to prevent them from eating away at the chair to the point where it falls over. In the nonviolent version, geometrical shapes were seen falling on the chair, chipping bits away from it as they hit it. The player had to touch these shapes before they hit the chair to make them disappear. The games were designed for, and played on, a mobile phone. After the game playing had finished, all participants watched video recordings of violent real life incidents, and their emotional (physiological) reactions continued to be monitored. These reactions included heart rate, blood pressure, electrodermal conductance as well as facial responses.

There were no significant differences between the violent and nonviolent versions of the video game on the physiological measures, except that facial muscular movements revealed a more positive emotion when playing the ants squashing version of the game. It was suggested by the researchers that killing ants probably did not arouse significant negative emotion in participants because it was seen as a socially acceptable behaviour. It is also possible that because the game was played in a small screen of a mobile phone that it did not engage players psychologically in the way that games played on larger screens might. There was no evidence of desensitization effects while playing the violent version of this game, as is evidenced by the physiological responses during the watching of the violent video footage later on.

Video game players vary in the lengths of time that they play. Some experienced players might play for hours on end on a regular basis. Others might play less often, but still engage in marathon sessions when they do. Others might play for relatively short durations at each sitting. One question that has arisen about the way players are affected by violent video games is whether those who play for long durations become more aroused, and therefore, potentially more angered by the experience, than are those whose play is restricted to relatively short sessions.

In a test of this phenomenon, Devilly, Callahan and Armitage (2012) assigned video game players to play for 20 and 60 minute sessions with the violence-themed game, *Quake III Arena*. Players' anger states were measured before and after playing. Those in the longer playing session exhibited less change in their anger levels from before to after playing than those in the short duration session. Participants who were regular players of violent video games seemed relatively insensitive to the length of game play, which made little difference to their anger levels after play had ended. Female players, and players not used to playing violent video games, exhibited greater changes in anger levels than did males and experienced players.

In an analysis of aggressive emotional effects of video games, examining variances in such reactions with a specific sample of players, Unsworth, Devilly and Ward (2007) found that it can be misleading to only look at overall average effects. The reason for this, as they found in their study, is that participants can display significant variances on their emotional responsiveness to violent video games. Some participants might react very strongly, and others hardly at all. In this particular study, the apparently significant effect of violent video-game playing on hostile feeling states was disproportionately contributed by a small segment of their experimental sample, which exhibited powerful emotional responses. In comparison, most of the participants in the violent video game condition seemed little affected by playing with this type of game. This finding indicated that previous studies, reporting positive emotional aggression reactions among violent video game players, might have overstated this effect through failure to produce a distribution breakdown of strong and modest responders.

COGNITIVE EFFECTS

Research into the behavioural effects of media violence, during the late twentieth century, adopted a more cognitive edge with more emphasis being placed on the internalised encoding into memory of mediated behaviour on screen, than on whether such depictions triggered immediate aggression, whether copy-cat in nature or unique to the perpetrator. The prevailing view here is that after watching violence played out on a screen, whether at the cinema, while watching television or playing a video game, aggressive thoughts can be triggered in the mind of the observer or player (Berkowitz, 1984).

It is known that media experiences can trigger mental fantasies in their consumers. If the mediated experiences are violent in nature, then the follow-up fantasies might be too. There has been interest in this type of

cognitive response to video games, especially among children. Research on this subject has found that playing video games with violent themes can influence the kinds of fantasies detected in pre-teenage children. Children of ages between 6 and 11 years were found by one study to exhibit more assertive fantasies after playing a violent video game. Children's fantasies were assessed using a projective test—this is a psychological instrument in which respondents describe their feelings in relation to ambiguous picture stimuli that can be interpreted in a variety of ways (Graybill, Kirsch, & Esselman, 1985).

Any fantasies or thoughts triggered by mediated violence could be fleeting, or they might persist. If observers continue to run over in their mind the violence they have seen acted out on screen, because something about it appeals to, intrigues or puzzles them, those thoughts can remain with them for some time after the original stimulus that triggered them has long gone.

Similarly, when playing a violence-themed video game, any further rumination over the violence that occurred in which the individual player, in part, controlled and perpetrated, keeps alive any aggressive thoughts that might have been triggered, or installed afresh during the game play. If the individual subsequently encounters a social situation in which they are frustrated, annoyed or provoked, he or she will determine what they believe to be an appropriate behavioural response. Tjis occurs through a process of cognitive association between the immediate social experience, the thoughts released through video-game playand any related behavioural scripts previously installed (Berkowitz, 1990). If their associated thinking, in relation to their immediate frustrating experiences, leads them in the direction of an aggressive response, then such a response becomes more likely to occur. If their mediated violent experiences continue to feed, extend and refresh previous cognitive behavioural script networks that are violent in nature, a process is instigated through which those mediated experiences might influence an individual's behaviour in everyday life.

Research has confirmed that aggression-themed cognitive reactions can be triggered by playing violent video games. The relevance of these cognitions to openly displayed aggression has been disputed. As we will see a little later, for some scholars, aggressive cognitions represent a mechanism underpinning the display of delayed aggression after an original stimulus has been experienced (Bushman & Gibson, 2011). Others have argued that these cognitions are natural reactions to any social experience, and do not necessarily mean that, once internalised, the individual is primed to behave aggressively (Elson & Ferguson, 2013).

Researchers have used a number of techniques to measure the emergence of aggressive cognitions. One approach is a word-completion task in which an individual is given ambiguous and incomplete word spellings. Each word is carefully selected such that an aggressive or nonaggressive version could be created by the person completing the task. For example, "sho_t" could be completed as "short" or "shoot" and "explo_e" as "explore" or "explode". The researcher examines the total number of successful word completions produced; and the proportion of those who chose aggressive, as opposed to non-aggressive, options. The latter measure indicates the extent to which aggressive thoughts are at the top of the mind, and whether this outcome can be influenced by the nature of any preceding video game (violent or non-violent) experience. A number of studies supported this effect with players of violent video games producing more aggressive word completions than did players of non-violent video games (Anderson, Carnagey, et al., 2004; Barlett & Rodeheffer, 2009; Barlett, Rodeheffer, & Harris, 2009; Sestir & Bartholow, 2010). One investigation of this kind failed to confirm this outcome (Cicchirillo & Chory-Assad, 2005).

The Stroop task requires participants in an experiment to quickly respond to words in different colours by pressing an appropriate number key for the colour in which the word is shown. This, a participant might be told to press button '1' if a word is printed in 'red'. This technique has been used to test priming of aggressive thoughts by measuring how quickly participants make a correct response for aggressive and non-aggressive words after playing a video game with a violent or non-violent theme. Hypothetically, if a violent video games primes aggressive thoughts players should respond to aggressive words more quickly than non-aggressive words in a Stroop test. This finding was confirmed by research in China with participants aged 12–21 years. These participants were assigned to play with either a shooting game with a law enforcement theme or an electronic card game. The aggressive cognition priming effect of playing the violent video game was significant however only among boys and not among girls (Jingpin & Zhang, 2014).

Another method used to measure aggressive thoughts is a reaction time task in which experimental participants are presented with words on a screen for brief durations and must recognise what they saw. Comparisons are made between the reaction times of accurate responses of participants who had previously played a violent or non-violent video game. In this test, aggressive and non-aggressive words are presented on a screen and

participants have to pronounce each word as it appears to show that they have recognised it. This task is timed. This kind of test has found that reaction times for aggressive words are shorter on average for participants who played a violent video game than for those who played a non-violent one shortly before being tested (Anderson & Carnagey, 2009).

In another cognitive task, experimental participants read short stories in which a protagonist is annoyed or frustrated by another person or situation, and the reader must decide how they think that person will subsequently react. The aim of this story-completion exercise is to find out whether readers will choose an aggressive or non-aggressive outcome, and whether experimental participants who played a violence-themed video game before completing this task were more likely than participants who played a non-violent video game to choose aggressive endings. Studies that used this measure of cognitive aggression have reported that aggressive outcome choices for stories were more likely to be given by individuals who had just played a violent video game (Giumetti & Markey, 2007; Hasan, Begue, & Bushman, 2012). This outcome was especially likely to occur among individuals who had pre-tested as high on trait aggression (Giumetti & Markey, 2007).

In a word test that required participants to say how similar selected aggressive words were in comparison to ambiguously aggressive words with which they were paired, it was hypothesized that playing with a violent video game might make aggressive thoughts more accessible, leading individuals to give a more aggressive interpretation of the ambiguous words, therefore, classifying them as aggressive as well as the unambiguously aggressive words that they appeared alongside. A study that used this measure of any such aggression through cognition, however, failed to reveal any such aggressive though accessibility effects of playing violent video games (Ivory & Kalyanaraman, 2007).

DO AGGRESSION-TRIGGER-EFFECTS LAST?

This chapter has examined experimental studies in which researchers have created artificial conditions under which psychological responses of players, after playing violent games, could be safely assessed. The measurement of aggressiveness tended to follow soon after playing video games. This research design leaves the possibility open that any changes in aggressiveness, whether at cognitive, affective or behavioural levels, might only be short-lived. Without further tests, we cannot be sure whether any

effects of violent video games, as indicated by these studies, are likely to remain active for some period of time after game play has ended.

A hypothesized significance of aggressive thoughts can be found in the way they can create a longer-term orientation toward behaving aggressively, even though opportunities are not made available to do so immediately after game play has finished (Berkowitz, 1984). If an individual has been provoked, and is subsequently encouraged to continue thinking about what happened, even though they are not given an immediate opportunity to launch a retaliatory response, the motivation to deliver this response can remain strong enough for aggression to still occur against the original target many hours after the original incident of provocation occurred (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005).

The significance of rumination to the eventual effects of playing violent video games was confirmed in an experiment by Bushman and Gibson (2011). This study was carried out with a sample of college students that was divided almost equally between men and women. This experiment had two parts. The first part involved students playing with a video game for 20 minutes, after which they provided a number of evaluative ratings about the game, and gave further information concerning their three favourite video games. The researchers used six different video games in all, three of which were violently themed (*Mortal Kombat* vs *DC Universe*; *Resistance*: *Fall of Man*; and *Resident Evil 5*) and three were non-violent (*Guitar Hero*, *Gran Turismo 5* and *Shaun White Snowboarding*).

At the end of the first day's session, half of the children were randomly assigned to a 'rumination' condition in which they were instructed to think about the game they had played overnight. The researcher's instructions to participants at this point were as follows: "In the next 24 hours, think about your play of the game, and try to identify ways your game play could improve when you play again" (Bushman & Gibson, 2011, p. 30).

The next day the participants returned to the laboratory where they were initially asked to list their thoughts on the past 24 hours. They were then placed in a competitive reaction time task with another person, whom they could not see (because he did not actually exist). They were told that the other person was the same sex as them. Across a series of trials, the reactions of the participant, versus the other fictitious person, were tested. The loser of each trial was punished by having a brief blast of loud noise delivered to them over headphones. The participant could control the magnitude and duration of this noise blast, and this response represented

the measure of 'aggression'. There was also a no-noise option that could be selected as well. The critical measure was the amount of potentially painful noise the participant decided to deliver to the fictitious 'other', and whether those participants who had played violent versus non-violent video games, or had ruminated after playing a violent game or not, differed in their 'aggression'.

The results showed that none of the experimental conditions made any difference to the aggression behaviour of female participants. Among the male participants, however, there were differences in aggression behaviour intensity as a function of the specific experimental conditions in which they had been placed on the previous day. Aggression intensity was significantly greater among those young men who had played a violent video game, compared with a non-violent video game, and was enhanced still further if they also ruminated after playing a violence-themed game. In the absence of rumination, and after playing a non-violent game, there was no effect on the propensity to deliver, what the participant was led to believe, a potentially painful punishment to another person.

Not all experimental research evidence has confirmed that the aggression effects of playing violent video games last. One study that measured aggressive thoughts, aggressive feelings, aggressive behaviour and heart rate found that, while physiological arousal and all measures of aggression increased after playing a violent video game, as compared to pre-playing tests, aggressive thoughts and feelings dissipated within 4 minutes after game play had finished. Heart rate and aggressive behaviour still remained raised, up to 9 minutes, after players had finished (Barlett, Branch, Rodeheffer, & Harris, 2009). In this particular case, behavioural aggression was measured by the hot sauce analogue in which participants decided how much chili to use in a sauce to give to another person. Question marks have been raised about the validity of this analogue in terms of whether it indicates genuine aggressiveness (Elson & Ferguson, 2013).

DOES CAUSALITY EXIST?

This chapter has examined the question of 'causation' in relation to playing violence-themed video games, and any subsequent changes in the aggressive dispositions of players. The literature considered here described interventionist studies that attempted to test for cause-effect relationships directly. The survey evidence reported in Chapter 4 relied upon *post hoc* measures of violent video-game playing and aggressiveness obtained

through respondents' self-reports. In the laboratory based studies reviewed in the current chapter, participants experienced controlled exposures to video games and were then placed in settings in which they had opportunities to display aggressiveness. The latter displays could take the form of aggressive thoughts, aggressive feelings or aggressive behaviour.

The advantage of this type of research over survey studies is that participants were given opportunities to interact with video games. Video game exposure did not vary between participants but was controlled, in terms of the amount and type, by the researcher(s). Hence, it was clear what type of video game exposure each participant had. In fact, this was the key manipulated variable. Participants could also be tested before and after video game play so that a baseline set of measures on relevant variables could be obtained, which allowed for an examination of whether a specific kind of video game experience resulted in changes from the baseline measures.

The disadvantage of studies of this type is that they are constrained by tight research ethics rules, which forbid researchers from engaging in any activity with participants that might cause them real harm, or might cause them to harm others. This means that measures of real behavioural aggression cannot be used. Instead, researchers have devised ingenious substitute (or analogue) measures instead. These measures are designed to indicate when a person intends to do harm to another, and maybe even believes that they have done so, but in fact, under controlled laboratory conditions, no actual harm to another can occur.

The artificial nature of laboratory experiments means that their critics have been able to challenge their veracity, and therefore their ability to demonstrate genuine effects of violent video games. If analogue measures are used as substitutes for real aggression, do those substitute measures really and truly represent how a video game player might behave in real life? It is unclear. Moreover, it is important to be sure that the participants in these experiments do not second guess what the study is about, and therefore comply with the researcher's aims by giving them the findings they seek. Many experimentalists will respond to this by stating that they build in design controls and tests to ensure that this is not a problem. What researchers cannot be sure about, however, is whether participants regard the experimental setting as separate from everyday reality, and as such, do not observe the usual moral codes or social constraints that would shape their behaviour, particularly when it comes to behaving in an aggressive way.

There is more compelling evidence that aggressive thoughts or emotions can be triggered by violence-themed video games, but being quicker to respond to aggressive words after exposure to video-game violence is not the same as being more inclined to behave with aggression toward another person in real life. To ascertain whether this outcome is likely means we must depart from analogue measures of aggression toward real behaviour. For ethical reasons, however, the price researchers must then pay is the loss of control over research participants' video game experiences. This is a topic we look at more closely in the next chapter.

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Can Video Games Influence Levels of Real Violence?

The research we have examined so far has concerned two questions. The first of these was: Is there an empirically demonstrable association, or link, between playing violence-themed video games and the general aggressiveness of players? The second was to find out whether it can be scientifically demonstrated that playing a violent video game can directly trigger aggression, or directly create a psychological state, or disposition, that can increase the likelihood that a player will behave aggressively (or think aggressively) when subsequently given an opportunity to do so? The first type of inquiry usually takes the form of a one-off survey in which respondents answer pre-determined questions with pre-structured responses, options or answer choices. Questions and answers attempt to provide meaningful, valid and accurate measures of respondents' video game exposure and experiences as well as their aggressiveness as individuals. Information of relevance is then often collected about other variables that might also be influential in relation to their video-game playing and their social behaviour. The second type of inquiry is more intervention-ist, and sets up controlled video-game playing conditions, and controlled conditions for the later display of aggression by those under investigation.

Critics of violent video games research, in which aggression or violence effects have been measured in these ways, have identified a number of methodological and analytical flaws that are believed to undermine the validity and reliability of their findings. Sometimes these flaws are idiosyncratic to a specific study and sometimes they are more generic to adopted

research designs. Debates have raged about these issues, with critics and proponents disputing the pros and cons of surveys and experiments in the study of violent video games. We examine these debates in other parts of this book. They are mentioned here because they provide a convenient lead-in to the main theme of this chapter which is to consider the potentially wider social ramifications of violent video-game playing. Does the involvement of young people with these games represent a social influence factor that contributes more generally to levels of real youth violence?

If it can be shown that playing violence-themed video games can produce lasting changes in the character of players such that, as individuals, they become more aggressive; this could represent a serious problem for governments, social policy makers, law enforcement agencies and for the public at large. Given the popularity of these games, and in particular the extent to which violently themed games are played, if the evidence derived from cross-sectional (one-off) surveys, or from experiments, is to be believed, then adverse side-effects could occur in many different kinds of players, with some reacting more severely than others. If the numbers affected in this way are scaled up to represent thousands or even tens or hundreds of thousands of individuals, does this not represent a serious social problem, and a potentially major contributor to youth-perpetrated crime and social violence across society?

Before we lodge calls for more police, state troopers or even special-forces to be put on the ground in our major cities, however, we need to be sure of the evidence. The research literature that has been reviewed so far has generated powerful arguments for potentially harmful effects of violent video-game play. The studies that make up this literature, however, have generally investigated convenience samples rather than randomly or quasi-randomly selected individuals for samples that can be deemed to represent the large societal populations from which they are drawn. More importantly, they have not usually examined the effects of playing violent video games on real aggression.

For ethical reasons, laboratory experiments have measured aggression in controlled ways that use substitute actions for real violence. These measures of aggression have been critically challenged in terms of whether they can reveal anything meaningful about how video-game players might react in the real world, that is, outside the laboratory setting in which they were tested (Kutner & Olson, 2008). Surveys, whether cross-sectional or longitudinal, have relied upon self-reports of aggressiveness rather than direct measures of it. There are some experts in the field who have claimed

that laboratory measures, along with aggression and self-reports of aggression given in survey settings, can display inter-correlations that are statistically significant (Anderson, Lindsay, & Bushman, 1999). This may be true, but we should ask whether a statistical result of this kind actually strengthens the case of violent video game effects when it occurs between two problematic measures of aggression.

It is a difficult area, however, because of the ethical implications of attempting, within research studies, to manipulate participants' behavioural dispositions in a way that could render them at risk, or a risk, to others. The claims of external validity for laboratory measures of aggression that has been reinforced by analyses of survey data have also been critiqued in terms of whether the reported statistical relationship is as robust as claimed (Mitchell, 2012). Furthermore, while aggression as measured in the laboratory was found to be linked to exposure to media violence in that setting, when extended to the likelihood of real-life aggression among the same participants, there was no evidence of any mediated violence effects (Krahe et al., 2011). So, what kinds of evidence of real violence effects from playing video games might we turn to that would both be valid and ethically permissible? If we can find relevant evidence, what does it reveal about the potential social harms that might flow from violent video games?

A number of research perspectives are relevant here. The wider literature on media violence has previously sought evidence about real-life, aggression-related effects through:

1. Anecdotal accounts of real-world violent incidents in relation to the genesis of which media violence experiences of perpetrators is believed to have played a part.
2. Analyses over time of secondary data on media consumptions habits, and official statistics at a societal level of crimes rates, civil disturbances and other violent events.
3. Investigations of apparent links between specific mediated violent events, and subsequent occurrences of similar events in the real world.
4. Observations of naturally occurring behaviour in real world social settings, where the media violence exposure of the individuals being observed has been manipulated or has been systematically changed.

There is research evidence deriving from studies on film and television violence that has examined each of these kinds of influences. There has been much less evidence produced so far on these potential effects being linked to playing video games.

ANECDOTAL ACCOUNTS OF VIDEO VIOLENCE EFFECTS

Attention has been drawn to the possibility that violent video games can influence players, and cause them to engage in antisocial and even criminally aggressive acts of real-life extreme incidents of violence. In these cases, evidence that the perpetrators enjoyed playing with violent video games, as well as watching media violence, has been presented as an explanation as to why these incidents occurred. These incidents have included mass shootings, murders and other violent crime sprees involving single or multiple perpetrators.

Many of these incidents have occurred in the United States, but a few have also taken place elsewhere, such as the killing spree of Michael Ryan in the small town of Hungerford, England in 1988, and the school shootings of Thomas Hamilton in Dunblane, Scotland. Ryan killed 16 people with an AK-47 assault rifle, as he drove around the town. Hamilton, who was armed with four handguns, killed 16 children and a teacher (Clouston & Boseley, 2013; Edwards, 2012). With these last two incidents, there was much media speculation about the role played by both perpetrators' apparent enjoyment of violent television programmes. Similar speculation has surfaced in relation to the violent video-game playing habits of killers in the U.S., with even the Federal Bureau of Investigation identifying this content as representing a risk factor in the genesis of murder (O'Toole, 2000). This concern about violent video games has been reinforced by high-profile homicides carried out by apparently violent video-game-loving perpetrators.

On 20 April 1999, two senior students, Eric Harris and Dylan Klebold, aged 18 and 17 respectively, entered Columbine High School in Columbine, Colorado armed with guns and explosive devices, and killed 12 students and one teacher. After a shoot-out with police, both perpetrators committed suicide by shooting themselves in the head. The massacre shocked the world. The significance of this incident, in the context of the theme of this book, is that, when searching for reasons as to why an apparently unprovoked attack of this kind should have taken place, it was disclosed that they had developed a keen interest in playing violent

video games, such as *Doom* and *Wolfenstein 3D*, and had even developed a weblog site of their own to discuss these games with their friends. Their online discourses also discussed other issues, such as how to cause trouble and unrest, and how to make explosives. In following diagnoses, the FBI found that both perpetrators, though gifted at school, had also been victims of bullying (Cullen, 2009). Furthermore, there was evidence that Harris had displayed psychopathic tendencies, and Klebold suffered from depression. These background conditions were invoked to offer an explanation as to why they perpetrated mass murder (Adams & Russakoff, 1999; Boodman, 2006).

These explanations were challenged by a psychiatrist, Jerald Block, who believed that the perpetrators' involvement with violent video games represented a further influential factor. Block claimed there was evidence that their online writings included references to launching an attack on the school alongside their commentaries about video games. A previous incident of theft involving Harris and Klebold had resulted in their computer access at school being restricted, which was a source of frustration for them both. Thus, a combination of anger at their treatment by authorities, and a loss of impulse control, conditioned by regular violent video-game playing, could had created the psychological conditions for their murderous behaviour (Block, 2007). What is lacking here is proof of a connection between video game experiences and the violence that took place. Nevertheless, set against this high-profile case, which attracted considerable public interest and media attention, the suggestion that violent video games could have played a part in the causality of murder was enough to trigger calls for such games to be more tightly controlled.

The Columbine incident is illustrative of a pattern of blame that has previously been levelled against media violence for extreme and disturbing acts of human aggression, which usually involve homicides. Violent incidents that target innocent victims, especially when they are children, can prove to be especially horrific and stick in the public consciousness. Mass media plays an central role in the blame game, often blaming each other. Newspapers in particular have been quick to blame television, and now, both newspapers and broadcasters have targeted video gaming. Yet, these accusations toward media violence tend to be based on the flimsiest of evidence (Barker & Petley, 1997).

The blaming of the media is not a new phenomenon and has been present since the earliest 'mass' media appeared in the nineteenth century, when plays and entertainers in the theatres were accused of exposing people to

"filth" and tempting children into lives of delinquency (Murdoch, 1997). Close inspection of alleged copy-cat incidents of violence, modelled on media events, has indicated that the science is lacking, and evidence for causation is hard to find (Wilson & Hunter, 1983). The tendency of news media to place a lot of focus on acts of extreme violence, which are statistically rare, can give the impression to the public that the threat these events pose is far greater than it really is (Burns & Crawford, 1999). Such incidents are then accorded significant weight as an illustration of wider social problems that demand immediate social policy or law enforcement rectification (Muschert & Ragnedda, 2011).

Epidemiological Approaches

There have been attempts to adopt an epidemiological approach to the problem through secondary analyses, which involve the statistical examination of social datasets, often from different sources that purport to reveal how much certain types of behaviour take place across a society, and whether one social variable of this kind is statistically connected to another at an above-chance level. Thus, if social statistics exist to show how many people play violent video games and how much social violence of different kinds occur in a society over a period of time, are the two systematically linked? Can other social and demographic factors be discounted as explanatory variables? It is problematic to impute with confidence that causality is proven from such analyses. Nonetheless they can raise observations or questions that deserve further investigation.

Another approach is to construct a longitudinal study in which verifiable measures of actual aggressive, criminal or delinquent activity are taken about the participating individuals, in an attempt to find out whether their involvement with violent video games is linked to the development of their antisocial behaviour. Longitudinal surveys, as we have seen already, take a developmental perspective on media effects by considering whether a person's media experiences at one point in their life can be shown to be significantly (in a statistical sense), and systematically, related to behaviour patterns shown to emerge later in their life. Sometimes, these studies have also been referred to as prospective designs (Ferguson, 2011).

A few studies into the effects of television violence, which pre-date most violent video game research, adopted epidemiological and econometric approaches in relating the spread of television in specific societies with crime trends revealed by official government and law enforcement

agency statistics. For example, links between television set penetration data and crime rates were established within the United States. One investigation reported no relationship between the spread of television sets across the 1950s, 1960s and 1970s, and occurrences of homicide, aggravated assault, burglary or car theft, but did find a link with incidents of minor theft (Hennigan et al., 1982).

Another investigation of this type examined television set penetration data and crime rates for the United States, Canada and South Africa from the mid-1950s to mid-1970s (Centerwall, 1989). The findings revealed that homicide rates increased over time in all three countries, though fell toward the end of this period in South Africa. Television set penetration also increased over this period in Canada and the United States, with homicide rates lagging some 15 years behind. Television was not introduced to South Africa until the mid-1970s. Even though the study obtained data on other factors such as the demography of each country, changing economic conditions, levels of civil unrest, alcohol consumption, capital punishment and availability of firearms, the evidence for a media violence effect is incomplete because no data were included about patterns of media consumption.

One approach, then, in the study of the 'real-world' effects of video-game playing has been to examine the changing prevalence of these games in specific societies, and how adoption of them might be statistically linked to crime and social violence trends. Other demographic, social, economic and public policy variables are also usually factored into the statistical models designed to establish whether significant, and systematic, relationships exist between the target variables over time. There are limitations to these studies because they cannot hope to control for all relevant variables that might influence the target variable. In this context, the target variable usually comprises societal-level metrics indicating the frequencies of occurrence of specific types of crime.

The researchers using this approach have generally acknowledged the limitations of macro-level datasets, but it is an established practice that is widely used in medical sciences and economics. It has one advantage in that it examines and tries to explain naturally occurring social phenomena. As well as exploring behavioural events, some studies have also examined how public perceptions of those events might be shaped.

The proposition that media violence might create the conditions under which social violence is promoted across entire populations is based on an assumption that it causes an atmosphere of violence. This violent 'climate'

can colour the world views of children as they are growing up, and might come to be seen as normative. The psychological mechanisms identified by various theories of media effects, such as social learning, impulse disinhibition, desensitization, general arousal, and belief cultivation are invoked to offer explanations on an individual level, but are not tested with macro-level data. It has nonetheless been argued that, if media, such as violent video games, contribute toward a more general atmosphere of social violence, the people exposed to this may develop a tolerance for violence that could encourage them to be more relaxed about its presence in society, and its use to resolve individual social problems (Fischer, Aydin, Kastenmuller, Frey, & Fischer, 2012; Fischer, Kastenmuller, & Greitemeyer, 2010).

The premise that a climate of acceptance of social violence could be conditioned, through regular exposure to media violence of the type provided by violence-themed video games, has been confirmed by one-off studies with adolescent video-game players. Adolescents claiming to be regular players of violent video games have been found to display different moral codes and sensitivities to moral issues than those who played these games relatively infrequently (Bajovic, 2013). Both pre-teenage and teenage children who regularly played violent video games displayed weaker abilities to take the perspectives of others, and to feel sympathy for victims of violence, and in turn, such youngsters were also more prone to regard the use of violence in different social settings as justified, rather than unjustified (Viera & Krcmar, 2011).

Further evidence has emerged that many of the video games that are popular with young players, especially 'first-person shooter' games that draw the player into the on-screen violence more directly, are characterised by themes that seek justifications for the use of violence, rather than encouraging moral reflection. It is through these game attributes that their potential to cultivate moral disengagement from the deployment of violent scripts could stem (Hartmann, Krakowiak, & Tsay-Vogel, 2014).

Gabbiadini, Andrighetto and Volpato (2012) surveyed teenagers about their playing of *Grand Theft Auto IV*, and how this related to the nature of their responses in a test designed to measure their morality in different social settings. The authors found that those youngsters who reported more frequent and recent playing of this game also displayed greater 'morality disengagement'. Although this evidence does not fit with the types of study being examined in this chapter, it is worth mentioning this evidence here because it reinforces the hypothesis concerning macro-level video game effects on levels of antisocial conduct in specific societies.

In another investigation that used a controlled exposure and response design, teenagers were allocated to conditions in which they played with a video game that had a theme that reinforced delinquency, or to a video game with a neutral theme. In one study using this design, those who played the delinquency reinforcing game subsequently displayed greater tolerance for a serious road traffic offence than did the control group. In a second study, the antisocial-themed video game rendered players more likely to subsequently steal candy bars or pens from a laboratory setting than were those in the neutral video condition (Fischer et al., 2012).

Ward (2011) conducted an econometric analysis of crime data and video game consumption across the United States. He did not measure video game consumption directly, but instead used a proxy measure based on the numbers of video game stores operating within specific counties. This measure, as he acknowledged, was a less than perfect substitute for more direct measures of the amount of video-game playing. It might seem logical to presume that if there are more stores in an area that this fact signals a greater demand for video games. However, store sizes can vary, with fewer big stores serving some areas, and smaller stores serving others. Even if numbers of stores served as a valid proxy for overall video game demand (which it does not), this measure did not and could not differentiate between levels of demand for violent and non-violent video games. This was an important observation, because if video game demand and levels of criminal and delinquent behaviour changed in the same direction the explanation might rest with the volume of violent video game consumption (with an increase being expected to trigger more arousal of aggression) or to decreasing demand for prosocial video games that might have an aggression countering or calming effect.

Ward also acknowledged that there could be other extraneous variables that he failed to take into account, which could explain both differences in video game demand, and levels of crime in different geographical areas. Ward's analyses revealed that on a county by county basis, as most types of crimes decreased, the numbers of video game stores increased. Similar inverse relationships occurred between crime rates and the number of sports goods stores and movie theatres in each county, although the latter two relationships failed to achieve statistical significance. Crime levels were also sensitive to other demographic factors, such as a larger overall population density, and larger proportions of the population aged 15–24.

The 'effect' of video game stores was statistically significant for most forms of violence with two exceptions—murder and rape. Ward notes that

the crimes that displayed the closest relationship to video game store numbers, such as arson, motor vehicle theft, and robbery, tended to also be crimes most usually linked to adolescents and young adults in the 15–24 age bracket. For every 1% increase in video game stores, there was a 0.1% drop in crime levels. Ward suggested that this relationship can be explained in the following way: as video gamer players are drawn disproportionately from this age group, if the local youth and young adult population are drawn toward playing violent video games, they remain inside more, rather than going out to commit crimes. Playing violence-themed video games might function as a substitute for engaging in real antisocial behaviour.

Lee, Peng and Klein (2010) looked at the nature of role playing in video games and their subsequent judgements about violent crimes. In this experiment, undergraduate students were randomly assigned to one of two conditions. In the first condition, participants played a violent video game called *True Crime* in which a police officer character, controlled by the player, used violent means—often excessively—to catch criminals, and also, from time to time, attacked innocent victims just for fun. In the control condition, participants were not assigned to play any video game. All participants subsequently read and evaluated narratives about four real-life crime cases that featured violence committed either by police officers or criminals.

The participants assessed the behaviour of the violence perpetrator in the crime stories and whether it was justified or not, as well as giving their views about how severe the punishment for this violence should be in terms of recommended length of jail sentence. The participants who played the violent video game were far more tolerant of criminal violence, particularly if that violence was perpetrated by a police officer, than were those who did not play this video game. The players of the violent video game also recommended far more lenient sentences. Role playing a violent police officer in a video game setting led to players showing far more acceptance of police violence and its justification.

Ferguson (2014) conducted an epidemiological analysis of violent video game penetration and youth crime rates in the United States. Data were examined from 1996 to 2011. He began by examining the numbers of units of video games sold over this period. Because these data did not differentiate between violent and non-violent video games, he selected the top-five selling video games each year, and had them rated by independent judges in terms of how violent they were. The rating scheme was based on the video classification system used by the Entertainment Software Rating Board, which rates video games in the following way: EC suitable for early

childhood, E for Everyone, E10+ for ages 10 and over, T for Teen, M for Mature, and finally AO for Adults Only. There were no AO videos in this sample. Government statistics were utilised for youth violence data.

Violent video game consumption rose from 1996 to 2011, while youth violence rates fell. In both cases, trends reversed for limited periods, but then got back to the primary upward or downward trend. There was no evidence that the emergence of violent video games from the mid-1990s contributed to greater violent tendencies among young people, because the overall trend for youth violence was downward. Such findings seem compelling on the surface. However, the measures of video violence used here were fairly crude, and, as we know from earlier research with televised violence, global ratings of entertainment units, such as programmes, can disguise subtle (and sometimes not so subtle) differences between them in the nature of their violent content, and it is the latter which is critical in terms of how viewers might respond (see Gunter, 1985).

MEDIATED VIOLENT INCIDENTS AND REAL AGGRESSION

Under this heading we can include studies that have examined secondary data sources concerning societal- or community-level occurrences of violent incidents, such as homicides and suicides, around the times when high profile media coverage was given to violent events such as murders, executions, prize fights and suicides of well-known public figures. This type of investigation represents another form of epidemiology, but instead of linking social violence trends to the spread of media, and the overall amounts of mediated violent content that people might experience, these studies focus on specific violent incidents that receive a lot of media coverage for a limited time period.

Evidence has emerged from analysis of official crime statistics that certain kinds of violent crimes increase in their prevalence, compared with normal, seasonal adjusted levels, following high profile violent incidents, such as the assassination of major public figures (Berkowitz & Macauley, 1971). Similar evidence has been reported in relation to major championship boxing matches, reports of murder cases or death sentences and executions (Phillips, 1983; Phillips & Hensley, 1984).

High profile stories about suicides, whether involving public figures or unknown citizens, also reportedly exhibited statistical links to increased rates of real-world suicides among teenagers in the United States, with girls exhibiting particular sensitivity to such stories (Phillips & Carstensen,

1986). Depictions of suicides in movies were reported to have similar effects on teenagers, with the claim that the effects were imitative in nature (Gould & Shaffer, 1986). An attempt at replicating the latter findings, however, have failed (Phillips & Paight, 1987).

Other researchers have challenged these findings on the grounds that the time lags between high-profile violent incidents, and the changes from normative levels of societal violence vary between types of mediated violent cases, and also have no clear explanation. Furthermore, none of these epidemiological studies were able to establish the extent to which these real-world cases had actually been exposed to the mediated events that allegedly served as trigger points (Baron & Reiss, 1985; Kessler & Stipp, 1984).

Marley, Marley and French (2014) conducted a time-series study to find out whether there was any evidence that violent video-game playing trends, the volume of online searches for information about certain games, and the release of specific new games, (often highly promoted and well-known brands such as *Call of Duty*, *Grand Theft Auto* and *Halo*) were related to violent crime rates (e.g., homicides and aggravated assaults). There was no evidence that trends in playing violent video games were statistically related to rates of violent crime, and no indication that the release of new violent video games triggered homicides or assaults.

MEDIATED VIOLENCE INTERVENTION EFFECTS ON NATURALLY OCCURRING AGGRESSION

Causal attributions can only be regarded as genuine statements of cause-effect, when they derive from studies that have investigated how specific media interventions may have changed the way people behave in their natural environments. Laboratory experiments offer the design control needed here, but lack the ecological validity. There have been two types of studies that have examined the effects of mediated violence on natural behaviour, as opposed to the analogues of aggression used in laboratory exercises: field experiments and naturalistic intervention studies.

Field experiments involve the systematic observation and measurement of social behaviour in non-laboratory conditions before and after a specific change has occurred in the nature of the participants' media experiences. Typically, these kinds of studies have taken place in school environments, institutional settings and in summer camps attended by young people. In these settings, pre-teenage or teenage children can be observed interacting with each other and with adults in different contexts (e.g., at play, while

studying and so on) over a period of days or even weeks. At some point in the research, the media 'diets' of the participants are manipulated by the researchers, such that some are 'fed' one type of media content (e.g., violent in nature), and others receive other content (non-violent).

Usually these studies have investigated televised violence effects in this way. The aim of the exercise is to find out whether changes occur in the nature of the social behaviour of both groups over time, and whether increases in aggressive behaviour are detected specifically among those individuals fed a violent television diet. Some evidence of this sort has supported the conclusion that a controlled diet of media violence in a natural setting can promote violent behaviour in children and teenagers (Friedrich & Stein, 1973; Leyens, Park, Camino, & Berkowitz, 1975; Parke, Berkowitz, Leyens, West, & Sebastian, 1977). Conflicting results have been produced with an explanation that young people fed a non-violent diet of television programmes can also display more aggression motivated by frustration over being denied access to their favourite programmes, which also contain violence (Feshbach & Singer, 1971).

Naturalistic studies have usually comprised opportunistic investigations of media 'virgin' territories, associated, for example, with the introduction of television for the first time to a country, region or community. There were several national studies of this kind conducted during the early days of television, in countries such as the United Kingdom (Brown, Cramond, & Wilde, 1974; Himmelweit, Oppenheim, & Vince, 1958), United States (Schramm, Lyle, & Parker, 1961); Japan (Furu, 1962); Canada (Granzberg, 1982; Joy, Kimball, & Zabrack, 1986; Williams, 1986); and the remote island of Saint Helena in the South Atlantic (Charlton, Gunter, & Hannan, 2002). The evidence from these studies was mixed, with the Canadian research revealing that children in a community receiving television for the first time subsequently displayed increases in some types of antisocial behaviour. Similar research in St Helena found no impact of television viewing on local children, even those with the most violent programme diets (Gunter, Panting, Charlton, & Coles, 2002).

A local intervention study manipulated the cable television feeds of married couples to direct violent programmes to one sub-sample of households, and non-violent programmes to another sub-sample over a period of 1 week. Observations of husbands by their wives indicated that those fed the violent programme diet displayed greater hostility and bad temperedness across the week (Loye, Gorney, & Steel, 1977).

The kind of naturalistic field studies reported in this section have not been repeated with video game studies, and would be difficult to mount anyway. Such is the ubiquity of video games, more so than any other form of mediated violence, especially on television, that finding virgin spots where people have had no relevant exposure has become increasingly difficult to locate. The observed restrictions on mounting this type of research also raise a wider point about the design of studies on the effects of video game violence.

Video-game playing does not occur in either a social vacuum, or in a setting devoid of other potentially violent media experiences. Separating out the effects of mediated from non-mediated violence experiences is difficult enough. Going one step further to differentiate between the effects of violent video game exposure as distinct from those of violent movies watched in a movie theatre, or violent programmes seen on television, is even more challenging.

Violent Video Games: A Threat to Real Aggression?

Researchers have engaged in a variety of methodologies and analytical perspectives to find out whether people's experience with mediated violence can influence how they behave in everyday reality. Some of the evidence derives from real-world incidents of violence, in which *post hoc* rationalisations of seriously violent crimes were sought in terms of perpetrators' alleged media experiences. Others sought to examine whether high-profile violent events reported in the media might trigger similar incidents to occur. Yet, others examined patterns of media consumption and crime statistics over time to assess whether there could be possible connections. When these types of study have been applied to violent video game consumption, no evidence of the effects on real-world violence has emerged.

There have been a small number of investigations in the mainstream-media violence literature that examined the effects of new media experiences, such as the introduction of television broadcasts, on communities that previously had had none. Similar evidence from video-game players is not available. There is clearly a gap to be filled in this context. This is an important gap, because ultimately we all need to understand the extent to which real-world behavioural risks are created by violence-themed video games.

The focus of this book so far has centred on the hypothesized antisocial effects that might follow from regular exposure to violent video games. Not all video games, however, are violent. Further, not all video games

that contain violence are exclusively violent. Some video games are characterised by prosocial themes designed to promote good behaviour. Other games contain a mixture of antisocial and prosocial themes. This raises questions about whether video games can promote positive social behaviours, and also about the possible neutralising effects of potential antisocial effects that prosocial content in video games might have. The next chapter turns our attention to prosocial video game effects.

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Can Video Games Promote Good Behaviour?

There has been a great deal of attention directed toward understanding the potentially harmful effects of playing video games, and this concern has understandably placed a spotlight on games with violent themes. It has been recognised, however, that the effects of playing video games are not invariably negative. There are many ways in which these games can promote positive effects, for example, in relation to cognitive development through exercising specific cognitive and perceptual skills (Greenfield, 1984; Greenfield, Brannon, & Lohr, 1994; Gunter, 1998). These effects can cut across cultures (Greenfield, Camaioni, et al., 1994). They can also flow from playing action video games with violent themes (Greenfield, de Winstanley, Kirkpatrick, & Kaye, 1994).

The significant aspects of video games, in terms of how they might influence players, can be found in relation to the way they are played, and the specific skillsets they require for players to be successful, and not just in their thematic content. Video games present players with tasks and challenges and sets of rules they must follow in playing each game (Larson, 2000). Becoming more skilled as a player represents a learning process, and that learning can sometimes produce skills that are transferable to other contexts beyond video-game playing. Often players must also learn to be committed and persistent in the face of the challenges that confront them during game play (Gee, 2008).

With some video games, the game's narrative requires players to think strategically, displaying the ability to organise themselves, as well as

different components, within the game (e.g., when players are provided with equipment or tools to help them overcome obstacles). In the case of games that are played with other players, there are interpersonal skills required to establish constructive working relationships (Busseri, Rose-Krasnor, Willoughby, & Chalmers, 2006).

The majority of studies on the effect of video games have concentrated on its negative side-effects, and most especially on the propensity for players to become addicted to game playing, to a clinically pathological degree, and even more on the negative social behaviour effects of playing with video games with violent themes. In this context, Adachi and Willoughby (2013) indicated that well over 200 studies had examined negative effects, compared with just 30 studies that had examined prosocial effects, of these games (see also Anderson et al., 2010; Bushman & Gibson, 2011; Gentile et al., 2009). Yet, there is a burgeoning literature built on research into the potential positive, prosocial effects of video games (Greitemeyer & Mugge, 2014). Just as it has been proposed that violence-themed video games can promote aggression through a variety of psychological mechanisms, this argument has been transposed to create the theoretical possibility that video games with prosocial themes can be equally adept at imparting more helpful, supportive and caring behaviour patterns, while also decreasing the propensity to behave in antisocial ways (Gentile et al., 2009; Greitemeyer, 2011; Greitemeyer, Agthe, Turner, & Gschwendtner, 2012).

Following early efforts to examine the efficacy of theories designed to explain the effects on human aggression of such mediated enactments of violence as are found in movies and television programmes, one theory emerged that has had the greatest influence over scholarly thinking on this subject. The general aggression model (GAM) was comprised of an amalgam of previous theoretical thinking that incorporated cognitive and behaviourist psychological theory (Anderson & Bushman, 2002; Anderson & Carnagey, 2004; Anderson & Huesmann, 2003). In their most comprehensive exposition and demonstration of this theory, Anderson and his colleagues (2007) acknowledged the contributions made by Bandura's social learning theory (Bandura, 1986), Berkowitz's cognitive neoassociationist theory (Berkowitz, 1984, 1990), Crick's social information processing theory (Crick & Didge, 1994), Geen's affective aggression theory (Geen, 1990), Huesmann's script theory (Huesmann, 1986), and Zillmann's excitation transfer theory (Zillmann, 1983).

The GAM has proposed that people internalise thoughts about aggression, and that they can learn from exposure to violent entertainment content. These thoughts represent ideas about violent actions and behavioural sequences and emotions associated with violence, which can combine with physical arousal, triggered by exciting entertainment content, to create a psychological condition under which the individual becomes more prone to display aggression within socially conditioned impulse control mechanisms, while at the same time becoming weakened or deactivated. In this state, there is an increased risk that an individual will behave in an aggressive way if placed in a situation in which such behaviour seems to be appropriate, or is actively encouraged.

This priming of aggression is not a one-off response or one that is triggered by specific mediated violent experiences. Repeated experiences of this kind can result in an accumulation of thoughts about aggression, and its association with a diverse range of social settings. Hence, the GAM can be used to explain, not only the psychological mechanism that can underpin short-term effects of violent entertainment experiences, but also longer-term, or cumulative, effects of such experiences over time.

In the research literature that has examined the potential of video games to trigger aggression, it has been recognised that negative psychological or social situations after playing violently themed games can occur at different levels: behavioural, affective and cognitive. Video games are not invariably characterised by violent themes. They can also promote pro-social behaviour and thoughts. The general aggression model (GAM) has been articulated to move beyond simplistic behaviourist explanations of violent media effects. It recognises that a diverse range of factors can come into play, or 'interplay', during video game play, which determines the nature of a player's psychological reactions to a game, and also shapes the ways in which they might behave afterwards. Behavioural outcomes that are antisocial in nature are no longer regarded as direct and immediate reactions to mediated violence experiences, but may derive from internal psychological changes, most especially emotional or cognitive in nature. If such psychological mechanisms can be invoked to explain, and can be empirically demonstrated to drive, aggressive dispositions, these mechanisms might also be explored in relation to more positive outcomes of video-game playing.

This idea has led to further expansion of the GAM into a general learning model (GLM). This model still acknowledges that a video game player might be psychologically influenced at cognitive, affective and behavioural

levels, and that any influences of playing these games can be short-term or long-term. It also recognises that any subsequent effects on video-game playing can be positive as well as negative depending upon the nature of the video game being played and other relevant factors, which characterise the nature of the game playing experience and the personality of the player (Buckley & Anderson, 2006).

Empirical evidence has begun to emerge to reinforce the predictions of the GLM from studies that have explored the prosocial as well as anti-social effects of video games. As we will see, this evidence has shown that prosocial effects can occur at cognitive, affective and behavioural levels. By promoting prosocial thoughts and emotions, prosocial video games can also enhance propensities to behave in prosocial ways (Greitemeyer & Osswald, 2010a, 2010b, 2011; Greitemeter, Agthe, et al., 2012; Saleem, Anderson, & Gentile, 2012a, 2012b). In the context of prosocial behaviour, research has been produced to show that such behaviour can be both enhanced and undermined by specific video-game playing experiences. Thus, playing video games with prosocial themes can promote positive behavioural dispositions (often underpinned by prosocial thoughts and feelings), and playing games with antisocial themes can undermine subsequent prosocial dispositions (Greitemeyer & Mugge, 2014).

Undermining Prosocial Behaviour

Initial studies of video games that touched on the topic of 'prosocial behaviour' were more interested in whether this behaviour could be discouraged or weakened by playing video games with violent themes, than with whether playing appropriately themed video games could actually promote positive social behaviour. Some early studies made comparisons between the relative effects of violence- and prosocially themed video games. The early studies of this sort found that children who reported more frequent playing of video games with themes of violence, or had stronger preferences for such games, also tended to display weaker prosocial orientations in their interpersonal behaviour (Anderson & Bushman, 2001; Chambers & Ascione, 1987; Wiegman & van Schie, 1998). These studies also generally confirmed other research into violent video games, finding that stronger violent video game preferences, and greater involvement with these games, resulted in the display of more aggressiveness in children's social behaviour (Anderson & Bushman, 2001; Wiegman & van Schie, 1998).

One investigation compared the impact upon children, between 8 and 14 years of age, of playing video games with violent and prosocial themes (Chambers & Ascione, 1987). The prosocial game used in this study was called *Smurfs*, released by Coleco, and entailed one character, controlled by the player, who rescued another character, while avoiding a series of hazardous scenarios. The violence-themed game was called *Boxing*, produced by Atari, and comprised a boxing match between two opponents and was controlled by two players.

This study was interested in finding out whether playing violent or prosocial themed video games made any difference to children's subsequent propensities to give and to be helpful to another person. The measure of giving was operationalised by giving each child US$1.00 in five cent pieces. After playing the video game, to which they had been randomly allocated, they were left in a room with a donation box, and could put as much money as they wished of the one dollar given to them into this box. In addition, while left alone in this room, they were given a chance to be helpful by sharpening some pencils for the researcher, or alternatively, they could choose to read a book instead.

The children in this experiment were between 8 and 14 years of age. What emerged was that the children who had played the violent video game gave and helped less than those who played the prosocial game. There was no clear indication that the prosocial game had made the children more generous or altruistic, but playing the violent game did appear to render them more selfish.

A longitudinal study of nearly 800, 10–11 year-olds in Japan, involving two surveys conducted 3 months apart, found that self-reported amount of video game use showed no significant relationship over time with social behaviour across the whole sample for girls (Ihori, Sakamoto, Shibuya, & Yukawa, 2007). Among boys, however, greater video game use predicted a decrease in prosocial behaviour. The children had also been asked how often they ever saw scenes in video games that also occurred in their real lives. The more often prosocial scenes were mentioned in this context in video games, the more likely the children came to behave in a prosocial way. Identification of violent or sexual scenes in video games, however, made no difference to later social behaviour. At the same time, children who exhibited stronger preferences for violent video games exhibited a decrease in their prosocial behavioural tendencies. Meanwhile, preferences for non-violent video games seemed to promote stronger prosocial behaviour. While these findings indicate that prosocial behaviour can

be undermined by playing violent video games (and enhanced by playing prosocial games), the actual measures of social behaviour were fairly blunt. The children were asked how often along a scale of one to five they had 'punched or kicked others' or 'was kind to other people' in the past month. Clearly, there are other ways in which antisocial and prosocial behaviour could have been measured, via verbal reports, that were not considered here.

In a German investigation with teenagers 12–13 years of age, data were obtained through self-reports and teacher reports about their personal aggressiveness, and through self-reports only about their media consumption habits. The latter were weighted in terms of the amount of violence-themed media outputs the teens generally consumed. Self-reports of media violence exposure did not just predict greater amounts of personal aggressiveness, as rated by teachers, but also predicted a reduced propensity toward the display of prosocial behaviour. These personal aggressiveness findings survived through the controls for moderator variables, and occurred among both boys and girls. The negative prosocial behaviour effects were significant only among boys (Krahe & Moller, 2011).

Sestir and Bartholow (2010) also examined the comparative effects of violent and non-violent videogames on antisocial and prosocial outcomes. While violent video game players exhibited stronger post-playing propensities to display aggressive thoughts and emotions, playing with prosocial video games had similar effects on the display of prosocial thoughts and feelings.

Playing a violent version of a video game was found to reduce the level of subsequent cooperativeness between players on a separate task, as compared with playing a non-violent version of the game. In this research, female and male undergraduate students were assigned as pairs to play with either a violent or non-violent version of the video game, *Doom* (Sheese & Graziano, 2005). In this game players have to navigate their way around a maze, and, in the violent version, opponents could use aggressive attacks to prevent their progress. After playing had finished, the pair of players were given the option to have their score increase by varying amounts, depending upon which of three options they chose. If they chose to cooperate, their scores would both be multiplied by a modest amount. If one chose to defect, their score would be multiplied by a more significant amount, however, if both defected they would have both their scores halved. If either decided to take the third option of withdrawing, their scores would remain the same. Participants' level of trust in their partners in terms of choosing to cooperate was unaffected by the version

of the game they played. Players of the violent version, however, were more likely than those playing the non-violent version to choose to defect in the hope that their score alone might be multiplied.

The potential of violent video game play to undermine the development and display of prosocial behaviour, and any underlying empathy, was demonstrated in research conducted with individuals in their late teens and twenties. These emerging adults were found to show weakened empathy for others in association with moderate to high levels of violent video-game playing. This emotional reaction also influenced the display of prosocial behaviour, which was less likely to occur among violent video game players, who also showed decreased empathic concern for the plight of others (Fraser, Padilla-Walker, Coyne, Nelson, & Stockdale, 2012).

Reduction of Aggressive Cognition

Despite the ultimate concern about the behavioural effects of playing video games, models such as the GLM have recognised that behavioural effects do not usually occur on their own. There are other psychological mechanisms at play that frequently determine, as much as the thematic content of a video game itself, whether a particular type of behavioural response will occur (Buckley & Anderson, 2006). At the outset, any mediated experience of violence is interpreted and stored away at a cognitive level. There is ample evidence that playing violent video games can trigger aggressive cognitions (Anderson & Dill, 2000; Bushman & Anderson, 2002). Hypothetically, therefore, there is every reason to believe that similar effects can occur in relation to video games with prosocial themes. There are two aspects of positive outcomes that might flow from video games with positive themes. The first of these is that negative thoughts are weakened or blocked, and the second is that positive thoughts become uppermost in the mind (Gentile et al., 2009; Grietemeyer & Osswald, 2009, 2010b; Grietemeyer, Osswald, & Brauer, 2010). Such effects could occur both in the short- and long-term as a result of playing video games with appropriate themes Gentile & Gentile, 2008; Swing et al., 2009). We will examine evidence for the first of these effects to begin with, and then turn to positive prosocial triggering effects later.

Greitemeyer and Osswald (2009) conducted two experiments with German university students to show that playing video games with prosocial themes could reduce the propensity to think aggressive thoughts. The experiments had two parts. The first part, which was the same in

both experiments, entailed playing with a video game for 10 minutes, after which, they evaluated it. The second part, in the first experiment, required participants to read and complete three stories that finished at points when their protagonists needed to take a particular type of behavioural decision. This could be either aggressive or prosocial in nature. The second part of the second experiment comprised a word completion task.

There were two video games used in these studies. The prosocial game was called *Lemmings*, and the neutral game was called *Tetris*. In Lemmings, players had to protect the creatures on screen and lead them to safety. In *Tetris*, players were confronted with falling geometrical shapes, which they had to position together correctly. After playing whichever game to which they were assigned in the first experiment, participants read and completed the three story stems.

The first story described a cyclist whose right of way was violated by a car at an intersection in the road, which almost caused a dangerous accident. The car stopped and the driver opened his window. Here the story stopped and the participant had to describe what happened next. The second story described how two friends had agreed to go to the cinema. One turned up 30 minutes early, while the other was 15 minutes late and unapologetic about it. They were further told that the person who had been kept waiting had had a hard day at work, and was looking forward to seeing the film. Once again, the story ended here and the participant had to describe how the main protagonist subsequently reacted to their tardy friend. In the third story, they were told about a woman at a restaurant who places her order after a long delay and then, after waiting for its delivery for 45 minutes, decides to leave. At that point the waiter arrives with her food and spills some of it over her. She spots the general manager of the restaurant at the back of the room, how then does she behave?

These stories were designed to measure the salience of aggressive or non-aggressive, socially constructive thoughts that might have been triggered by each scenario. The key question was whether the nature of a video game played beforehand might have primed a particular type of response. The results confirmed what had been expected. Compared to those participants who played with the neutral game, those who played with the prosocial-themed video game expected that there would be less aggressive responses from the protagonists in each story. In general, playing games with prosocial aspects seemed to neutralise the propensity to think of aggressive reactions toward social situations in which someone was provoked to anger.

In the second experiment, the first part of the study was the same, with the participants playing either a neutral or pro-socially themed video game. Afterwards, rather than reading and completing stories, participants were presented with a series of incomplete words and were asked to fill in the missing letters. The words had been carefully chosen to offer potentially antisocial and aggressive versions or non-aggressive versions. For example, one stimulus item in the list was: "sho_t". This could be completed as "shoot" (an aggressive word) or as "short" (a non-aggressive word). It was hypothesized that a prosocial game might reduce the likelihood of choosing the aggressive alternative, because it would reduce aggressive cognitions. This expectation was supported by the findings.

Perhaps the largest investigation to date on the prosocial effects of playing video games was a multi-study research programme conducted by Douglas Gentile, Craig Anderson and their colleagues in the United States, Japan and Singapore. This programme comprised a cross-section survey of children in Singapore, longitudinal surveys with children in Japan and an experimental study with college undergraduates in the US (Gentile et al., 2009). It was suggested by this research group that given earlier evidence of prosocial effects following the viewing of certain types of television programmes, there are reasons to believe that video games with the right kind of content could be similarly effective (Ostrov, Gentile, & Crick, 2006). Videos with prosocial content might provide prompts to behave in socially constructive ways, provide behavioural scripts to follow, present appealing role models to copy and also serve to reduce aggressive thoughts while enhancing more socially positive cognitions (Gentile & Gentile, 2008, Swing et al., 2009).

In the Singapore survey, children with a median age of 13 years were asked questions about their favourite video games. They were required to name their three favourites, and to indicate how much violent and hostile activity they contained. Further probing of participants was used to establish how much they played with video games. Measurements of the amounts of violent and prosocial video-game playing were ascertained. They were then given a battery of previously validated psychological tests designed to measure their attitudes toward aggression and prosocial behaviour, and their propensities to behave in these ways themselves. Statistical analyses were computed to establish the relationships between their personal behavioural dispositions, and the amounts of time spent playing violent and prosocial video games. The findings revealed that there were significant and positive relationships between playing prosocial

video games and exhibiting prosocial behavioural dispositions. Similarly, there was a significant relationship between the strength of violent dispositions, and the amount of time spent playing violence-themed video games.

In a second study that was conducted in Japan among teenagers 13–14 years of age and 16–17 years of age, respondents were asked to say how often in the previous month they had played video games with specified prosocial actions, and performed specific prosocial behaviours themselves (such as helping someone). This data was collected on two separate occasions, several months apart. The aim was to find out whether relationships between the types of video games played, and subsequent behavioural tendencies, developed over time. Results showed that there were significant links between playing socially positive and constructive video games at one point in time, and the propensity for youngsters to behave prosocially 3–4 months later. Relationships between these variables were bi-directional. Japanese teenagers, who exhibited greater amounts of prosocial video game play in the first survey wave, also reported greater prosocial behaviour on their own part a few months later. In addition, teenagers who displayed greater prosocial behaviour on the first survey occasion were also more likely to play with prosocial-themed video games several months later.

In a final study, conducted in an American university with a sample of female and male undergraduate students, each participant was assigned at random to play with either a prosocial video game, a violent video game or a neutral video game. Each game was pre-tested to confirm its thematic status. Participants played with specified segments of each game before moving on to the second part of the experiment. Here, they were teamed up with another person, and their partner was given 11 Tangram puzzles to complete. These puzzles involved making a specific shape out of smaller shapes in the form of squares and triangles. The participant was told that if their partner could successfully complete 10 of these puzzles inside 10 minutes, they would receive as $10 gift. The participant could influence the outcome by deciding which puzzles their partner should complete, and he or she could choose from puzzles classed as easy, medium or hard.

After playing the video game, and before starting the second part of the study, the participants evaluated the game they had played on a number of dimensions, and also completed an established psychological test designed to measure personal aggressiveness. The key measure, however, was whether they chose to 'help' or 'hurt' their partner in the second part of the experiment through the difficulty of the Tangram puzzles they chose for their partner to complete.

In general, the participants most often tended to select puzzles of medium difficulty, followed by ones classed as easy, and finally by ones deemed to be hard. There were variations to the pattern of puzzle choices, however, which were linked to the type of video game that had been played earlier. As expected, participants who had played with a prosocial video game were, relatively speaking, more likely to help their partner by choosing easy puzzles, and less likely to 'hurt' him him/her by choosing hard ones. In contrast, for participants who had played with the violent video game, the opposite outcome was observed.

Taken together, these three sets of studies were regarded by the researchers as supporting the GLM. Both short-term and long-term prosocial behaviour tendencies were associated with the types of video games played by young people. The experiment indicated that prosocial behaviour could be triggered by playing video games with more prosocial content, and could be reduced by playing games with more violent content. Over time, young people who reported a preference for video games with prosocial themes were also more likely to report behaving in prosocial ways in their own lives. Longitudinal evidence had also indicated that being a prosocial person could also mean having a preference for games with similar thematic qualities. Playing these games could then, in turn, feed prosocial cognitions and reinforce the probability that prosocial behavioural scripts would become an active part of the young person's behavioural repertoire. This process could be undermined by playing video games with violent themes.

Reducing Aggressive Emotions

At an emotional level, violence-containing video games have been linked to the development of emotional states that, in turn, can promote aggressive behaviour in the player, or render him or her less concerned about aggression in others (see Bartholow, Bushman, & Sestir, 2006; Bushman & Anderson, 2002; Carnagey, Anderson, and Bartholow (2007). There is other evidence, however, that shows that when video games have prosocial behavioural themes, they can counter the negative effects of violence in the video games, and even promote socially positive thoughts and emotions (Greitemeyer & Osswald, 2009, 2010a). We will return to these effects in the following sections of this chapter. At this point, however, evidence will be examined that shows how prosocial-themed video games can offset the enhanced emotional callousness that has been observed to

sometimes follow exposure to violent media content. In this context, the possibility is explored that prosocial content in video games can counter the desensitization effects of violent video-game playing.

Greitemeyer and Osswald (2010b) conducted two experiments with male and female students at a German university aged in their mid-20s to mid-30s. These studies have similar designs in that there were two parts to each study, though some of their details did differ. In the basic design, participants first played a video game for 10 minutes before being invited to take part in a second task, in which they read vignettes that described the misfortunes of other people. They were invited to give their opinions about these featured individuals; this was designed to measure how sorry they felt for them. The overall aim was to find out whether the type of video game played beforehand primed certain types of responses—positive or negative—toward the individuals featured in the vignettes.

In the first experiment, participants were randomly assigned either to play with a prosocial-themed video game called *Lemmings*, or a neutral video game called *Tetris*. In the first game, the player's objective was to take care of the lemmings and lead them to safety. In the second game, the player had to position correctly falling geometrical shapes. The vignette comprised a report of a court case involving the celebrity heiress Paris Hilton. Hilton was given a 36 month suspended sentence, and a fine, for a road traffic offence committed when driving, while already serving out a driving ban for a previous offence. Participants were questioned afterward concerning their feelings about Paris Hilton, and in particular whether they got some pleasure from her misfortune, or felt happy and relieved for her that she had not been incarcerated. After completing this task, participants were given two essays to evaluate, which were supposed to have been assessed by another person who had failed to turn up. In the case of these essays, one author had recently separated from his girlfriend and the other had broken his leg. These misfortunes were apparent in the things they had written about in their essays. Participants were asked to say how sympathetic they felt about each author.

The results showed that participants who had played with the prosocial video game displayed less *schadenfreude*, that is, pleasure at the misfortune for Paris Hilton, as compared with those who played with the neutral video game. The same result emerged for the evaluations of the authors of the two essays. Thus, there was evidence here, for both female and male players, that playing a video game with prosocial content could weaken any callous feelings they may have had about other people who had experienced upsetting incidents.

The second experiment had largely the same design as the first, except that an individual antisocial themed video game was added, and the Paris Hilton vignette and two essays were replaced by a single vignette, which described how two men entered the home of a wealthy music producer and his young girlfriend, and stole a large amount of money from him. Participants were tested for their sympathy toward the victim in this case. The antisocial video game was similar to *Lemmings*, but rather than saving the creatures in the game, the objective for the player was to destroy them.

The results showed that playing the prosocial video game reduced feelings of pleasure at the music producer's misfortune in being robbed, as compared with the other two game conditions. There was no significant difference on this measure as a function of playing the antisocial or neutral game however. Greitemeyer and Osswald (2010b) felt that this research added to the literature surrounding the GAM, and supported the wider GLM by showing that lessons could be learned from playing differently themed video games; and that it could produce subsequent affective responses that could be shaped just as readily by prosocial content, as by antisocial content in video games.

Saleem et al. (2012a) randomly assigned 230 female and male college undergraduates across six different video games, two of which had violent themes (*Crash Twin Sanity, Ty2*), two had prosocial themes (*Chibi Robo, Super Mario Sunshine*) and two were neutrally themed (*Pure Pinball, Super Monkey Ball Deluxe*). Paper and pencil instruments were administered to all the participants to measure their current hostility mood state (Anderson, Deuzer, & DeNeve, 1995) and the aggressiveness of their personality (Buss & Perry, 1992). A further instrument was administered, which had been designed earlier to measure 'prosocial tendencies' (Carlo & Randall, 2002). The trait aggression and prosocial measures were completed before video-game playing took place. Participants played with their assigned game for 20 minutes, and then subsequently completed a video game evaluation questionnaire, the state hostility instrument, and provided further demographic details.

Participants who played with violence-themed video games displayed higher states of post-playing hostility than those who played either the prosocial or neutral video games. There were further effects of trait aggression which had an effect of its own as well as interacting with the type of video game played. Thus, participants who played with prosocial and neutral video games displayed significantly higher post-playing hostility if they also scored higher on trait aggression, than those who scored low

on this dimension. Further analysis revealed that the type of video game played affected hostility levels primarily for low trait aggression participants (making them feel more hostile if they played a violent video game, than a prosocial or neutral video game), while having little effect on mood state for those who initially scored high on trait aggression.

A similar pattern of effects occurred in relation to displaying a more positive mood state. This state was significantly more likely to be registered for participants who played the prosocial or neutral video games, rather than the violent video games. This positive mood state was also more likely to be uplifted for participants who scored low on trait aggression, during play with prosocial or neutral video games, as compared with playing violent video games,. For those high with trait aggression, the type of video game played made little difference to their post-playing mood state. The further mood state of 'aggravation' was distinguished by the researchers, and this tended to be higher for participants who played with the violent video games than the prosocial or neutral video games. This video game effect occurred for all participants regardless of their pre-playing trait aggression levels.

Overall, then, Saleem et al. found that playing with prosocial video games reduced state hostility levels, and other feelings of anger and irritation, whereas violent video games magnified these feelings. Such effects were strongest among individuals with the weakest pre-existing aggressive tendencies. While it was reassuring that prosocial-themed video games could trigger more positive effects and reduce negative (i.e., aggressive) effects, these effects tended to be stronger for some personality types than for others. This also meant that while aggressive personalities expressed hostile feelings anyway, regardless of the game they played, non-aggressive personality types could be rendered more angry after playing violence-themed video games, and were less likely to express positive feelings.

Enhancing Positive Cognitions

A number of cognitive benefits have been recorded from playing video games. In the context of violent video games, of course, the kinds of effects deemed to be most relevant are changes to internalised aggressive and prosocial behavioural dispositions. Media violence effects have been shown to manifest in terms of verbalised aggressive thoughts, as revealed by psychological tests designed for this purpose (Anderson & Dill, 2000; Anderson et al., 1995; Anderson, Carnagey, et al. 2004). Meanwhile,

prosocial media content, including video games, with prosocial themes can reduce aggressive thoughts (Greitemeyer & Osswald, 2009). Can video games with prosocial themes also promote socially constructive, cooperative and positive thoughts? Before turning to the evidence concerning this last question, it is also relevant to reflect on other cognitive benefits that have been seen to flow from playing video games, including some video games with violent themes.

Playing violent games has been found to involve the practice of cognitive skills that can prove useful beyond the game-playing settings. The control of on-screen characters as well as overcoming challenges and obstacles, which confront a player in video games such as *Grand Theft Auto IV* and *Halo 4* and other 'first-person shooter' games, can condition high level visual processing and mental rotation skills (Green & Bavelier, 2012). These skills can be trained best with commercial and violent video games, which seem to be able to enhance these cognitive abilities very quickly (Uttal et al., 2013). These visual and spatial skills can be important to success in engineering, mathematics, science and technology (Wai, Lubinski, Benbow, & Steiger, 2010). These STEM subjects have been acknowledged to be vital to the creation of successful economies in the modern global marketplace.

Playing with video games can train players to develop pattern recognition skills, an ability to switch their attention rapidly from one task to another and to be able to rapidly sort out, from multiple incoming streams, the information that is most important to process in specific situations. These abilities are conditioned by video-game playing at a neurological level (Bavelier, Achtman, Mani, & Focker, 2012). Violent adventure games have been found to condition these skills more effectively than games produced explicitly for educational purposes, mostly because commercial action-adventure games have more sophisticated virtual spaces for players to navigate (Green & Bavelier, 2012).

Violent action games have not always emerged as better than strategic games, which require strategic problem solving and role playing. Much depends, however, on the precise nature of the cognitive skills being assessed. Problem-solving skills that require reflection, rather than the parallel processing of multiple information streams, are less likely to be enhanced by violent action games (particularly by first-person shooter or racing games, which can strengthen visual-spatial processing), than by role playing games, which involve slower-paced, but strategic thinking (Adachi & Willoughby, 2013).

Even violent video games might be able to promote prosocial cognitions if they contain prosocial themes integrated within their content. In a pair of experimental studies, a violent video game, in which the aggression had a prosocial motive (the perpetrator used it to help protect a friend who was trying to achieve non-violent goals), triggered lower levels of short-term aggression and higher levels of prosocial cognitions, as compared with a violent game in which the violence had purely selfish motives. This study indicated that it cannot be presumed that all forms of mediated violence within video games will affect players in the same way. The motives of the perpetrator of aggression on screen serve as important moderating factors that can influence the eventual psychological impact on players. Despite the variance in violent video game effects, difference and the promise of prosocial elements within an otherwise violence-themed game, the latter did not produce such strong prosocial cognition effects as a fully prosocial video game (Gitter, Ewell, Guadagno, Stillman, & Baumeister, 2013).

One important review of this evidence created a useful conceptual map for identifying which video games were best equipped to condition and hone specific types of cognitive skills. While some games were useful for strengthening complex combinations of cognitive skills, others were better for developing specific cognitive skills. Some games had themes and pro-duction attributes that focused on social skills, and others were concerned more with non-social scenarios. According to these reviewers: "… specific types of video games seem to enhance a suite of cognitive functions, some of which appear to generalize to real-world contexts" (p. 70). Perhaps more poignantly, they also observed that: "At the very least, the research on the negative impact of these games needs to be balanced with evidence for the cognitive benefits of these same games" (Granic, Lobel, & Engels, 2014, p. 70).

ENHANCING POSITIVE MOOD STATE

Much of the experimental and survey research about video game vio-lence has produced findings supporting the conclusion that exposure to violence-themed games increases the aggressiveness of players, and that this can operate through enhancing aggressive cognitions and mood states that, in turn, promote the overt display, or enactment, of aggression. Evidence has emerged, as reviewed earlier in this chapter, that playing prosocial-themed video games can enhance positive mood states as well as offset negative mood states (Saleem et al., 2012a). Further research

evidence has indicated that even violent video-game playing can enhance positive mood states under some conditions, and therefore, create a psychological climate that decreases the likelihood of aggression.

Ferguson and Rueda (2010) combined experimental and survey evidence to indicate that, not only did violent video game play fail to trigger more aggression in players, but that their history of involvement with such games was associated more with reduced, rather than enhanced, depression, which was, in turn, known to be psychologically linked to hostility proneness. The research was carried out among a sample of 103 young adults in a southern state in the US. Virtually all these participants were Hispanic. They provided data about their background, aggression proneness, depression, and video game habits on a series of questionnaires and established psychological tests and also took part in an experiment that was designed to test whether video-game playing could trigger hostility under controlled conditions.

The experiment had three stages. In the first stage, the participants performed a mathematical task in audio that entailed adding each new presented number to the previous number. The result of this calculation generated a third number, which could provide interference with the correct memory of the previous number. Often participants made the mistake of adding the new number in the sequence to the result of their previous addition calculation, rather than to the previously presented number. The speed of the presentation of the numbers was accelerated, making the task progressively more difficult and frustrating when mistakes were made. Although this task was originally developed for other purposes, it represented an effective device for creating frustration and a state of irritation in participants, and therefore provided a source for anger provocation.

After completing this task, the participants were assigned at random to one of four conditions. These conditions involved three video-game playing conditions and a control condition, in which no video game was played. Two of the video games were violently themed, and the third was equally exciting, but essentially non-violent in nature. Among the two violent games, a player occupied a role in the game either as a 'good guy', in the first case, who used violence to help others, or, in the other game, as a 'bad guy' who used violence for personal benefit. Game playing lasted 45 minutes. In the control condition, participants expected to play a video game, but were told that a computer breakdown meant that this was not yet possible.

After video-game playing had finished, or, in the case of the controls, after an equivalent period of time had lapsed, participants took part in a reaction time test with another unseen person. Each time that person made a mistake they could punish the response by pressing a button to deliver an unpleasant blast of noise to the recipient. The duration and strength of noise delivered were under the control of the participant, and served as measures of aggression. In addition to this task, the participants also completed the depression and hostile feelings tests for a second time to see if these mood states had changed over the duration of the experiment.

In subsequent statistical analyses, it emerged that participants who played the video games—whether violent or non-violent—displayed less aggression than did those in the control group. There was no indication that the type of video game played had any effect on short-term depression, or hostility changes. Participants with the highest scores on these variables also displayed the highest trait aggression, however.

In a follow up series of correlational analyses, utilising the questionnaire data from the sample, which were combined with the data from the experiment, it emerged that the best predictors of hostile feelings for the post-test stage of the experiment were the hostile feelings in the pre-test stage. Prior self-reported experience with violent video games was related to reducing feelings of depression and hostility in the later stage of the experiment. One interpretation of this result, according to its researchers, was that violent video games could exert a calming effect on individuals experiencing depression and hostility (Ferguson & Rueda, 2010). Of course, this study offered no direct test of such effects, but the correlational data were indicative that such an effect might exist.

Playing a prosocial video game has been found to generate affective responses that go beyond immediate personal mood states after play has ended. Playing a game, in which the main purpose, and objective, is for the player to care for and support an on-screen character, can generate feelings of altruism and selflessness that in turn produce an altered world view, in which the player's own sense of humanity is sharpened and his or her perceptions of humanity, in general, take on a much more positive hue (Greitemeyer, 2013).

REDUCING AGGRESSIVE BEHAVIOUR DISPOSITIONS

As we have seen already, prosocial-themed video games can enhance prosocial thoughts and feelings, while also acting to weaken aggressive cognitions and emotions. In many experimental studies on video game effects,

the counterbalancing effects of violent versus prosocial game playing have often been inferred from the differential outcomes of the experiment's conditions, in which participants were exposed either to antisocial or prosocial video content. In practical terms, however, these different elements could occur within the same game. What happens, then, if prosocial elements are integrated with antisocial ones within a single video game? The effects of this type of game have been investigated with interesting outcomes.

Evidence has emerged that the motives of the aggressive protagonist within a video game seem to be taken into account by game players in weighing up the justification for any on-screen violence. Even in a video game that is violent in nature, the presence of prosocial reasons has been found to weaken its expected antisocial effects. One empirical demonstration of this observation came from research in which participants either played with a violence-themed video game in which the violence had a prosocial motive, provided in the form of protecting a friend in order to enable him to pursue and complete, essentially, prosocial end-goals, or played a game with more ambiguous motives. The game with the prosocial aims triggered more positive sentiments among players than did the other game. It also resulted in them showing weaker aggression in a subsequent task. Although aggression was not totally eliminated, it was less pronounced when a violent video game incorporated positive goals within its narrative (Gitter et al., 2013).

Sestir and Bartholow (2010) compared the influences of violent and non-violent video games. They examined the effects of first-person violent video games, and non-violent puzzle solving video games. They also tested for aggression immediately after game play had finished, and then again, following a 15-minute delay. Participants who played a violent video game exhibited significantly more aggressive thoughts (as assessed through a word completion task), and reported significantly more hostile feelings as did those who played a non-violent video game. After a 15-minute delay, however, both aggressive thoughts and feelings decreased to a point where the violent video game group did not differ from the non-violent video game group.

In a study of college students and their video-game playing preferences, researchers found that high and low scorers on the Buss-Perry aggression questionnaire of trait aggression exhibited little difference in the amounts of video game play. Players of non-violent, role-playing games, however, exhibited less likelihood of behaving aggressively toward another person in a post-playing test, as compared with players of a violent action video game or non-players (Puri & Pugliese, 2012).

PROMOTING PROSOCIAL BEHAVIOUR DISPOSITIONS

Evidence for the positive social behavioural effects of playing video games has derived from a number of different types of study. It comprises the self-attributed effects of playing on the part of players themselves; the association between frequency of video-game playing and the players' propensities to display prosocial behaviour; and, finally, experimental research designed to demonstrated cause-effect relationships between playing video games with prosocial themes and subsequently being more inclined to behave in a prosocial manner.

In-depth interviews with adolescent American boys between the ages of 12 and 14 years have revealed that the best-liked video games enable players to get psychologically involved with the on-screen characters, who must display admirable attributes such as resilience and courage. As one boy who was interviewed in this study remarked: "What I like about [*Grand Theft Auto*] *Vice City* is, I like Tommy Vercetti because he never gives up and he never quits or anything …" (Olson, Kutner, & Warner, 2008, p. 63).

Players also liked games that enabled them to become engrossed in fantasy narratives linked to power themes. Any violence that was present in these games was clearly differentiated from violence that might be encountered in reality, and players realised that the consequences of real violence could be much more severe than those shown in video games. There was little evidence that these boys attributed any adverse effects of playing violent video games, either for themselves or their friends. Video games had wider social consequences and significance for adolescent players because they often played alongside, or with, their friends, and might link with new people via online gaming networks (Olson et al., 2008).

The general learning model (GLM) has been developed to explain how video games can generate social behaviour effects in players. Despite the focus of much of the research in this field on the, often, aggressive reactions of players in situations experienced after playing violent video games, the GLM allows for other kinds of effects to occur as well. Essentially, the GLM provides an explanation of how many behavioural effects could occur, and recognises that the actual nature of any post-playing behavioural dispositions and patterns are dependent upon the thematic content of the video game (Buckley & Anderson, 2006; Gentile, Groves, & Gentile, 2013).

Larger scale surveys have yielded further confirmation that the social *supplement* role is distinct from the social *substitute* role of video games.

Sixteen-year-old Americans who were regular players of video games reported greater levels of family closeness, involvement in a range of activities with others, strong attachment to their school and a general positive outlook on life than did non-players. This finding was true for both female and male video game players. Rather than showing that video-game playing was spawned by, and has further reinforced, social isolation, research has indicated that regular video gamers enjoy active friendship groups and social lives. Coupled with this pattern was the additional finding that heavier users of computer games were also more likely to engage in risky behaviours, and were more likely to get involved in disputes and conflict with others, including disobeying their parents (Durkin & Barber, 2002).

Survey research conducted in two Asian countries has provided further evidence of correlations between playing video games with prosocial themes: the self-reported propensity to help and be supportive to others, to experience empathy with others' feelings and to behave in a cooperative manner with other people (Gentile et al., 2009). These findings emerged at one point in time among teenagers in Singapore, and over time among pre-teens and teens in Japan. The Japanese results indicated that greater frequency of playing prosocial video games at one point in time predicted more regular display in prosocial behaviours by young people 3–4 months later (Gentile et al., 2009).

One negative effect of playing video games has been that it can lead to social isolation, or serve to further isolate children who already have few friends, and an empty social life. The social networking function of playing violent games, observed previously, would seem to question the veracity of this observation. Indeed, further research with Japanese teenage video-game players found that playing video games represented an integral component of their social lives; and instead of representing a substitute for direct, face-to-face social interaction, it often provided a channel for keeping further in touch with established friends. When players were temporarily apart from their friends, they could re-engage with them while at home through online video-game playing (Colwell & Kato, 2003).

Experimental research has emerged to show that when young people play with prosocial-themed video games, specific positive behaviours can be subsequently triggered and displayed, including an increased propensity to help others. In one series of four experiments, players exhibited increased helping behaviour after playing a prosocial video game, as compared with playing a neutral-themed video game. This behaviour took the forms of being more likely to help another person when they had a mishap

in front of the experimental participant, being more likely to agree to assist in further experiments as a favour to the researcher and being more likely to step in to calm down a situation involving another individual being harassed. These behaviours were apparently accompanied by, and possibly also promoted by, a greater presence of prosocial thoughts after playing a prosocial video game (Greitemeyer & Osswald, 2010a).

Sara Prot, Douglas Gentile, Craig Anderson and a large group of their colleagues reported a major international study on prosocial video-game playing and its potential effects on prosocial behavioural tendencies among teenagers and young adults in seven countries (Australia, China, Croatia, Germany, Japan, Romania and the United States) and pre-teenage and teenage children in Singapore (Prot et al., 2014). Respondents in the multi-nation survey provided data on their three favourite television shows, movies and video games, as well as frequency estimates concerning the regularity in which they used these media. Nominated favourite items were then rated by respondents for their prosocial and violent content, and scores, aggregated across these items, produced prosocial and violent content scores for the category of medium. Dependent measures included a pre-established empathy scale (Davis, 1980, 1983) and a prosocial behaviour scale (Cheung, Ma, & Shek, 1998). In the second study, conducted in Singapore, respondents provided data only about their preferred video games, and how often they used them, together with their responses to an empathy scale devised for their age group (Funk, Fox, Chen, & Curtis, 2008) and the scales from the same prosocial orientation questionnaire used in the first study. Respondents, on this occasion, were surveyed three times on an annual basis.

The international survey found that greater use of prosocial media was related to stronger empathy, and a higher level of prosocial behaviour orientation. These results exhibited a considerable degree of consistency across countries, varying in magnitude, to some extent, between Western countries, Eastern Europe and Asia, but achieving statistical significance throughout. Throughout, violent media use was related to weaker empathy, and then, in turn, to weaker prosocial orientation. In the longitudinal survey in Singapore, the amount of prosocial video-game playing reported during the first survey was positively and significantly related to empathy levels on the second survey, and to stronger prosocial orientations in the third survey. Greater playing of violent video games had the opposite result, with later empathy and prosocial behaviour levels being lower. Furthermore, if respondents exhibited gradually increased amounts

of prosocial video-game playing over time, this further magnified the effect of prosocial behaviour. Equally, if they played with violent video games more often over time, this resulted in much weakened prosocial behaviour, which seemed to also operate through a weakened propensity to display empathic feelings.

In an experimental investigation of violent, non-violent and prosocial video games, Tear and Nielsen (2014) found that the type of game played made little difference to the subsequent prosocial behaviour of teenagers, measured in terms of their willingness to pick up a pen accidentally dropped by another person in the room. Playing a prosocial game did not make this helping behaviour any more likely to occur than in the case of the control group, which was neutral in terms of antisocial and prosocial content; also, playing a violent video game made this behaviour no less likely to occur.

Greitemeyer, Agthe et al. (2012) conducted an experiment to show that, just as enhanced aggressive behaviour after playing a violent video game might operate through initial internal factors, including changes to aggressive cognitions and feelings, as predicted by the GAM, the broader version of this model—the GLM—provides a theoretical basis for explaining similar processes, which could promote enhanced prosocial behaviour on the part of players of prosocial video games. The predictions of the GLM, in relation to the effects of violent versus prosocial video games, have been confirmed elsewhere with children between the ages of 9–14 years. In this case, children assigned to play with a prosocial video game subsequently displayed enhanced helping orientations, and were less likely to seek to hurt another person; the reverse of what was found among those who played with a violently themed video game (Saleem et al., 2012b).

Importance of Prosocial Evidence

This chapter switched the attention to the prosocial effects of video games. The concern over the possible effects of violence-themed games is understandable, but it also draws attention away from the fact that not all video games contain violence, and not all games than contain any violence at all are totally defined by it. As the research reported in this chapter has indicated, prosocial themes in video games can promote prosocial thoughts and feelings that might, in turn, enhance the likelihood of prosocial behaviour being displayed by players of these games.

Another finding of importance is that prosocial themes in video games might offset the negative effects of antisocial themes. If this finding is

valid, and reflects how we might expect players to respond, it provides a means of cancelling out the effects of negative video games. Further research is needed to confirm some initially promising results. For one thing, we need to know whether prosocial studies to date can be regarded as devoid of the methodological limitations that have been identified for studies of violent video game effects. What also needs to be determined is how much, and what type of, prosocial content is needed to cancel the effects of a specific amount, and type, of violent video content. Hence, in a violence-themed "shoot 'em up" game, in which the player engages with multiple violent acts on screen, what kind of prosocial material might effectively reduce any aggressive arousal triggered by that experience?

Determining any potential neutralising effects of prosocial video game content on an experience with violent video game content needs research that identifies, and defines, different classes of both types of portrayal. Experiments could then be constructed in which different combinations of types of violence, and types of prosocial portrayal, could be tested on players. Their propensities to show aggressive thoughts, feelings and behaviours would then be subsequently measured. Looking beyond this, we might also need to investigate differences in the diets of specific players, and the extent to which their playing records are characterised by specific thematic mixes.

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Are Some Players More Susceptible Than Others to Video Game Effects?

Video games represent a highly popular and widely utilised form of entertainment among children and young adults around the world. The use of these games can vary greatly, however, from one child to the next. There are developmental changes in the amount of time devoted to these games, which occur throughout childhood. Compared to their earlier childhood years, when children enter adolescence, their amount of video play drops away. There are also gender differences in video-game play, with these games being used more extensively by boys than by girls.

From the perspective, not just of the use of these games, but of their possible effects upon players, there are other important factors that characterise children. The consensus position that violent video games can cause increased aggression in players is predicated on a specific interpretation of research evidence on this subject. It is presumed that experiments provide compelling evidence of causality in relation to playing violent video games, and its subsequent aggression. It is also assumed that statistical correlations, between self-reports about video-game play and personal aggressiveness, further reinforce the presumed direction of causation from game playing to subsequent psychological changes in the character of players.

There is a different way of interpreting these findings, however. In relation to the self-reported evidence of questionnaire-based surveys, the statistical degrees of association between reported violent video-game playing and player aggression could reveal something else going on. Rather than

the aggression that players report being caused by their playing of violent electronic games, it is also feasible to conclude that their aggression is the result of other genetic or experiential factors; and that these factors also create a disposition that enjoys, and seeks out, video games with violent themes. This 'reverse' hypothesis for explaining statistical relationships between exposure to violent entertainment content and personal aggression has been invoked before in debates about the alleged effects of televised or film violence. This hypothesis is not simply based on simple conjecture, or purely theoretical argumentation. There is empirical evidence to back it up.

What is also important, in the context of understanding how players might react to violent video games, is that not all players are the same. Even leaving aside, for one moment, the obvious fact that video-game players can vary in terms of their gender, age, family and social backgrounds, intelligence and educational performance, ethnicity and cultural background and associated beliefs systems as well as in their personality profiles, we know that no two players will respond in exactly the same way to the same video game experience. There is evidence to demonstrate this fact even before we begin to dig around for explanations. One study with adolescent video-game players in Australia found that while playing a violent game called *Quake II*, some participants showed increased anger during and after the game, as compared with baseline measures taken before they interacted with it, others exhibited a drop in anger level and others showed no change. Indeed, the majority of those observed and measured in this study exhibited little or no change in their anger levels when soundings were taken before, during and after game play (Unsworth, Devilly, & Ward, 2007).

Personality characteristics have been found not only to be potential influences over the choices of media entertainment for consumption, but also may relate to the way media consumers might subsequently be affected by it. Individuals found to possess aggressive traits also display a greater liking for media violence. Young people who scored higher in trait aggression, or had a propensity to engage in delinquent behaviour, also were more likely than their non-aggressive and non-delinquent peers to select television programmes, known for their violence, as their favourites (McIntyre, Teevan, & Hartnagel, 1972; Robinson & Bachman, 1972). Similar findings have emerged among American teens between the ages of 13–17 years, where preferences for violent video games were stronger among those diagnosed with pre-existing emotional and behavioural difficulties (Kronenberger et al., 2005).

Prior aggressiveness and other personality traits have also been identified as mediating variables that shape later emotional, or behavioural, reactions to screen violence. There is a body of evidence that states that reactions to screen violence are shaped by pre-existing behavioural and emotional difficulties, and that these relationships emerge during childhood (Mitrofan, Paul, & Spencer, 2009). The kinds of psychological problems highlighted here have often been linked, in their own right, to a propensity to display aggressive and other antisocial tendencies. Thus, children with behavioural and emotional problems have been found to exhibit increased aggressiveness with other children and less compliance with rules after watching animated cartoons with high levels of violent activity; whereas similar programmes, containing little or no violence, did not produce such reactions. Findings also emerged that watching a low-aggression cartoon resulted in lowered interpersonal aggression in play with other children later on (Gadow & Sprafkin, 1987, 1993; Gadow, Sprafkin, & Ficarrotto, 1987; Sprafkin & Gadow, 1988; Sprafkin, Gadow, & Grayson, 1988). Yet, the same authors also reported from one of their experiments that both a low- and high-aggression cartoon subsequently increased the aggressiveness of behavioural and emotionally disturbed children (Gadow & Sprafkin, 1987).

Gender Differences

One of the key individual difference factors associated with a propensity to aggression, and a liking for violent entertainment, is gender (Gunter, 1985). It has often been assumed that boys are more prone to react aggressively than girls because of differences in cultural conditioning, and such gender differences will occur in the ways boys and girls, or men and women, react to media violence (Bartholow & Anderson, 2002). In the present context, gender differences have been observed in relation to video-game play. It would be an over-simplification to take this hypothesis at face value. The empirical evidence on this point has not always produced consistent, or expected, outcomes.

Although the playing of video games has commonly been classed as a male activity, the fact is that girls have also been prominent players of these games. Even by the early 1990s, researchers working in this field noted that, while male players outnumbered females, clear majorities of girls who were surveyed admitted to playing these games (Funk, 1993). In fact, by their teens, most girls were, on their own admission, regular players of these games (Colwell & Payne, 2000).

As we saw in Chapter 2, both boys and girls have exhibited enthusiasm for playing video games with violent themes. The main gender difference was that girls preferred violence that was played out in fantasy settings with animated characters, whereas, boys preferred games with more realistic violence enacted by human characters (Funk, 1993). There was further evidence from this research that, for girls, the amount of time they spent playing video games, whether at home or in arcades, increased the lowering of their self-confidence (Funk, 1993).

Longitudinal research found that adolescent boys and girls with a preoccupation with playing video games, classed as 'pathological in nature', differed in apparent behavioural outcomes, with boys being much more likely than girls to record greater propensities toward the display of physical aggressiveness in a later survey. Other results from the same study, however, indicated that the gender difference in behavioural outcomes for pathological gamers might have resulted from boys playing mainly violent games, and girls playing mainly non-violent ones. In another analysis, among all young gamers, girls who exhibited a particular taste for violently themed games were no less likely than boys, with similar tastes, to exhibit increased aggressiveness later on (Lemmens, Valkenburg, & Peter, 2011).

One of the factors that naturally led to an assumption that boys were more likely to play with video games than were girls, was that most of these games had themes that were 'masculine'. In Chapter 2, we noted that, for a long time, female game characters were rare, and, when they did appear, their 'parts' were not as central to the narrative as were those given to male characters. As in the mainstream mass entertainment media, such as film and television, there was a lot of gender stereotyping with gendered role allocations within video games. Female characters displayed conventionally, and stereotypically, 'feminine' qualities. They were there to be helped, supported and rescued by male characters (Bryce & Rutter, 2005).

One of the core attributes of this orientation was the prevalence of violent themes. As we saw earlier when examining video game genres, violence has characterised many of the main types of video games. There seem to be relatively few genres that are devoid of violence. Violent role models, if they can be described as such, appearing in video games have tended to be male. Yet, this pattern of production changed with the appearance of a high profile, and very popular, female video game heroine, Lara Croft, in the best-selling video game franchise, *Tomb Raider* (Richard & Zaremba, 2005). The profile of this game was further enhanced with a spin-off movie release, starring Angelina Jolie.

Whether males and females react differently to video games, and behave differently after the playing has finished, has also been found to be influenced further by the style of play. For instance, if a video game is played with others in a cooperative way, it might not give rise to aggression stimulation, even though it contains violent action sequences in which players become involved. When it is played in a competitive fashion, however, this changes, and genders respond differently. One study found that after competitive violent video-game play, boys subsequently displayed more aggression, whereas girls did not (Lightdale & Prentice, 1994).

One reason why female players have different tastes from male players, when it comes to video games with violence, is because they are wired to respond differently to mediated violence (and also to real aggression). Males can become more physiologically aroused by violent video games in a way that they find pleasing, as compared with female players (Tafalla, 2007). There is evidence as well that, when asked, females simply dislike a lot of violence in video games (Hartmann & Klimmt, 2006).

Thomas and Levant (2012) examined the endorsement of traditional masculine ideology as a mediator of players' reactions to violent video games. Men who played violent video games more often, also displayed more pronounced aggressive dispositions, and this relationship was strongest among individuals who subscribed to a more traditional masculine self-concept, in which 'aggression' was more generally accepted as a natural attribute of 'maleness'.

Personality and Choosing to Play Violent Video Games

Personality can be theoretically of potential importance in understanding video-game playing and its effects, because it embodies a wide range of psychological dispositions that relate to how individuals react to the world around them. These dispositions are determined in part by genetic inheritance, and in part by environmental experiences and learning. Personality characteristics have a large degree of permanence about them; although the kinds of responses, to which they give rise in different social settings, can be reconditioned over time. They are independent of gender and other demographic attributes of individuals; and, whereas, the latter variables are largely descriptive in nature, personality dimensions refer to dynamic psychological structures and processes, which shape the way information

from the surrounding environment is interpreted, and the kinds of cognitive, affective and behavioural reactions that follow.

Turning to the act of playing video games, a number of psychological factors have been discovered as bearing systematic relationships to this behaviour. One of these factors is the way individuals perceive themselves. Self-concept has emerged as a potentially relevant and discriminating individual difference factor in relation to video-game play. Hypothetically, this concept has relevance in that motivation for extensively engaging with video games can derive from a general lack of social competence and self-confidence (Przybylski, Weinstein, Murayama, Lynch, & Ryan, 2012). The self can be defined along a variety of psychological dimensions (Harter, 1986).

One distinction can be made between a person's perception of their actual self (the kind of person they think they are), and their ideal self (the kind of person they would most like to be). Some researchers have, nonetheless, reported that self-concept measures bore no significant relationships with the amount of time young people spent playing video games (Creasey & Vanden Avond, 1992). Elsewhere, however, empirical evidence has emerged to show that, when the players' experiences of their virtual selves, within a video game environment, matches their concept of their ideal-self, they become more deeply immersed in the interactive aspects of the game (Przybylski et al., 2012).

PERSONALITY, ADDICTION PRONENESS AND SOCIAL WITHDRAWAL

Playing with computer and video games has emerged as a major leisure pursuit for children and adolescents around the world. While these games bring youngsters a great deal of enjoyment, there have been concerns that many spend too much time with them to the detriment of other activities. It is important for children to engage in a range of play activities as they are growing up to enhance their physical, emotional and social development. Devoting many hours of non-sleeping and non-school hours to playing games on a computer is physically passive. This can mean that children get insufficient exercise, which in turn can have detrimental effects on their physical development, and overall health status. Some video games with educational themes can have cognitive benefits, but others less so. If left unchecked, young people can develop strong dependencies on these games, which, in extreme instances, can display some of the behavioural characteristics of a chemical addiction (Grusser, Thalemann, & Griffiths, 2007).

The phenomenon of compulsively playing with video games was noted even in the early days of computerised game playing (Weizenbaum, 1976). Since early video-game playing was adopted by those already strongly involved with computers and programming, and these individuals usually had a quirky social image; and anyone who spent a lot of time with these games was often regarded as odd personalities (Weizenbaum, 1976). Furthermore, other writers on the subject observed that those who spent, what was seen as, disproportionate amounts of time with these games were also regarded as introverted and socially withdrawn individuals (Levy, 1984; Waddilove, 1984).

The desperation associated with excessive video-game play was also manifest in cases of young players who resorted to crime to make money in order to continue funding their habit (Griffiths & Hunt, 1993; Loftus & Loftus, 1983). Other obsessional video-game players would stop eating in order to save money for their gaming activities, or miss school in order to make more time for it (Griffiths & Hunt, 1993; McClure & Mears, 1984). It was also noticed that some players displayed symptoms, or irritability, when unable to engage with these games when they needed to (Griffiths & Hunt, 1993; Rutowska & Carlton, 1994).

Yet, any conclusion that video-game play might lead to social isolation and withdrawal has not always been empirically supported. One study found that heavy video-game players actually socialised with friends, at least, as often as those who did not play these games (Colwell, Grady, & Rhaiti, 1995). Elsewhere, it also emerged that regular video-game players had just as much of an urgent need to see their friends in person as did anyone else in their age group (Rutowska & Carlton, 1994). Video-game players generally had just as many friends as did non-players (Phillips, Rolls, Rouse, & Griffiths, 1995).

Indeed, video-game playing has often been regarded as a social, rather than an asocial activity. The popularity of emergent online multiplayer games testifies to this fact. These MUDs (multi-user domains) provided virtual settings occupied by many different types of video games in which two or more players could engage, often in competition, though also in cooperative modes. Virtual communities of players became established through these games, who communicated with each outside the games themselves. Players would become known to each other through their reputations as competent exponents of particular games, and new friendships could be established through these online interactions (Quittner, 1994; Rheingold, 1993).

ADDICTION TO VIDEO GAMES AND AGGRESSION

There is mixed evidence as to whether playing with video games a great deal leads to an addiction-like relationship with them; and whether this, in turn, is bad for players, in terms of their wider social experiences and competencies. In addition, researchers have increasingly come to question whether the development of a strong dependency on these games also creates a psychological condition that places players at a greater risk of reacting badly to violence-themed games. Research into this question has also incorporated closer analysis of personality variables that might be invoked in order to offer further explanation as to the level of risk for specific individuals. While addiction, or at least a strong dependency, on video games represents a social problem in its own right, it might also have implications for the effects of video game violence. Longer video-game playing sessions have been found to give rise to internal arousal in players that can, in turn, be expressed as overt aggressiveness. The effect appears to subside after a critical playing duration has been reached, but, nevertheless, this phenomenon opens up the possibility that players who engage in longer playing sessions with violence-themed games might also experience further enhancement of their inner aggression than they would otherwise (Krcmar & Lachlan, 2009).

The games themselves have many attractions. Intrinsically they are capable of generating a range of gratifications for players, and provide an enjoyable experience. When players get more competent at a game and perform better, by achieving higher scores for example, there is a genuine sense of achievement that serves as a reward, which can strengthen the playing behaviour (Zanetta et al., 2011). In addition, there are concerns that devotion of more time to playing these games is not just driven by the intrinsic attributes of the games themselves, but also by the external needs and problems of the players. When games are used to escape from everyday difficulties, such problems will not go away by themselves.

Peters and Malesky (2008) examined factors related to playing MMPORGs (massively multi-player online role-playing games), and found that some players spent so much time on these games that it interfered with the rest of their lives. The researchers collected self-report data, from known players of *World of Warcraft*, about the average number of hours they played this game each week. They also had them complete a personality inventory that measured the five major personality dimensions, consisting of an instrument developed to measure addiction propensity,

and another instrument that had been developed to measure recognition of problematic online game playing behaviour, in terms of the different ways in which it can interfere with other aspects of players' lives. The heaviest players of *World of Warcraft* were the most likely to report experiences of problematic behaviours in their own lives that could be attributed to excessive online game playing. An individual's specific personality profile was also relevant in this context, and emerged as a factor in its own right, providing an important psychological backdrop, not only in terms of an individual's propensity to display problematic reactions to their environment, but also the amount of time spent specifically with online games.

In a later study, a much smaller sample of less than 200 online game playing adolescents completed a battery of questionnaires and standardised tests, designed to assess their game playing habits, self-esteem, quality of interpersonal relations, loneliness and depression. The respondents were divided into those classed as dependent on online games, and those who had a healthier orientation toward playing them. In comparing these two sub-samples, in terms of their scores on these various tests, it emerged that the dependent game players generally displayed lower self-esteem, more social detachment and poorer relations with family and friends, than did non-dependent players. Once again, there was evidence that children who displayed a lack of self-confidence, and who had already withdrawn socially, used video games as a means of escape, and as a substitute for a real social life (Schmit, Chauchard, Chabrol, & Sejourne, 2011).

The suggestion that online video games can represent a form of escape from everyday problems was confirmed by a French study of young adult gamers. These individual were graduates, and lived alone in urban areas. Often, they had family, social, financial and job-related difficulties. These problems also meant that many slept badly and felt irritable. They turned to online games for something to do to occupy their time and attention, and to also bring themselves into contact, albeit virtually, with others. Rather than solving their personal problems, however, such individuals were often prone to develop a dependency on these games, which progressively came to occupy more and more of their time (Achab et al., 2011).

Some researchers have begun to investigate whether excessive video-game playing is not just a symptom of particular personality profiles, but also whether proneness to aggression becomes part of a wider problem. In a review of relevant evidence, Frolich, Lehmkuhl, and Dopfner (2009) concluded that there were reasons to be concerned about the possibility that video-game playing could attract some young people to an excessive

degree, and in a way that resulted in problems occurring in their every-day lives. In many ways, excessive playing of these games was similar to a chemical addiction, and could occur among both child and adult players. Excessive video-game playing was associated with hyperactivity and impulsivity disorders, and, given the violent nature of many of the most popular games, there was also a risk that it could be linked to the onset of aggression. Players who already possessed personality characteristics known to be linked to aggressiveness, and who possessed active cognitive aggressive scripts were especially likely to be vulnerable to aggression effects.

In one survey of over 7,000 online gamers, around one in eight (12%) were found to fulfil the criteria of addiction. However, there was only weak evidence that excessive game playing was associated with a propensity toward aggression (Grusser et al., 2007).

Another survey, carried out with nearly 1,500 online game players, again questioned them about their playing habits and their attitudes toward online games, and included further scales designed to measure aggressiveness, internet and online game addiction, self-control and other personality attributes. Higher scorers on the online game addiction scales also displayed more narcissistic personalities, lower self-control and greater proneness toward aggression. The researchers concluded that specific personality types were predisposed to be more likely to develop a video game addiction. This kind of research could be used to determine the types of people most at risk of developing an abnormal interest in playing online games (Kim, Namkoong, Ku, & Kim, 2008).

AGGRESSIVENESS AND VIOLENT GAME PREFERENCES

Researchers in the past have reported that pre-existing aggressiveness in people can drive their television viewing preferences toward violently themed programmes. Survey evidence, in which programme preferences have been correlated with clinically measured individual aggressiveness, has been reported in support of this hypothesis. One reason that has been offered to explain this relationship is that children, especially boys, who exhibit aggression early on life often seek out attractive role models (which they can find on television) for verification and justification of the use of violence (Johnson, Freedman, & Gross, 1972).

Longitudinal evidence collected across more than one survey wave has indicated that, while earlier television violence viewing did not predict the development of aggressiveness in young viewers later on, earlier

aggressiveness was predictive of later violent entertainment preferences (Atkin, Greenberg, Korzenny, & McDermott, 1979). Furthermore, triggering an angry or hostile mood state in a person can be enough to turn them on to media violence. Angry people have been found to exhibit stronger preferences for violent entertainment (Freedman & Newtson, 1975). Furthermore, news of a violent incident in one's vicinity has been found to motivate individuals to seek out violent movies over non-violent movies (Boyanowski, 1977; Boyanowski, Newtson, & Walster, 1974). Elsewhere, it was found that inducing young men to have aggressive fantasies, through a story-telling exercise, subsequently resulted in them being more likely to choose to watch television programmes with violence, over ones with no violence (Fenigstein, 1979).

Anderson and Murphy (2003) conducted an experimental study with 91 female American undergraduate students who were each assigned to one of three conditions in which they played a violent video game with a female protagonist, a violent video game with a male protagonist or played a non-violent video game. The violent video game was *Street Fighter II*, a third-person game in which either a female or male protagonist on screen can be controlled by the player. The protagonist engages in a series of fights during the course of the game. The non-violent video game was called *Oh No! More Lemmings*, which is a children's game in which the player must help lemmings to safety through a number of obstacles.

The competitive reaction time task (TCRT) was used to measure the aggressiveness of participants in which they had the opportunity to deliver what they believed to be unpleasant blasts of noise to another person every time they failed to perform effectively on a task. The participants had previously been treated the same way on a similar task, where the researcher manipulated the levels of noise blasts they received. It was designed to create varying levels of annoyance with the other person, setting the scene for a revenge or retaliation motive. This test was introduced earlier in this book. Participants also completed a further set of questionnaire items designed to measure their motivations for the punishments they chose in the TCRT. Their motives were divided into revenge (wanting to get back at the other person for how he/she had treated them earlier by hurting them) and instrumental (choosing an appropriate level to impair their performance, but not necessarily to hurt them).

There was no evidence that the specific motives reported by participants were influenced by the type of video-game played. In general, however, participants who played with a violent video game (regardless of which

version) displayed stronger subsequent aggression motivation than did those who played the non-violent video game.

Research carried out over a 1-year period with over 300 German children between 8 and 9 years of age assessed the children's violent video-game playing and personal aggressiveness at two time-points. Although no evidence emerged that the amount of reported playing with violent video games predicted the development of more aggressiveness over time, there was a clear indication that those children who were rated as most aggressive in the first survey, exhibited greater preference for violent video games 1 year later, even when gender, family status, residency status, neighbourhood type, family structure, level of achievement and self-esteem were all statistically controlled (Von Salisch, Vogelgesang, Kristen, & Oppl, 2011).

Further evidence has confirmed that prior aggressiveness in pre-teens and teenagers, accompanied by higher sensation seeking tendencies, can drive a growing preference for violent video games as a source of entertainment. This pattern of behaviour is also linked to lower educational ability, which itself is a variable known to affect the propensity to aggression, and also the preference for video games with violent themes. Such findings have been confirmed by studies conducted in the Netherlands (Nije Bijvank, Konijn, & Bushman, 2012) and Belgium (Lemmens, Bushman, & Konijn, 2006).

PERSONALITY AND MEDIATION OF AGGRESSIVE RESPONDING TO VIDEO GAMES

We have seen that people differ in their propensities to play and enjoy video games with violence. What is also of interest, in this vein, is whether the personality characteristics of individuals can influence how they subsequently feel and behave after playing. One of the big concerns about video games is that they can teach players—especially young ones—how to behave aggressively, and might, at the same time, put them in a mood state in which aggressive reactions to different social situations become more likely to occur. While there is a concern about how far reaching this type of effect could be—that is, whether all players could be influenced in this way to some degree—it is known from research into other types of media violence that the way people react to it varies. Thus, some people are prone to react in negative ways after getting excited by violent media content, and others are immune to such effects (Diener & DeFour, 1978; Diener & Woody, 1981; Fenigstein, 1979; Gunter, 1985).

Despite the volume of evidence published in support of the premise that playing violence-themed video games can increase the aggressiveness of players, an alternative interpretation has emerged that posits that this conclusion in its extreme form could be premature. Instead, there is claim, backed by empirical evidence, that video game type preferences, and levels of personal aggressiveness, are both capable of being explained by other variables that could underpin the apparent relationship reported to exist between them. The key protagonist championing this viewpoint is Christopher Ferguson, who has produced a compelling series of studies, since the start of the twenty-first century, to question the majority view about violent video game effects. For Ferguson, some of the evidence concerning these effects needs to be revisited in part because of methodological data interpretation idiosyncrasies, which call into question some of the conclusions previously reached about video game effects. In addition, there is a need to more closely consider the possibility of 'third variable' effects in the shape of specific personality factors, which could provide alternative explanations for apparent video game effects.

Psychoticism and Violent Video-game playing

Among the personality characteristics believed to have the potential to mediate video game preferences, and to shape specific responses to violence-themed games, is psychoticism. This has featured in a number of psychological models of human personality, and is characterised by an emotionally cold, unsympathetic, unfriendly and touch-minded disposition to the world and other people in it (Eysenck & Eysenck, 1976). At its least sociable pole, it has been linked to antisocial behavioural tendencies (Claridge, 2006). There is research with television violence that encourages the belief that individuals with high psychoticism react differently from other people to scenes of violence. High scorers in this dimension have been found to get more enjoyment, than low scorers, out of watching violent movies (Bruggeman & Barry, 2002). Viewers who displayed higher levels of psychoticism also regarded scenes of violence on television as less disturbing, and as less 'violent', than did lower scorers on this scale (Gunter, 1983).

There is evidence that psychoticism is related to how players respond to video games with violence. One study reported that high scorers in psychoticism displayed higher levels of post-playing hostility and aggressive thoughts than low scorers, after engaging with a violently themed video game (Markey & Scherer, 2009).

Aggressiveness and Video Game Effects

It is well established that by creating an aggressive mood state in individuals, their propensity to react aggressively at a later point is enhanced; and such mood states can combine with the aggression cuing effects of violent media content to further magnify aggressive responding (Bushman, 2002). Aggressive responding, in this context, can take the form of an enhanced propensity to think aggressive thoughts, to feel angry and to behave in an aggressive or hostile manner. Responses of this kind have been observed as occurring with viewers' responses to film and television violence, for example (Berkowitz, 1984, 1990, 1993; Bushman, 2002). Aggressive mood states are also known to enhance aggressive responding to violent video games (Anderson et al., 2007).

As well as a temporarily primed mood state, prior aggressiveness can also take the form of a more lasting personality trait. In other words, some individuals, because of their personality profiles, have an inherent tendency to get angry easily, and to display overt aggression. Trait aggressiveness has also been found to promote aggressive responding—cognitively and behaviourally—to violent media content (Bushman, 1995). In relation to video-game playing, however, some longitudinal evidence failed to find signs that early trait aggressiveness predicted later violent game preferences (Lemmens et al., 2011).

State aggression has been observed to produce temporary conditions that promote 'aggression' in laboratory conditions. Aggression in such contexts generally involves an analogue measure that purports to represent genuine hostility, although, in fact, takes the form of a contrived, and carefully controlled, behavioural response that does not actually deliver harm to a target. Players who were made angry before playing a violence-themed video game displayed greater sensitivity toward hostile interpretations of ambiguous situations, as compared to non-angered players of these games (Giumetti & Markey, 2007). Furthermore, when players are primed to anger before engaging with violent video games, they tend to play these games more aggressively as well (Panee & Ballard, 2002).

Trait aggressiveness has also emerged as a significant mediator in the way players respond during, and after, playing violence-themed video games. Such people display greater post-playing hostility than do those low in trait aggressiveness (Arriaga, Esteves, Carneiro, & Monteiro, 2006). Individuals who scored high on trait aggressiveness, and who were also regular players of violent video games, also displayed a greater propensity toward delinquent and aggressive behaviour in their everyday lives (Anderson & Dill, 2000).

COMPREHENSIVE MODEL OF PERSONALITY AND REACTIONS TO VIOLENT VIDEO GAMES

There have been attempts by psychologists to draw together findings from personality research to establish a single, all-embracing, model of human personality. This effort has resulted in the development of the five-factor model (FFM), also popularly known as the 'big five' personality traits. These dimensions are: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Neuroticism is an indicator of an individual's proneness to anxiety, or his or her's propensity to worry about things, and his or her overall emotional stability. Extraversion refers to how outgoing, sociable and self-confident an individual is in the company of other people. Openness to experience is a dimension that reflects the extent to which the individual is creative, curious and receptive to new ideas. Agreeableness signals how friendly, cooperative and warm an individual is. Conscientiousness indicates how much an individual values order, discipline and reliability.

There is evidence that these five dimensions cut across cultural and subcultural divides in human populations, and when individually and cross-referred, they provide a multitude of personality profiling permutations that can predict the behavioural orientations and decisions of individuals across many different social settings (Costa & McCrae, 1988, 1992a, 1992b; Church & Katibak, 1989; Goldberg, 1993). Commonly, a high score on one of the five dimensions is associated with a low score on another, but this is not invariably the case (Costa & McCrae, 1995). There are also relationships between specific 'big five' factors and personal aggressiveness. Further, there are combinations of positions on two or more of the 'big five' which have distinct influences on aggression proneness. Being an aggressive person often means not caring much about others (or being low on agreeableness) or being indifferent to keeping rules and order (or being low on conscientiousness). Aggressive types can often be less emotionally stable (or high on neuroticism) (Sharpe & Desai, 2001).

Markey and Markey (2010) carried out a theoretical modelling exercise, drawing upon empirical research with the five-factor model (FFM) personality dimensions, and upon research that had linked player's reactions to violent video games back to these personality factors, and to other personality traits known to exhibit specific kinds of relationships with the FFM dimensions. Prior studies with violent video games that had reported on personal aggressiveness and psychoticism, as mediators of player's

reactions to these games, provided a focal point for these analyses. Because of known links between FFM dimensions—especially agreeableness, conscientiousness and neuroticism—and personal aggressiveness, for instance, it was theoretically possible to predict how these FFM dimensions might also be related to the players' reactions to violent video games.

By examining relevant effect sizes from these part studies, it might also be possible to predict how these effect magnitudes might be modified by the FFM dimensions. Drawing from their statistical modelling and relevant secondary data, Markey and Markey (2010) reported that a combination of high neuroticism, low agreeableness and low conscientiousness, when considered simultaneously (but not when examined individually), can provide a significant moderator of reactions to violent video games. A three-way interaction effect could emerge, in which the effects of violent video games are magnified for individuals who display this personality profile.

Can Video-Game Players Develop an Aggressive Orientation?

Scientific evidence has emerged showing that video games can trigger strong emotional responses, reduce impulse control, provide lessons in how to behave and install behavioural scripts into players' minds. They can encourage players to engage in virtually aggressive acts, and therefore, create an atmosphere of hostility within the game environment. Electronic games provide virtual realities that differ from the everyday reality of players. This reality shift could be enough to restrict any lasting effects of video games, if players regard their game experiences as separate from the real-life experiences. If games are not embraced as relevant to their daily reality, in terms of the social lessons they might teach players about how to behave, any aggressive thoughts, or scripts, that are learned from games might not be invoked in script solutions of the real world problems the player faces. Yet, there remains a concern that by engaging with these games on a regular basis, such experiences could re-wire players psychologically, and result in changes in their personalities. Any such psychological shifts could in turn change the way players subsequently deal with their everyday realities beyond game playing. Can game playing change a player's personality?

If the answer to this question is 'yes', then it further raises a series of important questions about the potential of video games to cause harm. Evidence has already been reviewed that showed the ability of video-game

play to install aggressive thoughts into players' heads (see Anderson, 1997; Anderson et al., 2007). These thoughts might take the form of short-term cognitive priming, which have been detected in laboratory tests designed to assess the sensitivity of individuals to aggressive ideas (Anderson & Dill, 2000; Anderson, Carnagey et al., 2004; Bushman & Anderson, 2002).

A further cognitive-level outcome could be the longer-term conditioning of beliefs about social violence, whereby, it comes to be seen as normative as a consequence of direct involvement with aggressive activities and events in virtual gaming environments (Guerra, Huesmann, & Hanish, 1995). It has already been noted in relation to other kinds of mediated violent experiences, such as those obtained through watching movies and television programmes with violent themes, that regular consumers of such content can acquire many aggressive scripts that are stored away for future reference (Berkowitz, 1993; Huesmann, 1988).

Krcmar and Farrar (2009) assigned American university undergraduates to conditions in which they either played a violence-themed video game, or played no video game. In the violent video game condition, participants were further sub-divided in terms of the way they played the game, either in a third person mode, manipulating on-screen characters, or in a first-person shooter mode, where the camera became their eyes. In a further twist, the video game had a feature that, when switched on, caused more blood and gore to be displayed. The video game used in this experiment was *Hitman II: Silent Assassin*. Participants provided subjective ratings of the video game on scales supplied by the researchers, together with demographic details and data concerning their video-game playing habits. 'Aggressive behavioural intentions' were measured using a revised version of the Buss-Perry aggression questionnaire. As a further measure of aggression, the participants were asked to evaluate a research assistant associated with the study who had earlier insulted them. This represented a measure of retaliation. Finally, a word association test was used to measure aggressive cognitions.

The results showed that there was a main effect of playing the violent video compared with playing no video game on the display of verbal and physical aggression afterwards, including the participants' orientation towards the research assistant. There was no evidence that aggressive cognitions, even if triggered by video-game play, mediated between the game and verbal or physical aggression. While there seemed to be a direct effect of video-game playing on behavioural aggression, this effect was not shaped by the presence of aggressive cognitions. Further analyses,

however, revealed that playing the game in the third person, combined with the presence of aggressive cognitions, combined to enhance the propensity to display verbal and physical aggression. When the presence of aggressive cognitions weakened, participants were also more likely to think more highly of the research assistant at the end of the experiment.

Ferguson (2011) surveyed 536, mainly, Hispanic youth that had previously been investigated by the same author and his colleagues (Ferguson, San Miguel, & Hartley, 2009). In that earlier study, they had found that aggression in their sample was predicted by depressive symptoms, and a track record of delinquency. The sample in the current study was drawn from a larger sample than in the earlier study, but a completely new, two-wave, investigation was conducted with them. There were 12 months between the two survey waves.

Key measures of media violence exposure were participant nominations of their three favourite television shows and three favourite video games, followed by independent violence ratings of video games, using an industry ratings system, as well as a further analysis by the researcher's assistants of the violence content of nominated television shows and videos. Participants also completed scales designed to measure their experiences of negative life events, family environment (and how violent it was) and the presence of depressive symptoms. A separate measure of family violence was supplied by the child's guardian; and a behaviour checklist, completed by both the participant and their caregiver, concerning the presence of aggression in the participant's usual behavioural repertoire, the propensity of the participant to bully another child, and a self-report of perpetration of delinquent behaviours was provided.

The results showed that reported playing of violent video games was only significantly related to one aggression outcome at both time one and time two, and that was the propensity to bully. Those youngsters, who reported more play with violently themed video games, also displayed a greater likelihood of bullying others. For all the other measures of aggression or violence, video-game playing did not emerge as a significant predictor, whereas, variables, such as the display of depressive symptoms and the nature of parental control over aggression in the family, were more often significant. In further analyses, there was evidence that those youngsters who played violent video games more during time one, also did so at time two. During time two, it was found that playing with violent video games was also predicted by being male and displaying depressive symptoms during time one, but not by aggressiveness during time one (Willoughby, Adachi, & Good, 2012).

Violent Video Games and Rewiring the Brain

As we have seen, despite the ongoing academic debates about the subject, most of the published research evidence has supported the premise that exposure to violently themed video games can enhance the aggressiveness of players. A number of behavioural and cognitive psychological theories have been developed to provide explanations for this effect. One of these, the general aggression model, has proposed that a number of psychological mechanisms and processes are triggered in the context of playing video games with violent content, which contribute toward an increased disposition to behave aggressively. Players can learn directly from video games how to behave violently by copying specific acts, or internalising behavioural scripts for later enactment. In addition, aggressive thoughts can be triggered by these games, which could remain internalised, or eventually motivate the individual to display overt aggression. Accompanying these cognitive changes, players can become physically aroused and experience emotional changes that, in turn, provide a motivation to display aggressive behaviour in social settings in which this behaviour receives encouragement (Anderson et al., 2007).

In the current chapter, we have considered the idea that an individual's personality can make a difference to how they respond to video games with violence, and, indeed, how they react to other forms of media violence. Not only this, but personality characteristics, which are usually regarded as stable and unchanging, might be re-shaped for individuals who engage in multiple repeated engagement with violent mediated content.

The suggestion that cognitive, effective and behavioural processes are inter-dependent aspects of a player's psychological responses to violent video games has received further scientific support from emerging research in the field of cognitive neuroscience. This research uses techniques, such as event-related brain potentials (ERPs) and functional magnetic resonance imaging (fMRI), which measure neurological activation of different parts of the brain, in response to specific environmental stimuli. An understanding of the role played by different parts of the brain in underpinning psychological responses to social events can provide additional insights into the relationships that might exist between cognitive and emotional processes, and, in turn, how these internal responses might drive specific behavioural outcomes (Carnagey, Anderson, & Bartholow, 2007). In research that used fMRI scans with children while they watched violent and non-violent scenes from mainstream movies, showed that parts of

the brain, known to underpin episodic memory activity, process emotion arousing stimuli, and control or overt behaviours were jointly activated (Murray et al., 2006).

It is already known, through fMRI scanning, that exposure to media violence can affect parts of the brain that are activated during specific types of cognitive processing. Some tasks require an individual to engage with environmental stimuli in a systematic and ordered fashion to identify solutions to problems, an activity that has been referred to as 'executive functioning'. In a test of individuals' abilities to respond as quickly as they can in identifying words that indicate colours, the task can be made more challenging when the word spells the name of a different colour from that in which it is printed. So, for example, if the word 'red' is typed in red, it will be recognised more quickly than if it is typed in green. This type of task activates a part of the brain called the anterior cingulate cortex (ACC). This part of the brain is also known to be involved in the regulation of aggressive behaviour.

Research with adolescents found that after exposure to violent media content, activity in the ACC was suppressed, and this in turn affected their performance on the colour-word matching task. This effect occurred equally for adolescents with a track record of delinquency, as well as normally behaved teenagers (Matthews et al., 2005). The social implications of this finding are that if the functioning of this part of the brain is disrupted by exposure to media violence, this could in turn impede the ability of the individual to control their aggressiveness.

In a more direct test of this neurological effect, researchers used fMRI scanning to monitor the brains of players of a violent video game on a moment by moment basis. Changes in brain activity were time-locked to changes in the violent nature of the game being played. This analysis revealed that ACC functionality was suppressed by engagement, in particular with the most violent elements of the video game (Weber, Ritterfeld, & Mathiak, 2006).

Further research indicated that a history of regular exposure to violent video games might induce more permanent changes in the way players' brains react to social violence. In this study, ERPs were recorded while the participants viewed a series of photographic images showing violent and non-violent scenes. The participants had also provided information about their video-game playing habits so that the researchers could differentiate between them, in terms of their overall regularity of exposure to violent games. The results showed that those individuals with personal histories

of frequent violent video-game playing exhibited less-pronounced brain responses to violent images than did relatively infrequent players. This evidence was consistent with the notion of desensitization to media violence and social violence (Bartholow, Bushman, & Sestir, 2006).

In a study conducted with Japanese university students, Tamamiya, Matsuda and Hiraki (2014) assigned participants to play with a violent action video game or non-violent action video game for 4 hours a week for 4 weeks. Before they started playing, pre-playing measures of hostility were taken, and brainwave patterns were measured. One week after the playing period had ended the participants returned to the laboratory where they were re-tested on these measures, and were also shown a series of photographs of faces showing either a female or male displaying anger, fear, happiness, sadness or no emotion. They had to click a star on a screen as quickly as possible to show they had registered each face. In a second study, most of the original participants were tested again after a further 3 months had elapsed.

Participants generally rated the violent video game as more 'violent' than the non-violent video game. Male participants who played the violent video game displayed increased post-playing physical aggressive tendencies as registered by a verbal scale; all other participants failed to display this change. Brainwave patterns revealed that emotional responses to angry faces were slower to emerge among participants who had played the violent video game, as compared to pre-test scores. This effect was not registered for any other faces, nor was it registered, in relation to the angry face, for participants who played the non-violent video game. After a delay of 3 months, the verbally reported physical aggressiveness effect disappeared, but the brainwaves indicated that emotional responding to an angry face persisted.

The Significance of Players' Characteristics

This chapter has explored evidence concerning individual differences in video-game players, and how these differences can shape their playing choices, game preferences and responses to the experience of playing with video games. Earlier media violence research had already indicated that differences such as gender, social background and personality can influence the magnitude and nature of our psychological reactions to violent portrayals. While much of the research about the effects of violent video games has searched for universal effects, it is probably closer to the truth that all players respond differently to these games.

The importance of understanding more about the individual differences in video-game players' reactions to the violent content in these games derives from a need to know whether some players are at greater risk than others of developing antisocial tendencies, contingent upon specified game playing profiles. As discussed previously, there are further concerns about these effects, which flow from our experiences with different types of violent portrayal. In the wider media violence research literature it is widely acknowledged, and has been empirically verified, that our cognitive, affective and behavioural reactions to violent portrayals can vary with the nature of the violent behaviour they display.

Violent portrayals can be differentiated by their physical form, the types of perpetrators and victims they involve, the reasons for their occurrence, their consequences for those concerned and a range of other features. It is also known that some people are particularly sensitive to specific forms of portrayed violence. If this is true for portrayals of violence on television, it may also be true for violence in video games. Future research, therefore, needs to consider, not only how to develop a comprehensive and relevant typology of violent portrayals, but also one that can define different types of players. This last point is explored further in the next chapter.

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Do Players Respond Similarly to All Video Violence?

The multitude of empirical research studies examined and critiqued in this book has generated a diverse array of evidence concerning the potential effects of violent video games on human aggression. The majority of published studies into the effects of violence-themed video games have indicated that playing these games can produce harmful side-effects on players in terms of their personal aggressiveness. It has been recognised that these effects can take various forms, and that they occur at different psychological levels. The ultimate interest, and source, of social concern is whether playing these games can enhance the probability that a player will subsequently be more likely to display overt behavioural aggression against others.

We know that video games are not all the same. They can be differentiated into a number of genres in the same way as movies and television programmes. Video game playing has emerged as a popular pastime for children and adults around the world. Not all games are equally popular however. Research with American adolescents in the twentieth century revealed that, while sports games were widely nominated as being among the most liked, there was also a widespread liking of games with violent themes (Funk, 1993, Kinder, 1996). At that time, fantasy violence themes were endorsed more extensively than games with human-like characters. This is not surprising given that there were far fewer video games with human characters at that time, than is true of those released in the twenty-first century. Already by then, fighting games with human characters such

as *Mortal Kombat, Streetfighter, Tekken* and first-person shooter games (in which the player sees through the eyes of the screen character they control), such as *Doom* and *Quake*, were changing the video game landscape. The greater realism of these games, underpinned by higher-quality production techniques and more elaborate story-telling, raised similar concerns about the effects of video games, which had initially been voiced several decades earlier about movie violence; and had also led the mayor of one American city to introduce a local law banning children under 18 from playing violent video games unless accompanied by an adult (Halladay & Wolf, 2000).

There are many scholarly researchers that have claimed that the influence of playing violent video games on players' aggressiveness is a proven outcome (Anderson & Bushman, 2001; Anderson et al., 2007). In addition, violent video games can generate internal states that represent psychological conditions, not always outwardly visible, but which turn the individual into someone who is more primed to use aggression in the future, or even immediately after they have finished playing. Violent video games can arouse players physiologically and psychologically, creating negative emotional states that could play a part in motivating aggressive behaviour. In addition, these games can give rise to aggression-related thoughts that might take the form of memories of specific violent acts, or of entire sequences of behaviour (or 'scripts').

Then, there have been dissenting opinions about the status of the empirical evidence on violent video game effects. The alternative case has been that the evidence for these effects is not watertight for specific research design reasons. In addition, there are limits to the theorising about these effects, in that some relevant, and important, variables have been given insufficient attention as moderators of how players react to video games, and as additional causal agents in relation to personal aggressiveness (Elson & Ferguson, 2013; Ferguson & Dyck, 2012).

It might also be argued that in many studies on violent video games, insufficient attention has been given to the nature of the violence itself. As video game production formats and narratives have evolved, the diversity of game-types and content-types has increased. This same feature has represented much of the empirical research into film and television violence. There was a tendency to over-simplify violent stimuli from the media for the purposes of establishing more controlled research designs. Violent stimuli were often extracted from longer narratives and, in the process, became decontextualized. This meant that the meanings, which might have been taken from them as they were originally performed in

full-length films and programmes, went missing. Yet, research has shown that viewers make subtle distinctions between violent acts and sequences by taking into account the physical nature of the aggressive behaviour, the type of story in which they appear, how graphically they are depicted, the nature of the characters or actors on screen who appear as perpetrators or victims of violence and the motives for the violence and the consequences that follow from it (Gunter, 1985; Morrison, MacGregor, Svennevig, & Firmstone, 1999).

There are several critical attributes, or dimensions, of screen violence that have been found to mediate the way viewers respond to it when passively watching. These include:

1. The physical form, or nature, of the violence.
2. Realism of the setting in which it is shown.
3. The types of actors involved in the violence.
4. The justification, or other motivation, for violence.
5. The outcomes for those involved in the violence.

Physical Form or Nature of Violence

Violence can take on many physical forms. Actors on screen can be shown hitting each other with their hands, feet or head; using objects as clubs; stabbing someone; shooting them with a gun or bow; using poison on their victim; running them over in a car; or using military weapons. Actors can also verbally abuse another person, or threaten them. Viewers have been found to rate scenes of violence differently, according to the type of violence being portrayed. One study found that viewers rated scenes involving the use of weapons as more serious than those in which the violence did not involve weapons (Greenberg & Gordon, 1972). Other research found that viewers voiced the most concern about violent scenes that involved knives or sharp stabbing instruments (Gunter, 1985). The sight of specific instruments of aggression was also found to play a part in triggering behavioural aggression in laboratory settings (Berkowitz & LePage, 1967). Elsewhere, experimental participants who witnessed a filmed knife-fight scene subsequently displayed more punitive aggression against a human target (Walters & Thomas, 1963; Walters, Thomas, & Acker, 1962).

In the context of video game playing, games pre-judged as highly violent, in terms of the number, and form, of aggressive acts they contained, were found to trigger stronger hostile feelings than less violent games

(Brady & Matthews, 2006). Elsewhere, games, differentiated in terms of the magnitude of their violent forms, failed to generate significant different verbal or indirect hostility, negative feelings, irritability and aggressiveness (Baldaro et al., 2004).

REALISM OF THE SETTING IN WHICH IT IS SHOWN

One consistent finding in the literature on media violence has been that, as the setting of violence becomes more realistic and life-like, the more seriously viewers take it. Thus, viewers react perceptually and emotionally in different ways to the same forms of violence when violent acts are depicted in realistic or fantasy settings (Gunter, 1985). Hence, a shooting on the news will be regarded as more 'violent' than one that occurs in a television drama; and a shooting in a contemporary drama will be regarded as more 'violent' than a similar act shown in a science fiction or cartoon setting.

The realism of screen violence not only triggers different emotional responses, it can also affect the strength of subsequent behavioural aggression among viewers. Children were found to show more destructive forms of play with other children after watching a scene of realistic violence, than after watching highly stylised violence in a fantasy setting (Noble, 1973). Even the same event, described differently, can result in different behavioural responses afterwards. Thus, children behaved more aggressively toward peers in controlled laboratory exercises after watching film footage of a university campus riot, when that scene was described as a real event than when it was described as a made-up event (Feshbach, 1972).

When viewers believe a fight scene is real, they maintain a state of emotional arousal for longer than when they think it is constructed and fictional (Geen, 1975). It seems that viewers become more psychologically involved in violent scenes when they believe them to be real (Geen & Rakasky, 1973). This enhanced involvement then, in turn, renders them readier to display hostility toward another person, when that individual previously provoked them (Leyens, Cisneros, & Hossay, 1976).

Realism has not always been a core feature of video games, which for many years displayed obvious fantasy settings and simplistic playing formats. Advances in computer technology, and investment in video game production, over time resulted in more graphic and realistic settings, and human-like characterisations being developed, which became more lifelike or, at least, more like watching, and interacting, with a movie.

As with film and television, some evidence has emerged to show that engaging with a more realistic setting in a video game has been found to

magnify subsequent state hostility among players, as compared with playing a non-violent game, or a violent game in a fantasy setting. In one relevant study, the researchers compared the effects of playing with video games containing realistic violence, unrealistic violence or no violence. Realism of violence, in this context, was determined by whether the type of enacted violence within the video game represented an incident that could be experienced in real life. Young adult males and females played with an assigned video game for 45 minutes, and had their aggressive thoughts and feelings measured, before, during and after video game play, while their heart rate (a measure of physiological arousal) was monitored continuously during video game play. Playing any kind of violent video game triggered more aggressive thoughts, while playing a game with more realistic violence also produced greater arousal and aggressive feelings, as compared with less realistic violence (Barlett & Rodeheffer, 2009).

Krcmar, Farrar and McGloin (2011) assigned university undergraduates to play with two different versions of a violence-themed video game that were classified by the experimental participants as differing in terms of their degree of realism. Compared to non-playing controls, participants in both video game conditions displayed greater aggressiveness after they had finished playing. Those who played with the version of the game judged as more realistic, displayed the strongest physically aggressive intentions overall. While enhanced verbal aggressiveness also arose more powerfully from the more realistic version of the game provided, players also displayed greater identification with the on-screen characters, which in turn enhanced their focus on the game.

Types of Actors Involved in Violence

Violent actors can vary along a range of dimensions such as their gender, age, social status, ethnicity, physical characteristics and, in the case of a fictional narrative, the role they play in the story. Hence, fictional characters can be depicted as good people or bad people. Violent actors can serve as role models for those who observe their behaviour. If viewers identify with on-screen actors, the latter accrue much more currency as a potential source of social influence. Viewers are most likely to identify with on-screen actors they like, with whom they perceive personal similarities or with whom they aspire to become more like.

Certain types of on-screen characters will also invoke specific expectations among viewers, in terms of how they are expected to behave. Thus, violence may be regarded as a cultural norm, as behaviour more

associated with, and expected of, men than women. Hence, if a character on screen acts 'out of character' viewers' impressions of that individual could be changed, and their psychological responses to any violence he or she performs could be magnified. Hence, the violent actor type can influence viewers' reactions to portrayed violence.

One analysis of viewers' perceptions of televised violence found that, when men attacked women victims on screen, such behaviour was regarded as more seriously violent than when women attacked men—even when the form of violence was the same in both cases (e.g., use of guns). However, this variable also interacted with the geographical location of the violence. Hence, this gender difference was found to be true for violent scenes in U.S. television dramas, but it was not replicated in similar scenes from equivalent UK television dramas. The viewers in this study were all British. In fact, in UK television dramas, violence perpetrated by women on men was regarded as more serious than when women were victims of men. One possible explanation floated to explain this finding was that the unusual nature of female aggression meant it had a greater shock value. There was also a sense that violent female characters were often regarded as abandoning the behavioural standards expected of their gender (Gunter, 1985).

Elsewhere, evidence emerged that male viewers behaved more aggressively toward a female target in a controlled laboratory setting, after watching film violence featuring a woman as a victim of violence (Donnerstein & Berkowitz, 1981).

In an experimental investigation on the effects of violent video games on laboratory analogue aggression, as measured by the competitive reaction time task, researchers found that female video game players exhibited stronger post-playing aggression motivation, as compared with players of non-violent video games, when the game they played featured a violent female protagonist, but not when it featured a male violent protagonist (Anderson & Murphy, 2003). This outcome suggested that the players might have identified more powerfully with the on-screen protagonist and their actions when the character was the same gender as themselves.

Justification and Motivation for Violence

When violence is reported, or played out, in films or on television, there is often a tendency for viewers to pass judgments about it that are grounded in the reasons why that violence occurred. Was there a just cause for the violence? Was the violence perpetrated for the personal gain of the perpetrators? Was it motivated by revenge? If so, was it proportionate given the nature and magnitude of the original provocation? Was it used as self-defence? Was it

used to uphold the law or to protect other people? These, and other different reasons for violence, can play a significant part in shaping our interpretations of violence and our judgements about it. British television viewers rated the violence used in televised fiction by fictional law enforcers as more justified, and, therefore, as 'less violent' than similar forms of aggression performed by fictional criminals (Gunter, 1985).

At a behavioural response level, in studies that used analogue aggression (i.e., delivery of electric shocks to a human target) under controlled laboratory settings, aggression responses were stronger among viewers who had watched screen violence presented as justified, rather than unjustified (Berkowitz, Parke, Leyens, & West, 1974; Meyer, 1973). The justification for behaving aggressively in video games can influence subsequent aggressiveness of players. Thus, the same video game violence delivers different levels of aggressiveness in players, depending upon whether players believed the violence used in a game was justified or not. When video game violence was presented as unjustified, players displayed greater levels of subsequent aggression (Hartmann, Toz, & Brandon, 2010; Hartmann & Vorderer, 2010).

Outcomes for Those Involved in Violence

Another factor found to exert powerful effects over viewers' responses to observed screen violence is the seriousness of the consequences for the victims of the violence. Two potential reactions can occur here. If the victim displays a great deal of pain and suffering, this can trigger distress and accompanying feelings of empathy and sympathy for the victim. Alternatively, pain cues from the victim have been found to fuel aggressive feelings that an observer may have developed against a potential target person who earlier annoyed them. The sympathy card can work to reduce a viewer's subsequent aggressiveness, while finding out that a victim subsequently had a successful and happy life can lead to pain cues enhancing a viewer's aggressiveness.

These outcomes were confirmed by one experiment in which participants observed the same fight scene in which a victim was clearly hurt, in pain and suffering. While one group of participants were fed a back story that the victim later died from his injuries, another group was told he made a full recovery and enjoyed a successful career. Participants in the first condition exhibited much weaker aggressive behaviour toward the target than did those in the second condition (Goranson, 1969).

These findings were confirmed in a study with schoolboys who were divided into groups then shown either a non-violent play sequence or two

different versions of a fight sequence on film all featuring boys similar to themselves. In one version of the fight sequence the camera focused on the instrumental acts of aggression. In the other version it focused on the pain reactions of boys hit and injured during the fight. When experimental participants were later placed in a task in which they could deliver electronic shocks to a target boy who had earlier annoyed them, those who watched the pain cues version of the fight sequence delivered the more powerful shocks (Hartmann, 1969).

The outcomes of violence in video games have been found to make a difference to the hostility players subsequently demonstrate. The evidence on those consequence dimensions that have been studied, however, has not been consistent. The visible presence of blood in violent video games sequences was found to increase players' subsequent aggressive feelings (Barlett, Harris, & Bruey, 2008). Another investigation failed to discover any evidence for a blood cues effect of this kind (Farrar, Krcmar, & Nowak, 2006).

In the Barlett et al. (2008) study regular video game players were testes while playing *Mortal Kombat—Deadly Alliance* to see whether the presence of blood in violent action sequences in this game affected the aggressiveness of players. Four different levels of blood were set within the game that ranged from none to a great deal of visible blood spewing from combatants during fight contestants in which their movements were controlled by the players. Psychological tests were run before and after game playing to assess players' aggressive cognitions and emotions and these were supported by heart rate measures. The psychological tests revealed some increases in aggressiveness after playing the bloodiest version of the game. In addition, heart rate measures changed during the game with arousal growing across the goriest versions. The researchers also measured the extent to which players have their on-screen avatar wield a sword which they used as yet another measure of aggression. Sword use was greater in the bloodiest versions of game. One issue with the later measure is whether it can be taken as a signal of genuine feelings and motives of hostility on the part of the player given that the game was regarded by them as make-believe.

In a study already reviewed, Krcmar and Farrar (2009) investigated the effects on aggressive cognitions and aggressive behaviour of playing a violent video game in third-person and first-person modalities. This study also examined the potential mediating effects on aggression outcomes of playing the violent video game with a blood and gore feature switched

on or off. The findings indicated that players who played the video game with the blood feature turned on and who also displayed the presence of aggressive cognitions were also more likely to display post-playing verbal aggression, though not more physical aggression or any greater likelihood of seeking revenge against a research assistant who had earlier behaved in a manner designed to irritate and annoy them.

PLAY CONDITIONS AND EFFECTS OF VIOLENT VIDEO GAMES

The effects of violent video games are sensitive to the way the games are played. Most video games involve players interacting with and controlling screen-based events. Other than the manual manipulation of controls the player is physically passive. Some games, most notably the *Nintendo Wii* brand have 'motion-capture' capabilities. This means that the player must move physically with the controls in their hands to mimic the movements of characters on screen. Hence, in a virtual tennis match, the video game player becomes one of the on-screen contestants and must perform serving and stroke play movements with the controls while standing in determining the action that occurs on screen.

One important feature of video games that can potentially enhance their overall impact for the good (and also if misused—for the bad) is the level of psychological immersion in the game on the part of the player. This outcome is underpinned by the complexity and engagement of the narrative of the game. If it conveys an interesting and involving story, players can be drawn into it such that they suspend any disbelief that might otherwise have arisen from a game's fantasy settings and actions and become more accepting of what the game requires them to do. If the player in this context has control over the movements on screen of characters that are also engaging and believable, a strong sense of identity with a character can develop which makes whatever happens to them with the game's storyline even more significant to the player. Story immersion of this kind can play an important mediating role in strengthening or magnifying specific psychological side-effects of game play. This can be a good thing in the case of video games designed to achieve prosocial and beneficial outcomes for players but can be more worrying when it occurs in games with prominent violent themes (Ewoldsen, Eno, Okdie, Velez, Guadagno & DeCoster, 2012; Lu, Baranowski, Thompson, & Buday, 2012).

Charles, Baker, Hartman, Easton, and Kreuzberger (2013) carried out research to find out if motion-capture technology required a form of video game play that could mediate a game's subsequent psychological effects on the player. In an initial study, they compared playing of two different video games, one on a platform that permits normal play and the other on a platform that permits motion-capture play. The players in the motion-capture condition displayed weaker subsequent aggression under controlled laboratory conditions. In a second study, players were assigned to play with the same game that was available in motion capture and non-motion capture versions, hence removing the confound that occurred in the design of the first experiment. Once again, participants in the motion-capture conditions displayed less aggression later on when tested.

Another development in video game design that has been found to make a difference to their aggression–eliciting potential is whether a game allows the player to personalize their own in-game characters. One reason why this feature might be expected to make a difference here is that it enables the player to develop a closer sense of identity with an on-screen character because they are able to choose elements of its appearance. In a typical experimental design, players were assigned to conditions in which they interacted with violent and nonviolent video games in which they had personalized or non-personalized on-screen characters. Subsequent controlled aggression tests revealed greater levels of aggressiveness occurred among participants who played with violently-themed games. This effect was further strengthened by playing a game with a personalized on-screen character It emerged that players that interacted personalized characters experienced greater arousal and became more activated by the game they were playing (Fischer, Kastenmuller, & Greitemeyer, 2010).

The gender of the protagonist and recipient of aggression were manipulated in another study that also examined motives for behaving aggressively in the context of measuring the effects of playing violent video games (Anderson & Murphy, 2003). In this instance, all the participants under observation were female college undergraduates at an American university. The women were assigned initially to play either with a violent video game (Street Fighter II) or a non-violent video game (Oh No! More Lemmings). In the Street Fighter II game, the participant controlled either a male or female on-screen character.

After playing the video game participants engaged with a competitive reaction task in which they competed with another (fictitious) person. Across a series of trials, whoever performed poorest received a blast of

unpleasant noise which served as the measure of 'aggression'. This task has been described previously. In this version, there were two phases. In phase one the 'opponent' set the intensity of aversive noise to be delivered on 'lose' trials. In the second phase, the roles were reversed and the participant set the intensity levels for delivery to her opponent if they lost a trial. The intensity of noise levels set in phase one was designed to create enhanced provocation so as to manipulate the participant's motivation for revenge when roles were reversed. Following the competitive reaction task the participants completed a questionnaire to indicate whether they set levels of noise intensity to impair their opponent's performance (instrumental motive) or to get back of them (revenge motive).

Participants who played with the violent video game subsequently delivered more intense noise blasts to their opponent than did those who played the non-violent video game. Whether the women participants played with a male or female character made little difference to their subsequent aggressiveness. Playing with a female character however resulted in significantly more aggression being delivered compared with the non-violent video games group, whereas playing with a male character in the violent video game did not significantly enhance aggression compared to non-violent video game players. A revenge motivation resulted in stronger subsequent aggression than did an instrumental motivation. Indeed, it was really only the revenge motive that created the conditions under which playing a violent video game produced significantly more aggression than did the non-violent video game.

Video games also vary in terms of the style of play invited by their thematic genre and stipulated in terms and conditions of game play by the game itself. One comparison of game playing frequencies reported by young adult players for action-adventure games and role-playing games revealed that players predominantly of role-playing games exhibited low personal aggression scores on the Buss-Perry Aggression Questionnaire than did non-players. It was suggested that role playing games require players to cooperate with and take the perspective of other players in the game and that this style of playing can trigger empathic feelings which in turn render the probability aggressive responding against another person less likely (Puri & Pugliese, 2012).

Extending the game-play style concept, Greitemeyer (2013) manipulated the way a game was played—either competitively or cooperatively—to assess whether the emotional reactions of players to a violent video game could be influenced. In two separate experiments, Greitemeyer found that when players played in teams that required them to coordinate and cooperate with others, the negative emotions that could be magnified by playing a violent

video game could be weakened. In fact, playing a violent video game in a cooperative mode with other players not only reduced the subsequent aggressive feelings expressed by these players compared with others who played the same violent video game in a competitive mode on their own but also as compared with competitive solus players who played with a neutral video game. Team play was also found to promote greater consideration for other people.

The positive benefits of playing a video game in a cooperative mode have been confirmed by other studies from the same author and his colleagues. Team play compared to individual play also strengthened feelings of cohesion with teammates and made players more likely to trust others (Greitemeyer & Cox, 2013; Greitemeyer, Traut-Mattausch, & Osswald, 2012).

The Relevance of Differential Responding

This chapter has examined the topic of difference in the nature of responding to violent portrayals. We have seen already that prosocial content in video games might neutralise negative effects of violent content. As yet, we have insufficient evidence about whether effects linked to all forms of video game violence could be countered in this respect and about whether some forms of prosocial portrayal are likely to prove more effective than others. We have also seen that violence can vary in video games and in other media. Variances in the form of violent portrayals in other media have been associated with different kinds of psychological reactions on the part of those exposed to such content (Bender, Rothmund & Gollwitzer, 2013).

What has emerged so far is evidence that some of the portrayal differences observed with, for example, film and televised violence, can produce different post-playing reactions among video game players. It has also been found that by varying the conditions under which players engage with video games can modify their post-playing responses. The realism of the setting could promote strong psychological reactions as could scenarios in which violence was classed as justified whether on the part of the actor or character in the game or on the part of the player when placed, for instance, in a competitive test situation.

What this evidence has revealed therefore is that we should not be searching for universal in the way video game players might be influenced by these games. The chances are that players post-playing responses will vary with the specific game that has been played, with the nature of any violent or non-violent material it contains, with the test conditions under which psychological effects are measured and finally with the personality of the player.

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What Is the Overall State of Evidence Concerning the Effects of Violent Video Games

A substantial body of research has accumulated based on the use of surveys and experiments as an attempt to measure cause-effect relationships between exposure to video game violence and subsequent aggressiveness in players. A number of reviews on the research evidence concerning the alleged effects of violence-themed video games have concluded that the overall evidence points clearly in the direction of harmful effects. In other words, playing with violent video games can increase the personal aggressiveness of players, both in the short-term just after playing, and in the longer term, and this outcome can be manifest in the form of aggressive cognitions, aggressive emotions and mood states, and aggressive behavioural tendencies (Anderson, 2004; Anderson & Bushman, 2001; Barlett, Branch et al., 2009; Dill & Dill, 1998; Bushman, Rothstein, & Anderson, 2010; Bushman & Pollard-Sacks, 2014; Grietemeyer & Mugge, 2014). Yet other reviewers, examining largely the same evidence, have reached more cautious conclusions (Elson & Ferguson, 2013; Ferguson & Savage, 2012; Griffiths, 1999; Mitrofan, Paul, & Spencer, 2009). The critics of the 'harm' view have challenged this conclusion on the grounds that many of the studies cited as evidence for this outcome suffered from design, measurement and analytical flaws rendering their data problematic.

As we have already seen, the measures of aggression used by researchers include controlled and pre-determined behavioural analogues of 'real' aggression used in studies of adults and children, and also observations of naturally occurring aggressiveness in children at play. Much of

the empirical evidence is also drawn from studies that deployed no direct measures of aggression at all, but simply asked people to report on their media and social behaviours and related attitudes and beliefs. The veracity of laboratory analogues of real aggression, and the reliability of autobiographical self-reports on behavioural experiences have been questioned, even though both types of aggression measurement have been defended vigorously as providing sufficiently robust indicators of relevant 'intentions' or 'orientations' as to render them of some value in judging the possible, or even probable, effects of violent video games. Moreover, even when the methodological defects identified by detractors are taken into account, and the weakest studies are discounted, there remains sufficient robust evidence about the potentially harmful side-effects of playing violent video games for there to be a genuine reason for concern about them (Anderson, 2004; Barlett et al., 2009).

There are further concerns about the measurement of video game violence exposure. Survey studies have often been reliant upon fairly broadly defined indicators of the frequency in which these games are played, and are often combined with self-nominated 'favourite' or 'preferred' video games. The latter are then further classified in terms of their usual amount of violent content. Survey respondents are often invited to provide their own classifications of whether their favourite video games are 'violent' and if so, how seriously so. Otherwise, the opinions of others, sometimes labelled as 'expert judges', are sought out about the violent nature of specific video game categories, or even specific named games.

Only occasionally are formal measures of violence systematically applied to specific games, in order to establish an independent and quantitative measure of the 'amount' of violence to be found in those games. Questions often remain unanswered about how effectively the frame of reference for subjective judgements about video games was controlled across respondents or independent judges. If each 'judge' provided personal opinions according to a self-selected frame of reference concerning 'violence', this means that no two 'violence' assessments are likely to be the same. This problem effectively demolishes any hope of obtaining meaningful and consistent measures of video game violence and, therefore, in turn, of exposure to it.

In experimental settings, we know much more about the specific types of content to which participants were exposed because this variable is controlled by the researcher. However, the problem with this type of study is that the exposure effect derives from a single game playing episode. It also usually involves just a single game playing experience for each participant,

which means that any 'effects' that are measured are linked specifically to that game, and may or may not be repeated with a different game. This doubt exists even if we were comparing one 'violent' game with another. The reason for saying this is that two 'violent' games could differ from each other, in terms of a range of production formats and content features, which in turn could create quite distinct experiences for the players. Some experiments have used 'violent' video games with simple narrative structures that depict obvious fantasy settings and non-human, on-screen 'actors' or 'agents', the movement of which is placed under the control of the player. Others have more complex narratives, and more life-like computer-generated human characters, and might, therefore, pull the player psychologically into the action to a far greater degree.

Leaving aside the nature of measurements that are used to represent specific types of behaviour, these media effects are further shown in terms of statistical scores. The strengths of these relationships are presented as correlation or regression coefficients, or degrees of variance. These coefficients indicate the likelihood that two or more variables are statistically linked. These results do not show absolute truths about social behaviour or media effects, but indicate the probability that the statistical relationships did not occur by pure chance. Tests of statistical significance are used to confirm whether, in probabilistic terms, two variables are interconnected. Usually these data indicate degrees of association between two or more variables, and often cannot prove causality in these relationships. Demonstration of the degrees of association, backed up by statistical confidence tests, indicates where causality might exist, but often does not prove it.

It is possible to produce further indicators of the 'social' significance of these kinds of statistical outcomes by determining the degree of variance in one variable that might be explained by the other variable, if we assumed that they were causally connected. Statistical programs will often produce these calculations automatically, or can do so on request. There is a simple manual calculation that can be computed for correlation coefficients: produce the square of the coefficient, by multiplying it by itself, and then multiply the result by 100. This produces a percentage figure that indicates the proportion of variance in one variable that might be explained by another. Hence, if a correlation analysis computed between scores on two variables yields a coefficient of 0.2 (all such coefficients range along a scale of zero to 1.0), and if one variable in this analysis is assumed to be causally linked to the other, the former explains 4% of the variance in the latter (i.e., $0.2 \times 0.2 \times 100$). In terms of 'social' significance, therefore, even if

these two variables were causally linked (and this is not shown by the correlation coefficient), one can account for only a small percentage of any variance in the latter. If the two variables were correlated at 0.6, however, then the amount of variance accounted for would be 36% which would represent a much higher level of potential social significance.

These statistical significance criteria are an important aspect of quantitative empirical research in the social sciences. However, statistical outcomes of this sort can be affected not just by the strengths of the potential social relationships between variables, but also by the methodological design attributes of the study from which they arose. Hence, even a relatively small correlation can achieve statistical significance if the sample of people from which it derived was very large. This means that we must look closely at the characteristics of these studies while judging whether each empirical investigation has produced evidence of real social significance or not.

The research literature has produced varying results, in terms of the types of psychological and physical effects on video game players, and the strengths of those effects. Different methodologies also vary in the typical sample sizes they use (large samples for surveys and small samples for experiments); whether they employed direct tests of causality (or not); and whether they measured real behaviour, in a direct or indirect sense, or only used analogues, or safe substitutes for real behaviour. All this means that, when examining the findings from the literature and reviewing the evidence, the data produced by different studies cannot be treated as the same, and none should be taken at face value without some further assessment of what different researchers have exactly measured when they talk about media consumption, and the 'aggressiveness' of individual media consumers.

Some authors have re-examined the findings of previous studies using a technique called meta-analysis. In doing so, they do not simply reflect on the results that were produced by different empirical inquiries, they actually take the coefficients produced between variables by those studies and aggregate over them. In this way, researchers have attempted to synthesise and summarise the overall effects emergent from this body of work by adding it all together as if it represented a single organic study. This type of exercise represents more than a simple review of the literature. Researchers extract the core data from previous studies, focusing in particular on the correlation coefficients presented in each case between playing with violent video game content and subsequent aggressiveness.

This technique has been applied to studies on television violence. In case examples of this type, researchers have collated data from hundreds of

independent studies (Andison, 1977; Hearold, 1986; Paik & Comstock, 1994; Wood, Wong, & Chachere, 1991). Andison reviewed 153 studies, Hearold examined 230 studies, and Paik and Comstock included 217 studies in their analysis. Wood et al. examined just 23 studies, but focused on investigations that used experiments only, whereas the other meta-analyses also included survey studies.

Andison (1977) looked at studies from the period between 1956 and 1976; and from the 153 studies originally identified, close analysis was carried out on 67 of these. These studies collectively obtained data from more than 30,000 people. This meta-analysis yielded a weak, but positive, overall relationship between watching televised violence and aggressive behaviour. Andison observed, however, that not all these studies produced consistent results. The overall coefficient, averaged over all the studies' results, disguised the fact that 14 out of 67 studies reported zero effects, 27 reported weak positive effects, 25 reported moderate positive effects and similar numbers reported negative effects (three studies) and strong positive effects (four studies). The strongest media violence effects occurred for studies that used analogue measures of aggression, rather than measures of real aggression.

Hearold (1986) covered studies published between 1929 and 1977. These investigations obtained data collectively from over 100,000 people. Some of the studies examined here also reported relationships between media use and prosocial behaviour as well as antisocial behaviour. Aggressive behaviour comprised a number of different types, including physical aggression (nearly half of all cases), verbal as well as physical aggression (nearly one in five cases), play with toys, approval of aggression, breaking rules and various other behaviours. The overall average effect size was 0.30. The average effect magnitude was slightly higher for laboratory-based experimental studies than for surveys, with experiments conducted in the field yielding the weakest coefficients. Hearold also differentiated between studies that had predicted a negative effect of exposure to media violence, as compared with those that made neutral predictions about behavioural outcomes. He found that that effect magnitudes were far higher (0.41) in studies that predicted media violence effects on antisocial behaviour, than in those that did not (0.17).

In the meta-analysis reported by Wood and his colleagues, the focus was placed on studies that used experimental methodologies. There were fewer of these, and hence the sample of 23 studies compiled here was much smaller than previous meta-analyses. Nevertheless, the participants

in these studies represented a diversity of types of people, including those with track records of delinquency or psychological problems as well as normal samples. Sixteen of these studies that measured aggressiveness (using laboratory controlled analogues of real aggression) found that exposure to media violence resulted in subsequently enhanced aggressive responding compared to controlled conditions. A further seven studies found the opposite pattern of behaviour. Some studies found that aggressiveness followed not only exposure to violent media content, but also to non-violent media content. One positive design feature of the studies examined in this analysis was that most used real media materials of the kind that might be found in regular movie and television broadcast outputs. There was some degree of diversity in the nature of the forms of screen violence, and yet, no analyses were computed to discover whether effect magnitudes varied between media violence types.

Paik and Comstock (1994) covered studies that appeared between 1957 and 1990, and around one in seven of those included had not been published. The authors included surveys, time-series analyses, laboratory experiments and field experiments. In half of the studies, participants were shown edited extracts from films and television programmes, while one in five used full-length materials. A further one in five of the studies used specially created stimulus materials, and the rest did not show media violence to participants at all, but requested self-reports on exposure patterns. Laboratory experiments produced the largest average effect sizes, followed by field experiments, surveys and time-series studies. Effect magnitudes were higher among male, than among female, participants. In comparing types of media violence, scenes that combined violence with sex produced the strongest effects. Cartoons and fantasy violence yielded the largest effect magnitudes from scenes from television programmes, while western scenes produced the weakest effects. Analogue aggression forms, such as delivery of electric shocks to another person in a laboratory setting, produced the strongest reactions to media violence.

Summing up the findings of early meta-analyses on studies of media violence, there was an overall conclusion reached across the researchers, who carried out these analyses, that the total body of media violence research evidence indicated a statistically significant effect of exposure to media violence on the subsequent aggressiveness of individuals. In terms of the social significance of these findings, the effect magnitudes, derived from the average coefficients, indicated fairly weak effects.

Effect magnitudes varied for different types of aggression, different types of media violence exposure, between genders and age groups and between studies with different methodologies. They tended to be strongest in laboratory experiments, weaker for surveys, and weaker still for field experiments. Overall, the effect sizes were small, and indicated that exposure to televised violence accounted for between 1 % and 10% of the variance in the aggressiveness of the individuals being investigated (Ferguson, 2002).

As we saw in Chapter 6, one of the critical issues raised about the overall empirical evidence base for the effects of media violence is that most studies have used dependent measures that fail to fully represent real forms of violence (Savage & Yancey, 2008). Despite the efforts of researchers using surveys and experiments to find ways of representing human aggressiveness, there has, more often than not, been a strong reliance on verbal reports that can lack accuracy (in the case of surveys), and substitute, or 'analogue', measures, which have received research ethics approvals (in the case of experiments). Verbally reported aggression by the respondents themselves, or on a second-hand basis by parents, peers or teachers were not always adequately validated. Substitute forms of 'aggression' used in experiments tend to only have tangential links to real human aggression, and may be even less able to represent, and therefore enable, the prediction of real forms of social violence (Savage, 2008).

Degrees of association between verbally reported aggressive propensities, or historical behaviours, and verbally reported exposure to media violence cannot demonstrate causality when all the data are obtained only at one point in time. When surveys have been conducted over time, with data collected repeatedly from the same people, it may be possible to monitor behavioural changes as children develop, and to also establish which came first: the interest in violent media or aggressive behaviour. Nonetheless, studies of this kind still generally suffer from design weaknesses linked to the validity of media exposure measures, and in respect to verbally reported aggressiveness (Savage, 2008; Savage & Yancey, 2008).

In stipulating a tighter set of requirements and qualifications on research studies, Savage and Yancey computed a meta-analysis that focused only on those studies that could directly question whether exposure to media violence was related to criminal aggression. It was acknowledged that meta-analysis could not demonstrate a true media effect size, but it did represent a method for establishing the status of research literature, and more especially, of its main findings and what might be concluded from

them (Savage & Yancey, 2008). To enhance the chances of a valid outcome, Savage and Yancey restricted their analysis to studies that measured 'criminal violence or analogous behaviour' (p. 775). Analogous behaviour could include fighting and shoving between individuals in observed settings, as well as verbal reports of such behaviour.

Studies that used peer rating indices, aggressive personality trait tests and button pressing or knob turning actions in the laboratory, which allegedly delivered a painful stimulus to another person, were not included. Studies also had to report effect sizes in a form that could be utilised within this secondary analysis. These initial effect sizes usually comprised correlation or beta coefficients. Savage and Yancey discovered 36 studies that initially qualified, and after further filtering out studies that lacked sufficient detail concerning specific design elements, 26 independent samples survived for the main analysis. These studies included aggregate investigations of secondary macro-level social data, cross-section and longitudinal surveys and laboratory and field experiments.

The initially computed average effect sizes for aggregate studies ($r = 0.043$, not signif.): experiments and quasi-experiments ($r = 0.057$, not signif.); cross-sectional surveys ($r = 0.164$, signif.), and longitudinal surveys ($r = 0.118$, signif.). The authors reasoned that the significant result for cross-sectional surveys could have been generous, and was magnified by the inclusion of some studies that used measures of preference for violent entertainment, rather than of amount of exposure to it. Given that other evidence indicated that more aggressive individuals choose to watch violent entertainment, the 'preference' studies could have been measuring selectivity of exposure, rather than an exposure effect. Among the longitudinal studies, there were variances in the findings across these studies, and across the samples that were used. One group of studies that represented an attempt to replicate American findings across other countries used different measures of media violence exposure (some using preference measures), and computed *post hoc* analyses in search of effects that failed to appear in every instance from the original design model. When this tweaking of analyses was removed, the overall effect size was non-significant. Savage and Yancey concluded that there was only very weak evidence that exposure to media violence promoted genuine forms of personal aggression or social violence.

META-ANALYSES WITH VIOLENT VIDEOS GAMES

In the video games literature, there have been nine meta-analyses published at the time of writing this book (Anderson, 2004; Anderson & Bushman, 2001; Anderson et al., 2010; Ferguson, 2007a, 2007b;

Ferguson & Kilburn, 2009; Greitemeyer & Mugge, 2014; Sherry, 2001). There has been disagreement between scholars about whether the research literature as a whole has demonstrated significant psychological effects on those who play with, or are exposed to, these games. The research group linked to Craig Anderson has produced a series of analyses that have led to conclusions that violence-themed video games produce antisocial effects. Research by John Sherry, and meta-analyses conducted by another group linked to Christopher Ferguson, have offered more conservative conclusions about whether there really are harmful side-effects of playing video games with violence. An analysis conducted by the German scholars Tobias Greitemeyer and Dirk Mugge led its authors to conclude that there was evidence for harmful effects, and that the critique of the Anderson group's work by Ferguson and his colleagues had not fully recognised the controls that the former group had taken into account in judging the quality of specific empirical studies (Greitemeyer & Mugge, 2014). It is worth taking a further look at the meta-analysis evidence.

The Meta-Analyses of Anderson

In their initial analysis of this kind, Anderson and Bushman (2001) aggregated data from 35 research studies. These studies reported data from 54 independent samples of participants yielding a total aggregated compound-sample of 4,262 individuals on whom relevant data were available. The researchers extracted the 'effect-size estimates' for each sample. These estimates indicated the strength of relationship recorded in each case between violent video-game play and separately measured aggressiveness. Some of these studies comprised experiments, and others obtained data from surveys. Nearly half of the participants in these studies' samples (46%) were under-18.

In reporting its findings, this study differentiated between studies with experimental and non-experimental designs, male and female participants, and the nature of the measures of aggression: aggressive behaviour, aggressive thoughts, aggressive feelings, general emotional or physiological arousal and propensity to behave in a prosocial fashion. Overall, a positive and statistically significant coefficient ($r = 0.19$) emerged between playing violent video games and various displays of aggressive behaviour. This behavioural effect occurred among male and female participants, among children and adults, and in studies that had experimental and non-experimental designs. According to Anderson and Bushman (2001): 'High video-game violence was definitely associated with heightened aggression' (p. 357).

With coefficients of this kind, it is possible to make a further calculation, not reported by Anderson and Bushman, of the amount of variance in aggression that might, hypothetically, be accounted for by exposure to, or involvement with, violence-themed video games. This is making an assumption that these variables are causally connected, which we do not know for sure, from these data. If they were causally connected, by computing the square of the resultant coefficient (0.19), we arrive at a result of 0.036. If this result is multiplied by 100 it can then be expressed as a percentage, which indicates the amount of variance accounted for in one variable by the other. This means that if we take the current relationship as indicative of causal agency on the part of the video games, the amount of variance in research participants' aggressiveness accounted for would be 3.6%.

In a further analysis, they differentiated between the different types of measurement of the exposure to video games. In the research literature that they collated, three principal measures of video game exposure had been deployed: personal estimates of time spent playing video games, in general, or playing violent video games; and preferences for violent video games. The overall coefficients yielded by these measures ranged from 0.16 to 0.24, and all were statistically significant.

Next, Anderson and Bushman examined the effect size estimate coefficients for relationships between violent video game playing and aggressive thoughts, aggressive feelings and physiological arousal, and then for prosocial behaviour. For aggressive thoughts, data were collated for 20 independent tests, and averaged 0.27. For aggressive feelings, data derived from 17 separate tests and averaged 0.18. For physiological arousal, data were based on a smaller set of seven tests, and averaged 0.22. With prosocial behaviour, data were obtained for eight independent tests, and averaged –0.16. The latter result indicated that greater violent video game play was linked to a reduction in the likelihood of displaying prosocial behaviour. In summing up, the researchers in this case concluded that there was compelling empirical evidence for a violent video effect on the aggressiveness of players, as obtained from across a range of studies with different samples, using different measurement methods for aggression and violent video game exposure, and for both experimental and non-experimental methodologies. The nature of that impact could be behavioural emotional, cognitive and physiological.

Anderson (2004) constructed a further meta-analysis study, but with the added twist of a quality control aspect designed to screen out studies that suffered from methodological weaknesses. He identified nine specific

methodological problems that characterised some of the studies included in previous meta-analyses. These problems included the failure to use a properly controlled experimental design with a pre-post intervention test design; inclusion of a control group with no video game violence exposure; ensuring that non-violent video games used for comparison purposes were fully devoid of violence; ensuring that the violent video game did contain 'violence'; inclusion of aggression measures involving a human target; control for factors other than video game violent content that could have triggered aggression; and ensuring that violent video game exposure was measured accurately and directly. A 'best practice' sub-sample of studies was then separated out from the total sample of relevant studies that had been discovered.

As before, the magnitude of the video game effects was expressed in the form of Pearson's r, both for survey studies and experimental studies. Five outcome variables were differentiated: aggressive behaviour, aggressive cognition, aggressive affect, helping behaviour, and physiological arousal. In relation to these five 'effects', data were derived from 32, 19, 19, 7 and 9 independent samples respectively. Anderson found that the average effect sizes were larger for the quality screened samples. There was little evidence that these effect sizes differed between surveys and experiments. Throughout, the evidence indicated that greater violent video game exposure resulted in increased post-play aggression and arousal, and reduced propensities to display helping behaviour.

Anderson (2007b) conducted a meta-analysis of seven published studies with 384 participants that examined relationships between playing violent video games and visuospatial cognitive abilities. The effect magnitude metric was the Pearson r correlation coefficient. Overall, there was an average effect size of $r = 0.49$ between violent video game playing and the development of these cognitive abilities. This meant that if these variables were causally linked, violent video game playing would account for 24 % of the variance in these cognitive skills. On correcting for publication bias, a feature that has characterised the meta-analysis work of Ferguson, which is discussed later in this chapter, the average effect magnitude fell to $r = 0.36$ which was still significant, and meant that the overlap in variance between these variables was 13 %.

In a further study that examined the prosocial as well as antisocial effects of playing violent video games, Anderson and an international group of colleagues examined studies that had measured as dependent variables, aggressive behaviour, aggressive affect, aggressive cognition, physiological

arousal, empathy, desensitization and prosocial behaviour. The aggregation of data, in this case, derived from experimental, cross-sectional and longitudinal survey studies. The included research derived from different cultures, and utilised best practice principles to include studies that had adopted tight design, or statistical controls over extraneous variables and conservative effects estimates. There were significant effect magnitudes in relation to all six of the dependent variables, and collectively, the findings indicated that exposure to violent video games increased personal aggressiveness behaviourally, emotionally and cognitively, and also reduced empathy toward victims of violence, and weakened propensities to behave in a prosocial manner. These effects cut across genders and cultures (Anderson et al., 2010).

The Meta-Analyses of Ferguson

Ferguson and his colleagues computed three meta-analyses and argued that, after they had made corrections for 'publication bias', there was little evidence to support the position of Anderson and others who had claimed that playing violent video games can cause harmful psychological reactions in players. Publication bias is the tendency to rely on published studies while ignoring studies that exist in the public domain, but have not yet appeared in academic journals. In selecting papers for publication, journals tend to favour research studies that initially yielded statistically significant results. Since peer reviewers tend to endorse studies with non-significant findings much less often for publication, published studies may actually provide a distorted impression of the status of our knowledge and understanding of a specific research issue, because of the studies that are rejected for publication, even though they may have value in terms of what they can reveal about the issue under investigation. Referring to corrections for publication bias (Rosenthal & Rosnow, 1991; Rothstein, Sutton, & Borenstein, 2005), Ferguson (2007a, 2007b) believed that if these were implemented into the meta-analysis of literature on violence and video games, a different set of conclusions about the behavioural effects of these games might emerge.

Ferguson has also raised a number of methodological issues about the work of Anderson and his colleagues. They have challenged experimental studies for failing to match video games assigned to different conditions in terms of variables other than their violent or prosocial content. Hence, the effects being measured could have been influenced by factors other than

those being manipulated by the researchers. A further major criticism has been the failure of survey-based studies, whether conducted at one point in time, or on several occasions with the same sample, to control for 'third variables'. These are variables that could influence the players' choices of video games and how often they play them, as well as their social attitudes and behaviours. Hence, any statistical relationship that appears between self-reported video game playing and aggressive dispositions could be explained by these other variables, rather than as a direct relationship existing between video game playing and social behaviour (Ferguson, 2010).

Ferguson (2007a) deployed a similar procedure as Anderson and Bushman (2001) in searching for research studies to include in his meta-analysis. He included articles published from 1995 to 2005 that had examined the effects of playing violent video games on aggressive behaviour, aggressive affect, aggressive cognitions, prosocial behaviour and physiological arousal. Ferguson restricted his analysis to research articles published in peer-reviewed journals. These stipulations yielded a sample of 25 published studies for analysis. Fourteen of these papers included an experimental component, and thirteen included a non-experimental method (e.g., a survey). The basic metric of 'effect magnitude' was the correlation coefficient.

Ferguson (2007a) reported statistically significant average r-scores (i.e., correlation coefficients) from experimental studies on the effects of playing violent video games on aggressive behaviour (0.29), aggressive thoughts (0.25), prosocial behaviour (0.30) and physiological arousal (0.27). These effects were stronger than those reported by Anderson and Bushman (2001). On correcting for publication bias, the effect outcomes for aggressive thoughts and prosocial behaviour were found to be unaffected by this factor, but there did appear to be a bias in the reporting of aggressive behaviour effects in experimental studies.

Turning to non-experimental studies, effect magnitudes were presented for three outcome variables, aggressive behaviour ($r = 0.15$), aggressive thoughts ($r = 0.13$) and prosocial behaviour ($r = 0.13$). These effects were much weaker than those for experimental studies, even before publication bias corrections were implemented. When publication bias corrections were included, it was the aggressive behaviour outcomes that were questioned, more than any others.

In testing for the possible influences of other variables, Ferguson (2007a) reported that age was important, with older participants exhibiting stronger violent video game playing effects than did younger participants.

The year of study did not make a difference. The importance of this variable was that it served as a proxy for the changes in the graphic nature of video games over time, as computer power increased and production techniques became more sophisticated. Ferguson acknowledged that the literature did reveal effects of violent video game playing on the aggressiveness of players, but that, when publication bias was taken into account and corrections were made for this factor, questions could be asked about how robust these findings were. This was especially true in the case of aggressive behaviour effects.

Ferguson (2007b) examined published studies from 1995 to 2007. The studies selected were restricted to investigations that examined the effects of playing violent video games on aggressive behaviour. Hence studies that had examined effects on aggressive cognitions, aggressive affect, physiological arousal or prosocial behaviour were not included. The final sample comprised 17 published studies that reported data from a total of 3,602 participants. As in other meta-analyses, the effect magnitude metric was the Pearson r correlation coefficient. Six correction methods were deployed to control for publication bias. The uncontrolled correlation coefficient was $r = 0.14$, which meant that if violent video games were causally related to the onset of aggressive behaviour, they accounted for around 2% of the variance in that behaviour. Once publication bias controls were introduced, the effect magnitude dropped to $r = 0.04$.

Ferguson and Kilburn (2009) conducted a follow-up meta-analysis that covered studies published between 1998 and 2008 that examined media violence effects. This study was not exclusively concerned with video games. The selections were restricted to studies that deployed some form of measurement of aggressive behaviour outcomes of media violence exposure, which included studies of violent video game playing. This yielded a sample of 25 studies which, together, obtained data from 12,436 participants. These studies included experimental, cross-sectional and longitudinal survey designs. As before, the Pearson r was used as the effect magnitude metric. The researchers also took into account the factor of publication bias, which was believed to favour the publication of studies that produced high statistically positive effects of exposure to mediated violence.

Two-thirds of the studies used standardized measures of aggression, whereas one-third did not. Four out of ten of the studies used measures of aggression that had been validated against actual aggression, whereas, for the majority, this was not the case. On correcting for publication bias, the overall effect magnitude of exposure to media violence was $r = 0.08$.

Uncorrected for his bias, the overall effect magnitude was 0.14. Another important finding here was that unstandardized measures of aggression yielded the highest effect magnitudes ($r = 0.24$), whereas standardised measures produced smaller effects ($r = 0.08$). Proxy measures that did not actually involve the direct use of aggression on the part of the research participants yielded a higher average effect magnitude ($r = 0.09$), than did measures that represented real forms of aggression ($r = 0.05$).

OTHER META-ANALYSES

There have been a number of other meta-analysis studies that have produced further disparate results. Sherry (2001) collated data from 32 different studies which, together, obtained data from over 2,700 individuals. After implementing quality controls for measurement of aggression, use of effective control groups, and other problems with data interpretation, a sample of 25 studies remained for full analysis. Six of these studies were cross-sectional surveys, and the remainder were experiments. The effect size estimate was based on the Pearson r coefficient. He found a statistically significant, but small overall mean effect size of $r = 0.15$ across these studies on violent video game effects on players' subsequent aggression. This finding was weaker than that obtained by Anderson and Bushman (2001).

There was considerable variance in mean effect sizes across the studies included in this meta-analysis, ranging from $r = -0.05$ to 0.36. The effect size was moderately correlated ($r = 0.39$) with the year in which a study was published. This measure served as a proxy for the graphic nature of video games, with later related games being characterised by more realistic production settings and on-screen, human-like actors. Later studies were also regarded as finding stronger violent effects. A significant correlation between player age and effect size indicated that older players exhibited stronger aggression effects while playing with violent video games. The length of play time in the study was not significantly linked to mean effect size.

Using Funk's (1993) system of video genre classification, Sherry found that there were modest, but statistically significant mean effect sizes for post-playing aggressiveness after playing with video games with human violence ($r = 0.15$) and fantasy violence ($r = 0.15$), and just a weak correlation in the case of playing with sports theme games ($r = 0.08$). On converting the effect size estimate from Pearson's r to Cohen's d, a comparison with the findings of Paik and Comstock (1994) indicated that the average effect size for video game violence ($d = 0.30$) was weaker than that for televised violence ($d = 0.65$).

Greitemeyer and Mugge (2014) collated data from 98 separate studies that, in total, obtained evidence from nearly 37,000 participants. Their analysis included studies that had investigated both antisocial and prosocial effects following exposure to violence- and prosocial-themed games. They examined studies that had included behavioural, affective, cognitive and physiological reactions to video games, and used zero-order correlation coefficients as the metric indicators of effect magnitude.

The literature covered included experiments, cross-sectional and longitudinal surveys. Studies published in English and in German were aggregated. They found that playing violent video games could have effects on aggressive behaviour, affect and cognitions, and could also arouse players physiologically. They also found that prosocial video games could trigger prosocial effects in the same ways and to the same degree. In other words, effect magnitudes did not differ significantly between violent ($r = 0.18$) and prosocial ($r = 0.22$) video games. Effect magnitudes were strongest for experimental studies, followed by cross-sectional surveys and finally by longitudinal surveys. While violent video games could weaken subsequent prosocial behaviour among players, prosocial video games could also weaken any inclinations to respond aggressively.

Greitemeyer and Mugge also separated out the studies authored or co-authored by Anderson and/or Bushman, and by Ferguson. The average effect magnitude of studies by Anderson and/or Bushman was virtually the same as that of all other studies examined by Greitemeyer and Mugge (excepting those by Ferguson), while Ferguson's studies yielded a much weaker average effect size.

CAUTIONARY TALES ABOUT META-ANALYSES

Meta-analyses often seem to offer compelling evidence because of the scale of data they present. The primary idea behind this approach to data analysis is that it aims to provide a systematic and comprehensive overview of the status of research findings on specific subjects. By combining the data of many studies in the literature, and going beyond mere reviewing of the key findings by aggregating key data outputs to create a bigger 'database', it should be possible to compute a more robust picture of the nature of the evidence.

One big problem with this approach is that analysts frequently, and somewhat conveniently, turn a blind eye to data quality, or at least to data differences between studies. The creation of larger databases by combining

studies does not iron out any methodological limitations that might have characterised the individual studies thrown into the mix. Sometimes, those limitations might even become magnified.

Another issue that is important is to be sure that these analyses are based on logical aggregations of data derived from common measures. If two studies measured 'aggression' but used two completely different instruments to assess this concept, can their aggression measures automatically be accepted as being the same in terms of what they are actually measuring? Giving them both the label of 'aggression' does not mean they actually measured the same behavioural dispositions. There are, therefore, always risks that these meta-aggregations are actually adding up measures as different as apples and oranges.

Thus, meta-analyses are as good as the studies they pull together. Meta-analyses can produce different results even when investigating a common topic, such as the effects of violent video games, simply because they aggregated over different sets of studies that varied on important characteristics, which affected the results they produced.

On another level, there have been disputes among scholars about the interpretation of meta-analysis outputs. Leaving to one side the debates about equivalence of measures and data quality between aggregated studies, studies that have yielded similar results have not always received similar interpretations in terms of what they really show. Thus, overall correlation coefficients from meta-analyses across different studies, and between the reported playing of video games and other variables, such as attention deficit and aggressiveness, have often been very similar, around $r = 0.10$–0.12, but have been interpreted by some researchers as weak, or failing to demonstrate the possibility of video game playing effects (e.g., Ferguson, 2007a; Ferguson & Kilburn, 2009), and by others as indicating a meaningful contribution to specific behavioural outcomes of playing these games (Greitemeyer & Mugge, 2014; Nikkelen, Valkenburg, Huizinga, & Bushman, 2014).

These differences of interpretation have led to calls for a more constructive debate between scholars about how to set standards for methodology and data interpretation, in order to produce meaningful knowledge gains (Valkenburg, 2015). Accompanying this call, attention has turned to the theoretical modelling of media violence effects in general, in order to consider whether there are important conceptual gaps that have resulted in weak research designs and data interpretations, which fail to include all relevant variables. In particular, media effects need to be re-conceptualised

as both potential causal agents as well as outcome variables. Furthermore, better recognition is needed of both 'mediating' and 'moderating' factors in the media exposure to media effects equation (Fikkers, Piotrowski, Weeda, Vossen, & Valkenburg, 2013). Small average correlations between exposure to mediated violence and subsequent aggressiveness might disguise more substantial relationships between these variables among specific population sub-groups displaying stronger susceptibilities to media influences (Valkenburg & Peter, 2013a, 2013b).

Identifying relevant moderating factors, and ensuring they are effectively built into media effects research designs, could result in better evidence concerning the relative vulnerabilities of different children to both antisocial and prosocial behavioural effects. Setting children on the right course by cultivating socially desirable, or positive, attitudes, values and habits, through early developmental experiences (including mass media related exposures), could create conditions that will enhance the building of even stronger desirable orientations in the future (Boyce & Ellis, 2005; Piotrowski & Valkenburg, 2015).

Conclusion

There is a substantial body of empirical research literature about the effects of violence-themed video games. This work has grown out of an even more voluminous body of work into the effects of media violence. The research to date has yielded conflicted findings. One powerfully endorsed view is that there is compelling evidence that exposure to, or regular playing of, violent video games can render individual players and observers more aggressive, and that, when this effect is multiplied over the large and growing community of video game players, such effects can become a problem for society. An alternative position has been presented that this 'effects' position has been overstated. When examining all the relevant evidence more carefully, it becomes apparent that the effects of playing violent video games have not always been unequivocally demonstrated. There are studies that have failed to yield evidence for socially negative behavioural effects. There are also reasons to doubt some of the data yielded by the studies of proponents of the harmful effects position.

Meta-analyses represent attempts to create large aggregates of the research literature, combining selected data from published studies into a larger database. It is the aim and hope of this approach that the overall research base is strengthened by being combined in this way. In doing so,

any design weaknesses that characterise individual studies are often over-looked, or conveniently ignored. All studies and their data are, therefore, accorded the same status in terms of their potential value to the analysis, and also in terms of their validity. Yet, this approach results in aggregates of studies and databases of varying values in terms of their validity and reliability. Combining weak studies with strong studies does not negate the limitations of the weak studies. Some researchers have included quality control tests within their meta-analysis designs, and try to weed out weak studies with problematic data. Even when this has happened, the end results from different meta-analyses have still not produced a consistent outcome.

There is a need, not only to recognise and be upfront about the inherent weaknesses of meta-analyses, but also to consider whether new theoretical modelling is needed that embraces new measurements, recognising that some variables can be causal agents and effects, and also that media consumers can vary in their relative susceptibilities to media influences. Scholars must try to set aside previous differences of opinion to come together in a constructive debate to examine the strengths and weaknesses of the empirical evidence that exists across the current violent video games research literature in order to ascertain whether these games genuinely pose a social risk, and whether this is generic or specific to certain types of players.

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Do Video Games Need to Be Better Regulated?

This book has examined the effects that video games can have on the people that play with them. Video game playing is widespread and extremely popular. The production and distribution of video games has become a big business. It is worth billions of dollars worldwide. Committed players can devote huge amounts of time to these games. Sometimes, their game playing can reach a point where it takes over their lives. Video games have many different themes, but violence has tended to be the dominant one. The most widely sought after and played games have violent themes, and in some instances, the on-screen action comprises little else.

The prevalence and popularity of video games coupled with the observation that many of the most widely used games are characterised by violent themes has understandably, and perhaps inevitably, led to concerns being raised about the ways in which players can be influenced by them. Dozens of empirical studies have been carried out into the alleged effects of violence-themed video games. Some major reviews of the evidence have concluded that these games can have undesirable psychological side-effects on players. These effects can be especially disconcerting if, and when, they occur among children and young adults still going through important life stages in which they are developing, emotionally and socially, as people (American Psychological Association, 2005; Anderson, 2004; Anderson & Bushman, 2002a, 2002b; Dill & Dill, 1998; Funk, Buchman & Germann, 2000).

Other reviewers have offered a more circumspect position, and concluded that the empirical evidence has not always been sufficiently

clear-cut enough to yield precise guidance for public policy makers (Elson & Ferguson, 2013; Unsworth & Ward, 2001). Indeed, if/when evidence does emerge that shows that players can be influenced by playing video games with violent content, the nature of their reactions, even within a single modest sample, can fluctuate widely. For some players, their involvement with a violent video game enhances their subsequent aggressiveness, while for others their likelihood of responding aggressively might actually decrease (Unsworth, Devilly, & Ward, 2007).

The critics of the 'effects' conclusion identify methodological weaknesses as the principal reasons for challenging the scholarly, majority-held view that violent video games can, and do, cause harm. For instance, experiments that can test causality fail to ensure that the video games assigned to different player groups have been appropriately matched on a range of factors (other than their violent nature, which is the key manipulated variable) that could potentially influence experimental outcomes. There are also concerns about the way 'aggressiveness' is measured, and whether the controlled behavioural assessments used in laboratory settings reflect how the individuals taking part might behave in a more natural setting (Elson & Ferguson, 2013; Ferguson, 2010; Ferguson & Kilburn, 2010).

There is empirical evidence, as we have seen, for more positive and prosocial effects of playing video games. These effects can arise from playing both violent and non-violent games (Granic, Lobel, & Engels, 2014; Greitemeyer & Mugge, 2014). If the challenges lodged against the veracity of research into the potentially harmful side-effects of playing video games are accorded some currency, similar concerns must be raised about the research evidence for prosocial effects, not least because similar methodological designs have been used throughout.

Those researchers who have reported that playing video games can trigger specific behavioural, or associated cognitive and emotional, reactions have defended their positions by pointing out their awareness of the inherent design weaknesses that characterised early studies in the field, and the subsequent attempts that were made to address these design limitations (Dodge & Crick, 1990). Studies, designed to investigate both socially positive and negative effects of playing differently themed video games, conducted extensive pre-testing of the games they used to ensure that they were carefully matched in terms of content attributes that could influence the players' responses, except for the manipulated game-theme variable (Greitemeyer, 2014a, 2014b). Other pre-tests were run to match different games in terms of how well-liked they were by players, or how difficult they

were to master (Anderson et al., 2004; Greitemeyer & Osswald, 2010a, 2010b). Further attempts were made in comprehensive critical reviews, and re-analyses (or meta-analyses), of previous studies to separate out the findings of studies that had been screened for their observance of the gold standards of methodological practice (Anderson, 2004).

Perfection in research designs, and absolute control over all potentially relevant extraneous variables that could contaminate empirical studies and offer alternative explanations for their findings, are probably unattainable goals. In social science research, the best, and more feasible, aim is to produce evidence that narrows down the chances, or probabilities, that if two variables are statistically related, they are related in a social sense. The validity of any such claim, of course, does not simply depend on comprehensive controls for potentially relevant 'other' variables (that is, variables other than the ones being tested for by researchers), but also on whether specific variables have been measured in ways that represent real-world psychological reactions to video games, and real-world behaviours (that may or may not be linked to video game playing).

There are ethical and practical constraints placed upon researchers that will often limit the methods they can use to measure human activity, especially if the activity itself could cause harm to the research participant, or others with whom that individual subsequently comes into contact. If specific real-world behaviours cannot be reproduced accurately within controlled research settings, then we need to have confidence that the measures that have been used are good predictors in their own right of those naturally occurring behaviours. Hence, any ethically approved analogues of real aggression used in controlled experiments may not outwardly appear like naturally occurring forms of violence; but does their appearance in specific experimental conditions signal the type of behavioural responses we might expect to occur in the real world? This is a key question in empirical inquiry into the effects of media violence. Despite the attempts of experimentalists to develop research designs that are as watertight as they can be, many studies are still characterised by design attributes that raise uncertainties about their veracity as modellers of real-world behaviour.

A Conflicted and Confused Debate

Video games have courted controversy almost since their inception. Certainly, once they spread beyond the community of computer geeks, and attained widespread public penetration as sources of entertainment, they

attracted a lot of attention from family and parent groups, governments and politicians and concerned citizens, often simply because children had begun to devote so much time to playing them. What also reinforced public concerns about video games was that many of the most popular games had violent themes. Even though the early games were obviously situated in fantasy settings, involving animated non-humanoid characters that were largely devoid of identifiable personalities, and had limited or non-existent narratives to involve players psychologically, prominent figures, such as the US Surgeon General C. Everett Koop, were still moved to identify them as sources of family conflict and meaningful contributors to social violence (Ferguson, 2013).

The popularity of video games waned a little in the 1980s, but then recovered in the 1990s with the arrival of new, more advanced games that benefited from increased computer power, higher quality production techniques, greater realism in characters and settings and more sophisticated narratives that incorporated movie-style storytelling with competitive game-playing formats. Furthermore, the nature of the interactivity characterising the newer games—a feature that was always held to render video games potentially more psychologically powerful than the 'passive' viewing of films and television programmes—also evolved with 'first-person shooter' games, allowing players to become even more deeply embedded within the game itself.

Video games enjoyed an expansion of genres, but violent themes remained among the most popular, and this only led to more critical attention being directed their way. Game titles only served to draw further attention to the violent nature of these games, with games such as *Mortal Kombat* (a play on combat), *Street Fighter* and *World of Warcraft* all making obvious references to violent terminology, and immediately underlining violence as an apparent core element. As a social backdrop, national agencies in countries, such as the United States, registered growing levels of youth violence and extreme events involving mass killings perpetrated by young offenders. This fuelled public concern and interest about their causes, and in finding effective solutions.

The well-established public debate about the effects of violence in movies and television programmes migrated toward video games, with searching questions being asked about the potential harm associated with playing them. Some empirical inquiries yielded findings that supported the arguments levelled against other supposedly violence-laden media that exposure to violence in the interactive settings of video games could enhance

the aggressive dispositions of players. This evidence was enthusiastically adopted by critics of video games as ammunition for lobbying for tighter legislative controls over the content of these games, and for better labelling of game contents to assist consumers in making game purchases and playing decisions.

Following a series of hearings on the subject in 1992–1993, the US Senate called upon the video games industry to adopt a content ratings system. The industry was given a year to produce its own acceptable system or have one legally placed upon it by government. Out of this order was born the Entertainment Software Ratings Board (ESRB) which devised age-related categories for video games much in the same way as those used for motion pictures. These ratings were designed to provide consumers with signals, informing them of the ingredients of video games in terms of sexual, violent and language content.

The reported role of violent video games in the lives of the perpetrators of the Columbine High School massacre in 1999, however, encouraged the Senate to look further into the controls over video games (and other media violence). Joining in the debate at this time was a number of prominent scholars in the field of media effects research, some of whom were students of prominent figures in the media violence debates and related research of the 1960s–1980s, who began to present events and commentaries that endorsed the view that violent video games did pose behavioural risks to children, and that the scientific evidence for such effects was virtually indisputable (Anderson & Huesmann, 2003; Anderson et al., 2007; Bushman & Anderson, 2002; Gentile & Anderson, 2003; Gentile & Gentile, 2008; Huesmann, 2007).

Next, authoritative professional bodies such as the American Academy of Pediatrics (AAP) and American Psychological Association (APA) waded into the debate with their own statements about video game violence that largely accepted the scientific case as closed (AAP, 2001, 2009; APA, 2005). Yet, one government department report on youth violence determined that media violence represented a relatively minor causal agent (Youth Violence: A Report of the Surgeon General) (DHHS, 2001), and further inquiries into school shooting cases uncovered little or no evidence to lay the blame on the perpetrators' alleged liking for violent video games (Vossekuil, Fein, Reddy, Borum, & Modzelski, 2002).

Despite the conflicted statements about the potential, or believed to be established, effects of violent video games, the fact that some reputable professional bodies presented explicit and unequivocal positions

about these effects gave these conclusions an authority that led to them being adopted by state and national legislators in countries such as the United States. Yet, closer scrutiny of the details of these statements, such as those put out by the AAP, revealed that the volume of relevant and supportive scientific evidence was overstated. This particular organisation actually changed its calculation of the number of studies in the field over time, but even then exaggerated how many distinct studies, as opposed to publications, existed to support the effects of video game violence (Ferguson, 2013).

One critic has accused organisations, such as the APA and AAP, of failing to observe their own standards of assessment of scientific evidence when drawing conclusions from reviews of research into the alleged effects of violent video games on players, and on wider society (Ferguson, 2013). In doing so, they appeared to allow their advocacy role to overrule their scientific role by jumping to conclusions about the status of the research evidence concerning how players can be changed by playing these games.

It might have been better in terms of establishing the scientific basis for conclusions that harmful effects of playing violent video games have been proven to have introduced independent reviewers to examine the evidence and to ensure that both research that supported and rejected any claims of harmful effects was accorded equal airtime and status. Such an independent review process might also have adopted a more critical stance in its evaluation of the validity of the extant science on the subject. Furthermore, some professional bodies have also appeared to share intelligence and views through common review committee memberships, which again, only served to exclude the opportunity for alternative viewpoints about the science to be considered (Ferguson, 2013). Unfortunately, this apparently blinkered approach to reviews on the research into video game violence migrated across to legal actions brought about by state governments in the U.S. against the video games industry (Hall, Day, & Hall, 2011a, 2011b).

Attempts by state governments in the US, most notably California, Georgia, Illinois, Louisiana, Maryland, Michigan, Minnesota, Oklahoma and Washington, to introduce restrictive legislation on the sale of video games met with robust responses from the industry, and laid bare the status of scientific evidence on allegedly harmful effects of these games. These legal cases usually centred on the introduction of restrictions on sales of video games to minors. Constitutional grounds, usually associated with the protection of free speech, were invoked in defence of video games. The provision of purportedly compelling and indisputable scien-

tific demonstrations that video games have actually produced harm, failed to reach a threshold of proof that would have enabled state or national courts to legitimately overrule any First Amendment protection claimed by the video games industry (Bushman & Pollard-Sacks, 2014).

Many of the courts involved in these cases were criticized, stating that the research evidence presented in support of sales restrictions was itself selective, and failed to represent the expert views of scholars who had previously disagreed with the harmful effects position. Indeed, the expert witness evidence presented in *Video Software Dealers Association and Entertainment Software Association v. Schwarzeneggar* (later *Brown*) (prepared by Pollard-Sacks, Bushman, & Anderson, 2011) saw an industry wide appeal against a new state law introduced in California by its then governor, Arnold Schwarzeneggar, restricting the sale of violent video games to minors. They critiqued it for failing to consider all the relevant evidence, and hence, for providing a somewhat one-sided assessment of the science on video game violence effects (see Hall et al., 2011b).

There was little doubt that some of the scholars, who supported the pro-restrictions lobby, had been very productive in generating original empirical inquiries, and publishing their findings along with other associated reviews and commentaries. The witness statements produced here, however, all too often failed to fully represent published counter-evidence, which was also plentiful and worthy of equal consideration. Thus, there was evidence that failed to demonstrate harmful violent video game effects (e.g., Baldaro et al., 2004; Colwell & Kato, 2003), there were analyses that presented alternative perspectives for explaining youth violence influences (Olson, 2004) and then there were studies that offered alternative explanations for violence than that of the 'violence' in video games (Adachi & Willoughby, 2011a, 2011b). Strong challenges have emerged toward the causal agency position of video games in regard to their ability to condition or trigger aggression (Devilly, Callahan, & Armitage, 2012; Ferguson, 2010; Grimes, Anderson, & Bergen, 2008; Mitrofan, Paul, & Spencer, 2009; Sherry, 2007; Teng, Chong, Siew, & Skoric, 2011; Unsworth et al., 2007).

WHAT ARE THE POTENTIAL EFFECTS OF VIDEO GAMES?

The interactive nature of these games means that players get to control events that happen on screen. Thus, even though these games comprise settings that are clearly 'fantastic' (in the sense of presenting obvious

fantasy worlds), such virtual realities have, over time, come to more closely resemble life-like environments. Video games are not like movies or television dramas. Although they might feature 'human' characters, they are computer-generated. Movies featuring real human beings can, therefore, draw us into their action through a close psychological identity with the on-screen actors, especially when those actors portray characters that resemble people we know, or who we believe could, exist in our real world. With video games, the veracity of the settings and characters does not match that of films and television.

Over time, however, the quality of computer generated scenes has grown, and alongside this, so too has the investment in scripting more psychologically involving plotlines. When these elements are combined with the interactive nature of video games, whereby, the player is more than simply a voyeur, but is actually part of the on-screen action, you have a mix of ingredients that can create a powerful psychological experience. Given the popularity of these games, it is understandable, therefore, that questions have been asked about the lasting effects they could have on those who engage with them a lot.

As evidence accumulated and it became widely accepted, in both academic and political circles, that media violence can affect people psychologically, and not usually in a good way, so too have questions been asked concerning how serious a social problem it is. Public concerns here have been especially acute where children were concerned. This should come as no surprise given that children are still going through stages of psychological development. Their behavioural repertoires are growing, but have not yet become fully established. During their social learning, they turn to different sources of information concerning how they might, or ought to, behave in different social settings. Parents and other family members have important roles to play in this context, but in addition, mediated experiences might also have an influence.

Following from this concern, further debates have been triggered about where primary sources of responsibility lie. Parents must inevitably have a great deal of responsibility for setting parameters and rules concerning the social behaviour of their children. If parental influences are undermined by contrasting examples on how to behave, provided to children though their media experiences, is there a case for calling upon the producers of entertainment content to bring their own house into order? In the context of video games, do the producers and distributors of these games carry a responsibility to play an active part in protecting children? If the

industry cannot or will not take on this responsibility, or simply denies that harmful effects ever flow from their products, even among child players, do governments, then, have a responsibility to step in and introduce mandated regulations, underpinned by legislation, to ensure that children's best interests are protected? (Funk, Brouwer, Curtiss & McBoom, 2009)

The problem for some societies, concerning solutions that involve government legislation, is that these types of controls over the activities of entertainment industries are seen as tantamount to curtailing freedom of speech. If video games are regarded in the broadest sense of the term as 'speech', then they qualify for protection in respect of this core value, and this means that any attempts to restrict their content would represent a breach of the freedom of speech laws. In open societies such as the United States, freedom of speech usually holds sway over any attempt to curtail it. Only when specific forms of 'speech' can be deemed 'harmful', and this accusation is backed up with compelling empirical evidence, can their restriction be countenanced.

The tricky factor here is to establish a threshold of 'harm' for violent video games that might then provide evidence to back a case for content restrictions. As the evidence reviewed in this book has indicated, the research evidence is conflicted. Despite the vociferous critique of violent video games by some scholars (most notably Anderson, Bushman, Gentile and their colleagues) that have presented studies that, they argue, show unequivocal evidence of harmful effects, not everyone has agreed with this evidence base (Ferguson, 2013). There has even been disagreement among scholars when they have attempted to pull together large bodies of evidence into single analyses of potential video game effects. Disagreements have arisen over methods used to select relevant studies for analysis, as well as differences in the way secondary data sources have been aggregated for large-scale, compound analyses. There is also the question of when a statistically significant result represents an outcome of genuine social significance.

An alternative approach is to look for a solution that recognises that not all people will react to video games in the same way, and that some games contain material that could trigger undesirable responses in specific players. This might be especially true in the case of children whose behavioural and psychological immaturity means that they may not be equipped yet to respond in socially constructive ways to specific entertainment experiences. This fact might still not represent sufficient grounds to restrict 'speech', but does raise a specific need to inform consumers about the type of content they can expect to find in certain video games. The solution then is to allow the industry freedom to produce and distribute a range

of entertainment content that varies in terms of its age-appropriateness, while also providing advance information targeted at parents that can help them to decide the suitability of specific video games for their children (Funk, Flores, Buchman, & Germann, 1999).

Similar steps have already been taken in respect of movies produced for cinema release and television programmes. Thus, the video game sectors in different countries have adopted content rating systems designed to inform and to empower parents. The next obvious question is how effective are these ratings systems, and how helpful do consumers perceive them to be?

There has been a growing interest in the beliefs and opinions of parents, both about the effects of media on children, and the efficacy of the entertainment industry ratings of media content in terms of its suitability for children. There is evidence that parents have their own ideas about media violence. These ideas not only embrace the individual tastes (that is, whether the like or dislike specific movies, television shows or video games), specifically because of their violent content, but also other beliefs about the effects of such content on their children. These beliefs about the way their children are likely to respond to mediated violence can also influence the extent, and nature, of parental controls over their children's entertainment experiences. This sensitivity to children's media experiences, and the need to ensure they do not receive exposure to content that parents believe could cause harm is most acute among parents of young children. Parents of preschool children are especially likely to monitor the media experiences of their offspring because of the beliefs they hold that media violence could harm their children (Funk, Brouwer, Curtiss, & McBroom, 2008).

Studies have been carried out to determine whether parents agree with regulators in terms of the ways video games are rated as suitable for children. This is a complex question because it often boils down to reaching an agreement among all stakeholders—child game players, parents, policy-makers, video game manufacturers and distributors—about what constitutes 'violence'. This question has been vigorously debated in relation to violence on television and in movies where, along with other factors such as sex, profane language and other risky behaviours, agreements about definitions are central to the drawing up of content classification codes that take into account consumers' tastes and evidence about harm. Difficulties arise for government policy makers, or the industry's own voluntary codes, when key stakeholders, such as children and parents, disagree with what constitutes 'violence' (Gentile & Anderson, 2003).

In all these debates, however, there is ultimately a position of consensus reached that violence includes a number of key attributes including the ability of on-screen actions, or characters, to inflict harm on other characters or objects. Harm, in this context, can involve one on-screen character killing another, or completely destroying an object. Reaching an agreement of this kind is important, but raises a further question about 'harm'. While the existence of 'harm' might be acknowledged in terms of virtual action sequences in video games, what about harm caused to individuals who play these games? Once again, in the context of research into cinema and television violence, it has been recognised that 'violent' acts that cause 'harm' on-screen can take on many forms. How serious these actions might be, in terms of the responses of viewers, can be mediated by how graphically portrayed they are, how realistic their settings are, whether certain instruments of aggression are used, whether significant and visible harm is caused to on-screen victims, the motives that underpin the portrayed aggression and a number of other factors (Gunter, 1985).

The issue of 'harm' to media consumers is important, because accusations of harm that are attached to specific video entertainment content can often find themselves at odds with the personal opinions of people who enjoy consuming that content. Children, for instance, like video games with violence. Children like fantasy violence, and also more realistic forms of on-screen violence that involve obviously human-like characters (Buchman & Funk, 1996). Parents and children can disagree about the suitability of specific video games, particularly when parents seek to restrict their children's access to games the children themselves really like and want to play (Funk, Hagan, & Schimming, 1999).

For the industry, market restrictions on their products are not welcome for understandable reasons. These kinds of restrictions have financial implications for their businesses. If a specific video game is restricted to a designated (usually adult) age group because its content is deemed to be unsuitable for other (usually younger) age groups ('suitability' in this instance relates to concepts of potential harm that could be caused by the game to people who play it), there is an onus on the part of policy-makers to prove that harm. As we have seen so far in this book, there is plenty of empirical evidence in the public domain that has concluded that violent video games can trigger aggressive reactions in players. Often these reactions are likely to be internalised as thoughts and feelings, but there also remains a possibility that players are changed by these games in terms of their own behavioural patterns (Anderson et al., 2007).

Walsh, Gentile and Van Brederode (2002) used a media evaluation tool, called KidScore, with a sample of parents who were invited to say whether the ratings given to different kinds of audio-visual entertainment, including video games, were the same as the ones they would give. In general, when the entertainment industry classified specific content as age-inappropriate for children, most parents agreed. There were other instances where the industry rated material as age appropriate for children where parents disagreed. This disagreement was especially likely to be triggered by entertainment content that depicted portrayals of violence.

In the context of video games, national ratings systems designed to assist consumers, as well as inform the game production industry, started to emerge in the 1990s (Haninger, Ryan & Thompson, 2004; Haninger & Thompson, 2004). These content classification ratings schemes were informed by ones already in use with movies and television. In the United States, two systems emerged in 1994 with one backed by the Interactive Digital Software Association (IDSA), and the other by the Software Publishers Association (SPA) (Gentile, Humphrey, & Walsh, 2005).

IDSA established the Entertainment Software Ratings Board (ESRB) which used age-related categories similar to those used with movies. At first there were four classifications: K-A (Kid-Adult), Teen (Ages 13+), Mature (Ages 17+), and Adults Only (Ages 18+). Later K-A was split into Early Childhood (ages 3 and older) and Everyone (suitable for 6+). SPA created the Recreational Software Advisory Council (RSAC), which used content classifications that rated each video game in terms of its level of violence, sex, and profane language along four-point scales.

How helpful these ratings systems are to consumers is debatable. Consumers, parents especially, have been found to dispute the ratings applied to games in relation to their violent content (Dart & Shepherd, 1999). Formal analyses have also revealed that ratings are not always applied consistently across video games. Sometimes, video games rated as appropriate for everyone still contain violence (Thompson & Haninger, 2001). Many video games that failed to obtain a high V-rating (for Violence) were likewise found to contain violent content (Kunkel, 2003).

Even though parents do not always agree with industry ratings of media content, research evidence has emerged that, in countries such as the United States, parents are more likely to be satisfied than dissatisfied with the age-related ratings that are used. This does not mean that they are also satisfied with the overall amount of information they receive about media content; and many parents have been found to prefer that basic

ratings be supplemented with more detailed descriptions of media content (Gentile, Maier, Hasson, & Lopez de Bonetti, 2011). There is further confusion in trying to make sense of these classification systems, and the meanings they have for parents, because parents disagree among themselves about the suitability of specific video games for children within particular age ranges (Walsh, & Gentile, 2001).

The Value of Interventions

Centralised regulation can set broad parameters in open commercial markets for the production and distribution of video games. There will always be limits to how far codes and practices can go in restricting the content of these games. The case for censorship must go beyond calls for content restrictions grounded in what certain selective public tastes will tolerate, and requires evidence of harm. As we have seen, proving that violence-themed video games pose a genuine risk to public health and safety is not always straightforward. Despite the claims of some critics of video game violence that the evidence base for harm exists, and that the case is proven (Anderson et al., 2007; Huesmann, 2010), others have challenged this position and the evidence base used to support it (Ferguson, 2011; Ferguson & Dyck, 2012; Ferguson & Kilburn, 2010).

In a complex digital media world, central regulation cannot be depended upon to provide total protection, if such protection is deemed necessary. Video game consumers need to also acquire a form of socialization that affords them internalised protection—a form of psychological inoculation if you will—against any potential risks associated with playing violently themed games. The idea of media literacy is not new. It has been widely discussed in the past, and some empirical investigations have indicated its value in creating better informed media consumers, even from an early age, who may be less susceptible to undesirable media influences (Abelman & Courtright, 1983; Anderson, 1983; Buckingham, 1995; Kelley, Gunter, & Kelley, 1985; Singer, Zuckerman, & Singer, 1980). In the context of the concerns about media violence, media literacy programmes were regarded as a counterbalance that could serve to protect children (Kelley et al., 1985).

In the context of video game violence, interventions have been tested with children in school to reduce the likelihood that playing with these games might enhance their personal aggressiveness. In one such intervention, a sample of 12–13 year-olds in Germany were assigned over a

five-week period to an intervention programme or to a no-intervention control group. Around 3 months before the start of the intervention programme, all the children were surveyed with measures designed to assess their media habits (including exposure to media violence), and their existing propensities to behave aggressively. Media violence measures combined television, movies and video games. They were then post-tested on all these measures 7 months after the end of the intervention (Moller, Krahe, Busching, & Krause, 2012).

Results showed that at the post-test stage, those youngsters who had been assigned to the intervention programmes scored lower than the control group on personal aggression, and were also found to consume violence-themed media less often. This difference, however, was confined to children who had scored high in aggression at the pre-test stage. There was also a reduction among the intervention children in their adherence to the belief that using aggression was socially normal.

Putting Science Ahead of Politics

It is clear from the material examined in this book that by half way through the second decade of the twenty-first century, a large volume of scientific evidence was published about the effects that violence-themed video games might have on players. Some of this evidence has led researchers to draw conclusions about the potential effects that this increasingly popular source of entertainment can have on societies as a whole. The subject has also been the source of controversy and widespread public debate. This debate has involved members of the public as concerned citizens, consumers, parents, avid players of these games, educators, lawyers, politicians, governmental bodies, regulators and the industry with its agents and representatives.

Each party is a stakeholder in this debate and has its own agenda. Often these agendas clash. Such clashes can also lead to disparate uses of scientific evidence, where such evidence is utilised to support a particular stakeholder's point of view. Sadly, when advocacy is linked to furthering personal agendas, evidence can become distorted or misrepresented, or can be used in a highly selective manner. Personal agendas can also lead stakeholders to adopt tactics designed to persuade others to adopt a specific, and supportive, position on the status of the science about violent video games, which does not invariably reflect the position we might adopt if we considered

the available evidence more comprehensively, and more carefully (which should also mean more *critically*).

Some parties resort to using scare tactics, or try to turn a scientific debate into one of morality. This approach can be effective at raising the public profile of the debate, and in leading it away from a considered review of scientific evidence to one of acceptance that something is 'wrong' and, therefore, must be stopped, regardless of what any science might tell us. The science then becomes secondary, and is more likely to be used selectively, with only that evidence which supports the dominant moral position being cited. Moral outrages against mass entertainment phenomena pre-date the emergence of video games. Opponents to new media outputs that achieve widespread public popularity discover some 'evil' within the 'messages' that such outputs purportedly contain (Cohen, 1972; Critcher, 2009; Gauntlett, 1995). These purposefully constructed 'panics' represent modern forms of witch hunts that make unfounded claims against victims and are not deemed to deserve the right of a reply (Ben-Yehuda, 2009).

When debates about the allegedly harmful effects of violent media are framed within a moral panic, discourse, even when supportive 'evidence' is provided, tends to derive from sources that are accepted for their message, rather than because they have passed accepted standards of critical scientific assessment. In this context, anecdotal evidence derived from real-world cases of extreme violence, reportedly triggered by violent media experiences, often acquires the status of scientific proof. Media outputs that cause offence to some can become labelled as 'harmful' without relevant supporting evidence, particularly if the content is defined by themes that resonate with specific areas of public sensitivity. These panics can become constructed into powerful appeals for greater media control, particularly when potential (or with real cases, actual) victims are children (Critcher, 2009; Muschert, 2007).

It is also important to be cautious about accepting calls for more stringent controls over the media when reinforced by references to societal level crime statistics, especially where an upward trend is detected and then linked to parallel growth in the size of the video game market. There could be many explanations for changes in crime levels, and sometimes they are not even linked to social factors, but are simply changes in the procedures for collection and compilation of data. Linking these kinds of data to more direct interventionist tests on the psychological effects of violent video games is also problematic. Although resonating neatly

with the agenda of moral panics, it represents untrustworthy science (Hall et al., 2011a, 2011b).

The confusion for the public over what to believe about the alleged effects of video games with specific themes, and whether they pose a risk to children is, of course, not helped by conflicted research. The public usually wants to know from relevant experts what steps they need to take to protect themselves, and their children. Yet, science is not perfect, and often fails to deliver consistent findings. The public cannot be expected to understand the finer details of methodological analysis. More problematic outcomes can arise, however, where legislators and policy-makers are also confused, and demand a less equivocal scientific statement on which to found new laws, regulations and codes of practice.

The bold statements made by professional bodies attempting to present a clear cut position to public and policy-makers do not help either if they misrepresent the status of the evidence overall. Such bodies might argue, of course, that, where risks to the public are concerned, it is better to be safe than sorry. This mind-set encourages a conservative position on regulation, especially in relation to the protection of children. This outcome might be regarded as acceptable by regulation lobbyists, helpful to politicians and acceptable to the public who simply want to know how to care for their children, but can be less useful to the other major stakeholder, namely, the video game industry.

Scholars themselves, therefore, have to adopt some introspection regarding their own debates about the scientific evidence concerning violent video games, and their potential effects on players. Recognition of methodological strengths and weaknesses in studies is a start. Further, close attention should also be devoted to the ways researchers place specific interpretations on specific empirical findings. It is not unusual for the same results to essentially be interpreted quite differently in terms of what they show statistically and socially (Valkenburg, 2015). Differences of opinion among research groups, between whom research disputes are as much personal as empirical, need to be reconciled if social science evidence is to be taken seriously by policy makers. At the same time, theoretical advances must accompany any fine-tuning of methodologies. There is a need to revisit standard research designs and variable definitions, especially in regard to distinguishing between independent, dependent, mediating and moderating variables. More flexibility in theory and variable definitions may be needed, in which specific measures can display dynamics as

both dependent and independent variables under different social and psychological conditions (Valkenburg & Peter, 2013a, 2013b).

The computer and video games industry will have understandable concerns about any new legislation that constrains the products they are allowed to make, and restricts their distribution. In the context of a moral panic, those stakeholders seeking to introduce more public protection will regard the industry's concerns as irrelevant compared to the needs of the greater social good. The industry might fairly counter, however, by demanding to see compelling evidence that video games do harm, and that this harm is on such a scale that their freedom of speech, and freedom of trade rights, can be legitimately overruled. In protecting the legitimate interests of all relevant parties, therefore, it is imperative that the best quality scientific evidence on harm is presented. Any expert statement must attempt to cover all relevant sources, provide a detailed critique of the evidence and arrive at the best possible position on whether harm exists, what form it takes, how widespread it is likely to be and what reasonable steps need to be taken to remove it.

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