

# Ethical Considerations When Using Video Games as Therapeutic Tools

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**Abstract—** Video games have been used in a variety of therapeutic and rehabilitative contexts. However, there are health risks associated with playing video games, including the risk of epileptic seizure. Additionally, video games have been criticised for reasons including their portrayal of women and minorities. For games to be accepted as an ethically valid therapeutic tool, these concerns must be addressed. The authors believe that video games can be used as therapeutic tools when used responsibly.

## I. INTRODUCTION

Video games are a new medium, and arguably an art form [20], born in the second half of the twentieth century [23]. The term “console game” refers to games which are played on a dedicated hardware device, called a console, connected to a television. “Handheld games” are portable entertainment devices. The latest generation of handheld games includes the Sony Playstation Portable, and Nintendo DS. Mobile phones also offer sufficient capabilities to be used as portable gaming platforms [16]. Finally, “computer games” are entertainment software applications played on a personal computer. The term “video game” is used here to mean a computer game, handheld game or console game.

Video games have been used in a variety of therapeutic contexts [12], [13]. However, video games have well established health risks, and have also been criticised for other reasons, including the effects of their violent content and portrayal of women.

The authors are interested in new therapeutic uses for games, particularly in the context of people who have suffered a traumatic brain injury and may require a brain-computer interface (BCI) to communicate. This group of users clearly has specific needs – are they more at risk than others from the dangers of video games?

## II. ETHICAL ISSUES IN RESEARCH

All research involving human participants today is subject to ethical considerations. Kimmel (p.6) [21] states that “Research ethics comprises principles and standards that, along with underlying values, guide appropriate conduct relevant to research decisions.”

Many ethical issues arise from conflicting sets of values. One example is that naturalistic observation may cause a conflict between methodological validity and participants’ privacy. Many ethical dilemmas are brought to the fore in experiments where the participants are initially deceived by the researcher.

At its heart, the question the researcher must answer is “Should I conduct this study?”

### A. Personal, professional and regulatory ethics

There are three main sources of guidance to which the researcher can turn in the ethical decision making process: personal; professional; and regulatory.

A researcher’s personal ethical values are shaped by his or her life experiences, and may lie on a spectrum between means-oriented (“do no harm”) and ends-oriented (“the ends justify the means”) [21].

Three tests for a personal ethical decision are suggested by the Institute of Business Ethics [19] (in the context of a business decision):

1. Transparency: do I mind others knowing what I have decided ?
2. Effect: whom does my decision affect or hurt ?
3. Fairness: would my decision be considered fair by those affected ?

In addition to his or her personal value system, the researcher will be expected to adhere to standards set by their profession. Examples of professional bodies are the American Psychological Association (APA) and British Psychological Association (BPS). These bodies’ standards are relevant to the evaluation of software user interfaces, because the experimental model of psychology is often followed in HCI experiments.

Researchers at hospitals and universities are required to submit their proposed study to an ethical panel or commission, typically called an Institutional Review Board. Kimmel [21] (p.51) notes some reservations about ethics boards. Wueste [41] notes their strengths. The ethical validity of a course of action is judged by several people. If the group of judges all arrive at the same conclusion, the confidence in the decision is

increased; if there is a conflicting decision, this indicates a possible dilemma that has been overlooked.

Finally, legal regulations supersede personal and professional principles. Examples of such government regulations are the US Federal regulations for Human Research; and in the EU, the 2001 European Commission directive (Data Protection Directive 95/46/EC) requiring ethics committees for medical research.

### *B. Informed consent*

Contemporary formal ethical standards can be traced back to the Nuremberg Code [28], arising from the Nuremberg trials of Nazi scientific atrocities. The ten-point Code introduces the concept of voluntary, informed consent, describing it as “absolutely essential” [21].

Saha and Saha [35] discuss informed consent in the context of clinical trials. Informed consent is crucial to allow the participant to decide what risks to take with his or her body. Informed consent protects the human rights of the participant. It is too valuable a principle to be sacrificed for any anticipated research benefit.

### *C. Working with severely disabled participants*

Researchers have a fiduciary responsibility to protect participants, in that an unequal relationship exists, where the more powerful person is entrusted to protect the best interests of the other.

Ethical issues arise when a participant is severely disabled and unable to communicate his or her consent. The APA Ethical code for research with participants from special groups provides the following guidance [21]:

“For persons who are legally incapable of giving informed consent, psychologists [should] nevertheless provide: 1. Appropriate explanation; 2. Seek the individual’s assent; 3. Consider such person’s preferences and best interests; and 4. Obtain appropriate permission from a legally authorised person, if such substitute consent is permitted or required by law.” (Section 3.10b)

The BPS Ethical Principles for conducting research with human participants states that [21]:

“Where real consent cannot be obtained from adults with impairments in understanding or communication, wherever possible the investigator should consult a person well-placed to appreciate the participant’s reaction, such as a member of the person’s family, and

must obtain the disinterested approval of the research from independent advisors.” (Section 3.4)

### *D. Privacy*

The right to privacy is enshrined in major human rights codes, e.g. the United Nations’ Universal Declaration of Human Rights; and the European Convention on Human Rights. A basic principle of research ethics is that the privacy and anonymity of participants should be respected.

Issues arise when usage of a system in the field is logged. Collecting data from real users in the field is recommended [25], to gather statistics such as how many features are used; or the rate of errors; to find usability problems which are not apparent during observations, etc. Clear issues of privacy are raised: the user must be made aware if logging is being performed, and must be able to disable it.

Kimmel [21] (pp.122-123) notes that methodological issues may also arise due to privacy issues, as participants may be unwilling to answer questions which threaten their privacy.

### *E. Participant Debriefing*

Participant debriefing is regarded as an integral part of any experiment [18], [21]. The reason is that the subject will have a natural tendency to feel that they, rather than the hypothesis, were tested, and may believe they have failed the test, suffering a damaging blow to their self-esteem [18].

Nielsen [25] makes the same point, in the context of usability studies. In the evaluation stage of interface development, participants will be measured on how well they can use the interface, with attributes such as speed and accuracy being recorded. It must be made clear to the participant that the interface was under test, not the person using it. This can be explained before and during the evaluation, and also reinforced during the de-briefing.

However, concerns have been raised that debriefing may itself cause harm, for example, if participants have been chosen because of some deficit, such as low self-esteem or embarrassing behaviour [21](p. 80).

Experiments involving deception of the participants complicate debriefing. The experimenter cannot lie to participants during debriefing, as this would undermine its purpose and exacerbate ethical problems. However, the participant may believe that the debriefing is also a deception. An *explicit debriefing* will address this head on and has been found to reduce false beliefs and negative feelings [21].

### III. THERAPEUTIC USES OF VIDEO GAMES

Video games have been used as therapy in numerous contexts [12], [13].

#### A. Physical therapy

Playing video games improves reaction times, hand-eye coordination, and raises the player's self-esteem [13].

Loftus and Loftus [22] note that sports games, requiring speed, accuracy, strategy, and alertness, are useful in the treatment of problems with eye-hand coordination, visual field, and tracking.

Games have been successfully used in situations where repetitive motion is required of a patient, as physical therapy. Griffiths notes that this success may be due to the motivating nature of games, and their role in distracting attention from discomfort during physical therapy [13]. Griffiths cites examples of games being used as therapy for arm injuries, as a way of increasing hand strength, and improving arm reach for patients with traumatic brain injuries [13].

Burke and colleagues [5] have developed a suite of games designed to aid recuperation after a stroke. This is accomplished by requiring the player to make repetitive arm movements which aid upper limb recovery.

Games can provide entertaining challenge – fun – giving rise to motivation that more conventional forms of therapy may lack. O'Connor and team [30] developed a wheelchair interface to computer games called *Game Wheels*. This interface motivated spinal cord injury patients to exercise more regularly, by controlling games by driving their wheelchair.

Disorders involving muscles of the eyes have been treated using video games [22]. The monotonous task of visually following a dot on screen can be replaced with the more entertaining task of playing a video game. Such therapy is in use at present, and a study of 60 participants at London's Great Ormond Street Hospital is planned [37].

#### B. Children with learning difficulties

Loftus and Loftus [22] (p. 148) report a study of 25 children with learning disabilities, aged between 6 and 13. The children were tested before and after playing a number of video games for 30 minutes, and were found to have improved in motor ability and spatial visualisation.

Demarest [7] describes the benefits of playing video games for her autistic son, aged 7. These are

improvements in language ability, basic maths and reading skills, and social skills. Demarest stresses that these benefits occurred as a result of her involvement interacting with, and discussing the games. Demarest found that playing the games improved her son's self-esteem and made him feel calmer, and has recommended their use to parents of other autistic children.

#### C. Treatment of behavioural problems

Favelle [10] used the game *The Wizard and the Princess* (Sierra on line, 1980) as a therapeutic tool to help adolescents with severe psychiatric disorders, in a residential treatment centre. The game allowed for the exploration of alternatives to violence, and the development of problem solving skills. Additionally, Favelle found the game *Alter Ego* (Activision 1986) effective in individual therapy, the game's situations providing an opportunity to talk about sensitive issues in a safe environment. Favelle concludes that games can be an effective tool in individual and group therapy, when used in conjunction with skilled counseling.

Spence [38] describes ways in which video games have been used to help children with emotional and behavioural problems. He provides case studies showing ways in which games can bring about changes in the development of relationships, motivation, cooperation, aggression, and self-esteem. In his view, the use of games has effected positive change in the children in his care, subject to some guidelines which he provides.

#### D. Pain management

Griffiths [12] cites examples where video games have been used to manage pain, the games providing a task which distracts the sufferer. DeMaria [8] (p. 34) cites a survey of casual game players, *twenty-seven percent* of whom claimed that distraction from pain was a benefit.

Finally, Loftus and Loftus [22] remark on some indirect benefits of playing computer games, of which the most important may be an introduction to the world of computers, and an incentive for children to learn computer programming.

### IV. HEALTH RISKS OF VIDEO GAMES

#### A. Photosensitive epilepsy

Numerous studies have shown that playing video games carries a risk of seizure due to photosensitive epilepsy (PSE), (e.g. [33], [24]). Video game manufacturers are careful to point out this risk. For

example, Nintendo includes a Health and Safety Precautions booklet with every game [27].

The incidence of people with PSE is approximately 1 in 4000 [17] (p. 161). This figure is also quoted by Nintendo [27]. However, the incidence of epilepsy is much higher among people who have suffered a traumatic brain injury (TBI). About 35% of TBI patients experience a seizure, with an ongoing risk of seizure in 5% of open or penetrating head injury patients. Closed head injury patients have a 1% chance of seizures [31] (pp. 66-67).

Precautions can be taken to minimise the probability of a seizure due to PSE. The incidence of epileptic seizure correlates with the number of retinal cells stimulated, and the intensity of stimulation [29] (p. 158). Advice to reduce the likelihood of seizure is given in [29] and [17].

Nintendo recommend that a person known to have suffered a seizure in the past should seek medical advice before playing a video game [27].

### *B. Joint and muscle complaints*

Nintendo [27] cautions that “playing video games can make your muscles, joints, skin or eyes hurt after a few hours”. Indeed, a condition called “Nintendo elbow” is identified by Bright and Bringhurst [4]. A variety of minor ailments of this type are reported by Griffiths.

Treatment for these conditions usually consists of taking a break from playing the game in question [14].

### *C. Other health issues associated with video games*

Gwinup and colleagues [15] measured the cardiovascular effects of playing a video game (*Berzerk*) in 23 healthy young men. The mean heart rate and systolic blood pressure of the participants during play was significantly higher than the rate before or after. Gwinup offers the explanation that the playing of video games causes the release of catecholamines. Novice players experience greater anxiety, and so a greater rise in blood pressure than for the more experienced players. Gwinup cautions that, in view of these results, it may be expected that video game players will experience other cardiovascular effects, such as arrhythmias. He predicts from the results that such effects would be more pronounced in novice players.

Is it dangerous to play video games? Overall, “the evidence of serious adverse effects on health is rare”, however, “frequent players are the most at risk from developing health problems” [14].

## V. VIDEO GAME ADDICTION

For many years it has been noted that someone who plays video games excessively may appear to be “addicted” (e.g. [39]). Indeed, the “addictiveness” of a video game is seen as a desirable quality by game players and designers, exemplified by the interview of a leading game designer in [34] (pp. 26-27).

Loftus and Loftus [22] examine video game addiction in terms of the psychology of reinforcement and of regret. Experiments with rats in Skinner Boxes have demonstrated that unpredictable reinforcement, such as that provided by video games, provide the longest extinction period (i.e., is addictive for longer). Furthermore, the regret a player feels when he or she “dies” prompts the player to try again, to “undo” the mistake.

Griffiths and Davies [14] have studied whether or not video game addiction exists. Griffiths’ opinion is that this is a real condition, because six major criteria for addictive behaviour can be seen in some people who play video games excessively.

Behavioural signs of addiction in adolescents which have been reported include stealing money to play arcade games or to buy game cartridges; truancy from school to play games and not doing homework [14].

Game-related crime is also reported in [22] (pp. 109-110). A thirteen year old boy in Des Moines, Iowa resorted to constant burglary to fund his Pac-Man habit. In Japan, a twelve year-old held up a bank with a shotgun, demanding only coins, for arcade games. And “cases of children becoming prostitutes specifically to earn money for video games have cropped up in several countries”.

## VI. VIOLENCE AND VIDEO GAMES

Since the arrival of video games, concerns have been voiced over their violent nature and the possible effects on the player, echoing similar debates over violence on TV and in movies. Smith [36] notes that most video games – around 80% - feature violence, with this figure rising to over 90% for games targeted at mature audiences.

Within the class of “violent” games, Loftus and Loftus [22] distinguish between violence to aliens and violence to other people. With regard to games such as *Defender*, *Galaxian* and *Space Invaders*, (where “aliens” are “killed”), “Despite E.T., the idea of defending ourselves against aliens may well be so deeply ingrained in our collective psyche that it’s futile even to worry about it”. Much more worrying to them are “kill people games”, although no evidence at

the time was available to demonstrate that playing violent video games promoted actual violence.

Provenzo [32] (p. 65) feels that the criticism of games which emphasise violence is justified, but does not distinguish between games in which fairly abstract aliens are “killed” (e.g. *Galaga*), and games in which humans fight each other. Provenzo takes the view that in any case, violent video games “...do – at least on a short-term basis – increase the aggressive behaviour of the individuals who play them”.

Anderson and Bushman [2] undertook a meta-analysis of 35 studies of video game violence, and found that violent video games do increase aggressive behaviour in children and young adults. They concluded that “exposure to violent video games poses a public-health threat to children and youths, including college-age individuals”. This is seen as a strong view by other media researchers who believe that more studies are warranted [26] (p.232).

Other evidence suggests that video games are not devastating society to such an extent. DeMaria [8] (p.19) shows that while consumption of video games has risen linearly since the 1970s, the youth violent crime rate in the US remained steady, until it began to decline in the mid 1990s.

## VII. VIDEO GAMES, GENDER AND SEXUALITY

Consalvo [6] finds that games from *Donkey Kong* (Nintendo, 1981) to *Final Fantasy IX* (Squaresoft, 2000) have presented not only an unquestioningly heterosexual theme, but also a stereotyped view of females who invariably need rescuing by a male.

Provenzo [32] analysed the cover art of 47 popular video games, finding that they routinely portrayed women as victims, having no initiative, and dependent on men. Smith [36] reports similar findings. Of the 54% of games featuring female characters, only two featured females on the cover, both portrayed ‘provocatively’. Within the games, Smith found that female bodies in games are sometimes hypersexualised, with unrealistically large breasts and small waists. Smith concludes that girls have fewer role models in games. The role models that they do have tend to be hypersexualized and disproportionately thin. These depictions may also affect boys’ social learning about women.

## VIII. VIDEO GAMES AS CORRUPTING INFLUENCE

On Nov 9, 1982, then US Surgeon General, Dr C. Everett Koop, delivered a speech in Pittsburgh in which he declared video games evil, that produced

“aberrations in childhood behaviour”, and which should not be played (quoted in [8], [22]).

Although this statement was not supported by any evidence, and was later retracted, the sentiment is presumed to have been commonly felt among parents at the time. Some communities have banned arcades on the basis of being an unwholesome environment where aggressive behaviour is encouraged. In the Philippines in 1981, then President Ferdinand Marcos banned arcade games for being a corrupting influence on children [32].

Loftus and Loftus [22] cite studies showing that heavy viewers of television (more than 4 hours a day) were found to have different conceptions of the real world than light viewers (less than two hours a day) -- agreeing with, for instance, portrayals of women as weak and passive. The concern is that heavy consumers of video games will suffer a similarly distorted world view.

Some games are unquestionably offensive by design. Provenzo [32] goes further and states that “video games have a history of being sexist and racist”, citing the particularly egregious game *Custer’s Revenge* (Mystique, 1982) as an example. This game attracted protests over its depictions of women and Native Americans.

The genre of ‘shocking’ games is now more popular than ever, with *Grand Theft Auto IV* breaking sales records on its release [3]. The *GTA* series of games is deliberately offensive and been duly criticised. For example, Hillary Clinton (quoted in [8]) complained that “The disturbing material in *Grand Theft Auto* and other games like it is stealing the innocence of our children and it’s making the difficult job of being a parent even harder”.

### *Game Ratings Organisations*

The video games industry has responded to concerns over unsuitable content by creating regulatory bodies. In the US, the Entertainment Software Review Board (ESRB) has been rating games in the US since 1994. Under the ESRB scheme, there are five age-based categories and 30 content descriptors.

In most of the EU, the Pan European Game Information (PEGI) standard created in 2003 is used to rate games. This scheme similarly specifies age-based ratings and 6 content descriptors.

On its release, *GTA IV* was rated “M” (mature, for ages 17+) by the ESRB, who urged parents to observe their ratings [9].

The issue of unsuitable advertising and box cover artwork has been tackled by the Advertising Review Council of the ESRB, who issued guidelines for the marketing of video games [1]. Publishers must be “sensitive” in portraying violence, sex, alcohol and other drugs, offensive expression, and beliefs.

Smith [36] reports that these guidelines have been complied with on the whole, with the exception of the depiction of excessive violence.

## IX. DISCUSSION

In any research, the participants must be informed of the known risks, to allow them to decide if the risks are acceptable.

The risks in this case are: health concerns, particularly PSE; the violent nature of some games; the attitudes expressed within the games; and the possibility that a player could become “addicted” to a game.

The incidence of PSE is approximately 1 in 4000 in the general population. However, for some groups of people the risk is much higher. TBI patients in particular have a high incidence of epilepsy – as high as 1 in 20 for some types of injury. [29] and [17] suggest ways of reducing the risk of seizure, which would be followed in a therapeutic setting.

Given that video game addiction exists, it would seem that enabling someone to play video games must carry the risk that the player will become addicted. This risk may be higher for people who, due to severe disability, are unable to balance game playing with a variety of other activities.

There is some evidence that playing violent video games encourages violent behaviour in children. Console games are rated by game industry bodies, such as the ESRB and PEGI, who have a strong interest in minimising these violent effects. Parents, and others who supply games to children, are encouraged to follow their guidance, but this practice is not believed to be stringently followed by all, shown by the ESRB’s plea to parents.

### *Informed consent*

In the case of severely disabled participants, it may be impossible for the participant to communicate either his or her understanding of the risks or their consent. In order for informed consent to be granted, family members or carers of patients need to have risks and benefits explained to them. For example, Gnanayutham provided demonstrations for this group of people [11].

Applying this spirit to video game therapy, the

suitability of a game could be assessed collaboratively by the researcher, the participant and his or her family. All parties could consider the game rating, the cover art, and the instruction manual. The game could be demonstrated by the researcher, and could be played and discussed with the participant and family members.

### *Debriefing*

Debriefing a participant after playing a game is a necessity. If a participant does not do well at a particular game, he or she may well feel that they have “failed” a “test”. In fact the researcher will have chosen the wrong game, perhaps in an entirely inappropriate genre. Additionally, the researcher may not be providing a user interface which is suitable for the participant.

## X. CONCLUSIONS

Video games have been shown to have therapeutic benefits when used appropriately. Successful therapeutic uses have included physical therapy for stroke patients, spinal cord injury patients, and traumatic brain injury patients. Additionally, games have been shown to help children with learning difficulties and behavioural problems, and are used for pain management. Playing games improves the player’s reaction time, coordination, and self-esteem. This final benefit may be of particular importance for people coming to terms with an acquired disability. Additionally, the authors are interested in investigating the further benefits which may result from playing online games with other players, fostering a sense of teamwork, belonging and fellowship.

Unfortunately, there are potential negative consequences to playing video games. Firstly, there are some health risks, notably that of epileptic seizure. There is some evidence that playing violent video games encourages violent behaviour in children. Other criticisms of video games are that they are sexist, racist, and perpetuate stereotyped views. Positive female role models in games are scarce, affecting both boys and girls. Heterosexuality is invariably the norm in games. Heavy users of video games may suffer a distorted view of reality. Finally, video games may be “addictive” to some people, leading to anti-social behaviour, and increasing the likelihood of other negative effects.

On the issue of violent and shocking games, it should be noted that games of this type are uncommon, but attract the most media attention. Some of the harshest critics of these games are careful to avoid tarring the entire output of the game industry with the same brush. For example, Walsh [40] notes that “With so

many good games available for children and youth, it is unfortunate that so much attention has to be paid to games which are inappropriate for all youth and harmful to some". And even Anderson and Bushman [2] "...wonder whether exciting video games can be created to teach and reinforce nonviolent solutions to social conflicts."

We have seen that video games have the potential to offer therapeutic benefits to many groups of people. Most of the negative effects of playing video games are dependent on the game content, and so selection of an appropriate game genre and title, in collaboration with the participant and his or her family, is essential. Engagement of the researcher with the participant during game play, and debriefing afterwards, are also necessary.

Finally, we return to the three main sources of ethical guidance: personal, professional and regulatory. All researchers seek to follow ethical standards set in law, by Institutional Review Boards, and by professional bodies. As to one's personal value system, we have seen that video games are beneficial to certain groups of people. Knowing this, are we not ethically obligated to offer these potential benefits to all?

Acknowledgement: Thanks to SAE London for financial support.

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