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The persistence of attitudes following violent and non-violent video game play using conventional versus embodied controls

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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ABSTRACT

The effects of violent video game play on hostility and support for violence are unclear. Previous studies have shown increases, decreases or no effect at all. At the time of the first study (2007) it was unclear if attitudes and opinions within a game persisted after game play. Also unknown was how long any such effects would last, and if they would be affected by using embodied versus conventional controls in the game. 3 experiments were run on university students to investigate these points. It was hypothesised that violent play would increase hostility and support for violence, and that these effects would be short term and increased by the use of embodied controls. Study 1 investigated whether attitudes and opinions persisted immediately after game play by having participants play either a non-violent or violent version of a computer game and then measuring their support for violence. The hypothesis was tentatively supported in males, who showed higher support for violence in the violent version group. Study 2 aimed to pilot a behavioural measure of hostility to be used in Study 3 by having participants watch either a non-violent (non-violent group) or violent clip (violent group) before completing the behavioural measure and the violence questionnaire used in Study 1. The hypothesis was not well supported in that the attitudinal scores were almost equal. However, the expected trend occurred in the behavioural measure. Study 3 investigated how long the effects on hostility and support for violence would last, and if they were affected by the use of embodied versus conventional controls. Participants played a non-violent and violent game on either the Playstation 2 or Nintendo Wii. Violent play did not increase support for violence and hostile decision making, it marginally decreased them. Also, the participants’ responses did not completely return to baseline after 24 hours. Lastly, embodied controls were not found to have a greater effect on support for violence. Therefore, the 3 predictions of this study were not supported. Overall, the central tenet that video games can affect players’ attitudes, opinions, cognition and behaviour post play and that this will be especially true in games wherein an in-game character mimics the physical actions of the player is not well supported.
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DEDICATION

This dissertation is dedicated to the memory of my father, Dr. Edwin M. Koloko.
Table of Contents

INTRODUCTION 1
BACKGROUND 2
Media Bias 5
Presence 6
Contextual Violence 9
Violence and Enjoyment 13
Effects of Violent Media 14
Gender Differences 15
Conclusion 16

STUDY 1 18
Overview and Predictions 18
Method 18
Results 24
Discussion 28

STUDY 2 34
Overview and Predictions 34
Method 34
Results 40
Discussion 42

STUDY 3 46
Overview and Predictions 46
Method 46
Results 55
Discussion 59

GENERAL DISCUSSION 65

CONCLUSION 70

REFERENCES 72

APPENDICIES 82
List of Tables

Table 1: Study 1 Procedure Timeline
Table 2: Gaming experience of participants
Table 3: DES-II items in the positive and negative emotion factors
Table 4: Study 2 Procedure Timeline
Table 5: Behavioural Measure Ratios
Table 6: Clip Assessment Means
Table 7: Means of the 4 factors of Presence
Table 8: Activity and argumentativeness means
Table 9: Study 3 Session 1 Procedure Timeline
Table 10: Study 3 Session 2 Procedure Timeline
Table 11: Study 3 Session 3 Procedure Timeline
Table 12: Differences between the Baseline and High challenge, Negative feedback turns
Table 13: Inferential Statistics of Computer Experience Between Sexes
Table 14: Activity and argumentativeness questionnaire means between groups
Table 15: Means of Physiological Data
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Game play in Violent condition</td>
<td>1919</td>
</tr>
<tr>
<td>2</td>
<td>Game play in Non-violent condition</td>
<td>2020</td>
</tr>
<tr>
<td>3</td>
<td>INVAQ across gender and condition</td>
<td>2424</td>
</tr>
<tr>
<td>4</td>
<td>Skree plot of Eigen values of positive and negative emotion factors</td>
<td>2627</td>
</tr>
<tr>
<td>5</td>
<td>Engagement across gender and conditions</td>
<td>2735</td>
</tr>
<tr>
<td>6</td>
<td>Screenshot from the violent clip</td>
<td>3545</td>
</tr>
<tr>
<td>7</td>
<td>Screenshot from the non-violent clip</td>
<td>3547</td>
</tr>
<tr>
<td>8</td>
<td>Control with next generation controller</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Game play in Wii Sports Tennis</td>
<td>4748</td>
</tr>
<tr>
<td>10</td>
<td>Game play in Wii version of Manhunt 2</td>
<td>4848</td>
</tr>
<tr>
<td>11</td>
<td>Control with traditional game controller</td>
<td>4849</td>
</tr>
<tr>
<td>12</td>
<td>Game play in Playstation 2 version of Manhunt 2</td>
<td>4949</td>
</tr>
<tr>
<td></td>
<td>Game play in European Tennis Pro</td>
<td>4950</td>
</tr>
</tbody>
</table>
INTRODUCTION

Video games are traditionally a source of entertainment whose popularity has led to the development of a lucrative gaming industry (Vouvakis, 2007). In particular, violent video games are very popular. Along with popularity, video games have attracted controversy. Games such as *Grand Theft Auto: San Andreas* (Rockstar Games, 2004), *25 to life* (Eidos, 2006) and *Manhunt 2* (Rockstar Games, 2007) have been the subject of public debate due to the in-game violence and the positive consequences for the in-game character that the violence brings. It is feared that the attitudes and opinions expressed in the games can be transferred onto players and that this may lead to negative social actions. An example is the association an adolescent made between the game *25 to life* and his murder of 3 police officers (Anderson, 2005). Associations such as this have made violent video games and their after-effects the subject of research, particularly in the first world. Of particular interest is whether violent video games lead to general violent/destructive cognition and behaviour in players.

Extensive research has been conducted on video games and the after-effects of game play in first world countries such as the USA (e.g. Anderson & Bushman, 2001; Anderson, 2005; Markey & Scherer, 2009). However, to date little research has been conducted in a third world context. The third world has seen an increase in the availability of media forms of entertainment. Specifically, South Africa has made major advances in its entertainment industries. This has led to video games being more widely available to the public, and therefore a feature in numerous households. This upsurge in video game and hence violent video game availability in South Africa has been preceded by the country experiencing a violent past.

South Africa as a country has experienced violence leading up to the new democracy of 1994. Despite the stability the democracy has brought, the country still has a high violent crime rate, i.e. from 2008 to 2009 the following crime statistics were recorded in a population of approximately 47 million people: Murder – 18,148; Assault with the intent to inflict grievous bodily harm – 203,777; Aggravated robbery – 121,392 (Institute for Security Studies, 2010). Hence, violent scenes are commonly described in the news/newspapers, and a substantial proportion of the population has been directly affected by violent crime. It is unclear if differences between South Africa and most first world countries regarding the after-effects of
video game play exist. Any such differences could inform distribution policies to seemingly violent countries and potentially prevent increases in anti-social behaviour or permit increases in pro-social behaviour. As South Africa is a very modern third world country, it can be at the forefront in terms of distribution policies. Any changes implemented in such a country can then be filtered to less developed third world countries as they modernize. It is in this context that the present research is conducted.

The central tenet of this study is that video games can affect players’ attitudes, opinions, cognition and behaviour post play and that this will be especially true in games wherein an in-game character mimics the physical actions of the player. Results that show a difference between the attitudes, opinions, cognition and behaviour with regard to violence in players of a violent game versus players of non-violent game would support the main thesis - this would show that the existence of violence in a game can alter a player’s views on the use of violence in the real world after game play. 3 studies were thus conducted to find support for the main thesis.

Study 1 investigated the main thesis by exposing players to either a violent or non-violent version of a game and examining subsequent support for violence (attitudes and opinions). Study 2 examined the effects of viewing a violent or non-violent clip on a viewer’s support for violence (attitudes and opinions) and hostile decision making (cognition and behaviour). This examined the main thesis by investigating if merely viewing violent media could also affect a viewer’s support for violence in the real world. It also tested links between violent media and general violent cognition/behaviour through a decision making task. Lastly, Study 3 examined the differences in a player’s support for violence and hostile decision making post non-violent play vs violent play on either a conventional control system or an embodied system wherein the player’s physical actions are mimicked by the in-game character. This was to determine if the control system mediates any effects caused by the violence.

BACKGROUND

The effects of video games on players while playing games have been well documented (Anderson & Bushman, 2001). However, questions around the lingering effects players experience outside the gaming environment after game exposure remain unanswered. Particularly important are two questions: whether the attitudes and opinions taken on by
players in the game persist outside the gaming environment, and, given that many games are played under conditions of high arousal brought on by violent content, whether violence plays a role in this. These questions arise due to the controversies around prejudicial behaviour and violence apparently stemming from game play. An example is the controversy around the game *Grand Theft Auto: San Andreas* (Rockstar Games, 2004). The game allows players to commit crimes for rewards as part of the greater plot. As such, parents and institutions called for the game to be banned for presenting a positive view of crime and gratuitous violence, and rewarding the committing of these acts (Farrell, 2005). Further questions have been raised on what effects the use of embodied control systems such as the Nintendo Wii could have on players’ attitudes and opinions. Public concern has been expressed that embodied violence will lead to increased hostility due to violent actions being simulated by players (IFCO, 2007).

In addition to the controversies, the video game market is extensive, and so the behaviour of gamers and how to influence this behaviour becomes commercially important. The popularity of video games creates the potential for the views expressed in them to gain a wide following. An example of this popularity is the World Cyber Games, wherein 700 players from 74 countries compete against each other (Vouvakis, 2007). As such, there is potential to reduce stereotyping and build attitudes that are more positive, if these do indeed persist outside the gaming environment. Also, video games could then be used to help develop informed opinions on various issues. There is of course the chance that the wrong messages can be sent out through the games. Concerns around *Grand Theft Auto* have already been mentioned. In another example, Anderson (2005) claims that the game *25 to life* (Eidos, 2006) promotes disrespect towards law enforcement due to the main character being an escaped convict. It is argued that law enforcement being cast as the player’s enemy may negatively shape players’ opinions regarding law enforcement.

Hence a potential danger in violent video games is that the in-game character will serve as a model, and that the player may exhibit a “generalization of imitative response patterns to new settings in which the model is absent” (Bandura, Ross & Ross, 1961). This concern is raised from Bandura’s famous Bobo Doll study wherein children observed an adult model exhibiting either violent or non-violent behaviour towards a doll. The children were then provided with aggressive arousal and placed in a room with a similar doll. The group that had observed violent play towards the doll imitated the modelled behaviour, while children that
had observed non-violent play were not violent towards the doll. The authors concluded that observance of aggression was sufficient to produce imitative aggressive behaviour in children. This is concerning in light of violent video games in that a player is more of an active agent than an observer, and may therefore more readily produce imitative aggressive behaviour (Silvern & Williamson, 1987). Study into this possibility is required in both children and adults.

If persistence of the attitudes and behavioural tendencies encouraged in violent video games does exist it may be very dangerous. Sanford and Madill (2006) purported that one’s behaviour in video games can be used to resist certain world views, but can also lead to the reification of traditional stereotypes. The same study also claimed that the resistance of certain world views helped to form and restructure players’ identity formation. Thus, the underlying opinions in games can be transferred onto the player. These authors call for studies on the effects on players of the bias and values contained in video games. The current study raises a further question around how long any possible effects last. This is important because if players are still affected by game play days after playing, the potential for adherence to certain views and opinions would be higher. This could be either helpful or harmful depending on the content of the games.

Personality could also influence what effects occur. Despite numerous studies supporting the idea that hostility is increased by violent media, particularly violent video games, Giumetti & Markey (2007), as well as Markey & Scherer (2009) propose that “it appears that violent video games only adversely affect some individuals and those who are affected have a preexisting disposition (i.e., are angry or have elevated levels of psychoticism) which causes them to be susceptible to such violent media” (p. 410). Furthermore, Ferguson (2007) revealed publication bias in literature surrounding violent video games. His meta-analysis suggests that researchers tend to be determined to prove ill-effects and at times neglect precise methodology. He also points to Colwell & Kato (2003); Funk, Buchman, & Germann (2000); and Wiegman & van Schie (1998), who all found no significant associations between violent video game play and aggression. Although some after-effects of media reception have been shown, it is unclear how pervasive these are or how long they persist. Recently, the arrival of embodied control gaming systems (i.e. controls wherein a player’s physical actions are copied by the in-game character) have raised further questions.
The main question on embodied controls is whether they will influence the after-effects of game play due to featuring less abstraction - the player’s own motion is copied by the in-game character as opposed to the push of a button causing an action. This and other questions arise due to the uncertainty around the persistence of gaming effects, especially regarding a next generation console like the Nintendo Wii, where the controls simulate the action the in-game character is performing, e.g. using a swinging motion to have one’s in-game character swing a bat. The answers to the questions will have both social and commercial implications concerning what games can be produced for next generation consoles.

Despite large concerns expressed by the public regarding the release of mature games on the Nintendo Wii, up until 2009 there were no studies testing the potential negative effects of play with embodied controls. Markey & Scherer (2009) argue that there were plausible reasons for the public to be worried, in that players tend to identify with the in-game character. If characters were to mimic the player’s movements, the player may identify more with the character. They concluded that in theory “it is likely that the greater interactivity afforded by motion capture controls will cause individuals to be more negatively impacted (e.g., become more hostile, have increased aggressive cognitions, etc.) than individuals who play violent video games using a traditional controller” (p. 408). These concerns necessitate study into the persistence of attitudes, opinions, cognitions and behaviours post play in both conventional and embodied controls. At the root of the concerns is the idea that media bias can affect recipients.

Media Bias

Babad (2005) notes that media bias in general can influence viewers’ opinions of people. The study involved having an interviewer favour or show contempt toward the person interviewed. Participants watched the interviews and then rated their perception of the person interviewed. The participants showed hostility or favour to the person interviewed depending on which bias the interviewer showed. When the interviewer portrayed the person interviewed in a positive light, participants rated the person interviewed favourably. The reverse was true when the person interviewed was portrayed in a negative light. Therefore, media bias can affect viewer perception. Nelson (2002) showed that brand placement in games (e.g. billboards) led to participants having a positive identification with the brand.
Since media bias can affect recipients, further investigation is required into how long the effects last and if greater involvement in the media mediates these effects. The extent of the effects of media bias has been linked to Presence.

**Presence**

Lombard and Ditton (1997, p. 30) define Presence as the perceptual “illusion of non-mediation”, i.e. the extent to which a person fails to perceive or acknowledge the existence of a medium during a technologically mediated experience. Nunez and Blake (2006) state that Presence is a central element in modern gaming and that people actively seek out Presence in their games. Furthermore, Lombard, Reich, Grabe, Bracken, & Ditton (2000) noted the importance of investigating the effects of Presence on judgments, perceptions and behaviours in real environments. Their findings showed that television viewers responded to ideas and meanings presented in the content viewed, and felt like they were a part of the programme. It is therefore important to explore Presence in terms of the effects of game play as it is linked to emotion, arousal, realism and enjoyment. Presence is comprised of 4 factors: Spatial Presence, Engagement, Naturalness and Negative Effects. Lessiter, Freeman, Keogh & Davidoff (2001) define the Spatial Presence as feeling physically located in the displayed environment. Engagement is defined as a user’s involvement, enjoyment and interest in the displayed environment – this includes arousal. Naturalness refers to the realism and believability of the content of the displayed environment. Lastly, Negative Effects include eyestrain, headache, nausea and tiredness (Lessiter et al., 2001). Ravaja, Saari, Turpeinen, Laarni, Salminen, & Kivikangas, (2005) also link emotions to Spatial Presence, and not just to Engagement.

Ravaja et al.’s (2005) study purports that Spatial Presence links to emotion through the physical arousal experienced in feeling immersed in a mediated environment. It is believed that one’s feeling located in the mediated environment would increase arousal and attention, and in this way influence emotion. While their findings supported a link between Spatial Presence and emotion, there appeared to be a stronger link between Engagement and emotion. This supports Lessiter et al.’s (2001) definition of Spatial Presence and Engagement. However, it must be noted that one’s feeling immersed in an environment may influence the emotions felt during the mediated experience. In this way Spatial Presence can be linked to emotion, but not to a greater degree than Engagement. Presence has been seen to be affected
by the presentation medium used. The more active the role of the recipient, the greater the sense of Presence.

**More Presence in Playing Rather Than Watching**

Lombard *et al.* (2000) investigated the effects of television size on Presence and found that Presence is experienced when viewing content on a screen in excess of 12 inches. They also found that television viewers responded to ideas and meanings presented in the content viewed. Therefore, people can be sufficiently immersed in television viewing. Furthermore, Murray, Liotti, Ingmundson, Mayberg, Pu, & Zamarripa (2006) reported that the brain regions involved in the regulation of emotion and arousal were stimulated by short term viewing of violent television. This shows that at both a cognitive and physiological level, watching televised violence impacts a viewer. The links between arousal and Presence suggest then that viewing media will induce Presence in a viewer. Therefore, similar effects can be expected between television viewing and video game play and so viewing and playing can be used to investigate the after-effects of violent media exposure. However, video game play has been shown to elicit a greater sense of Presence in individuals (Ivory & Kalyanaraman, 2007).

Horowitz (2006) conducted a study on how presentation medium affects the effectiveness of political advertisements. He noted more Presence when participants viewed computer advertisements rather than television advertisements. Participants also experienced more positive affect for the candidates portrayed on computer advertisements. Therefore, participants’ political views (and perhaps voting choices) can be influenced by the medium used, and possibly by the degree of Presence experienced during the advertisement. So, if it is possible to affect perceptions through bias in the media, it may be possible to create a propaganda effect in video games to change player’s opinions. It is unclear, however, whether the opinion changes, if these do in fact occur, will persist outside the gaming environment.

Persky and Blascovich (2007) propose that immersive platforms intensify the content specific effects of violent games. This suggests that immersion through play would increase Presence and other effects of game play. This has been supported by the findings of Polman, Orobio de Castro, & van Aken (2008). The authors conducted a study in which 57 children aged between 10 and 13 either played or watched a violent video game. The results showed that in
males playing violent video games lead to more aggression than merely watching. Females showed no significant increases in any of the conditions. It was concluded that playing violent video games will lead to higher aggression than viewing violent television/films. The study also showed that aggression in males reduced after approximately an hour in both the playing and watching groups. Therefore, greater effects can be expected in video games. This suggests that the more active the role of the participant in the media, the greater the effect. It has also been found that Presence is increased by the naturalness of the participant’s involvement.

Presence and Embodiment

Schuemie, van der Straaten, Krijn, and van der Mast (2001, p. 187) note that Presence can lead to a virtual experience evoking the “same reactions and emotions as a real experience” suggesting that real experience may act as an inoculation against such a propaganda effect. This suggests that an individual’s real world experiences will inform whether or not their real reactions will be influenced by their virtual experiences. It is therefore proposed that if the individual has already had real experiences similar to the virtual experience, the reactions and emotions experienced in the virtual experience will not create a propaganda effect around the scenario presented in the virtual environment. Pfau, Szabo, Anderson, Morrill, Zubric and Wan (2001) suggest that this inoculation confers resistance to persuasion. It has been found that viewing material elicits sufficient Presence, but taking a more active role in the medium (e.g. controlling a character as per video game play) induces greater Presence. It is therefore possible that the greater the involvement, the greater the sense of Presence. Involvement has been increased from the norm of the past decade by the introduction of motion capture controls like the Nintendo Wii. Skalski, Lange, & Tamborini (2006) found that the naturalness of the gaming controls predicted interface Naturalness, Spatial Presence, and enjoyment. The study had participants playing a driving game using a steering wheel, joystick or mouse and keyboard. This adds to previous literature purporting the “mapping between the user’s actions and the perceptible spatio-temporal effects of those actions” as a determinant of Presence (IJsselsteijn et al., 2000, p. 521). Thus, embodied controls can be expected to elicit greater Presence, but clarity is needed on whether this increase will translate into hostility and the support for violence. It has been found that Presence is affected both by in-game content (namely the occurrence of violence) and prior gaming experience.

Increased Presence in Violent Video Games
Bracken and Skalski (2006) suggest that a player’s prior gaming experience may impact his/her level of Presence and gaming experience. Furthermore, Nowak, Krcmar and Farrar (2006) found that people who played games more frequently felt more Presence. This was in part due to frequent gamers being familiar with the controls and so not having breaks in the mediated experience to check that the right buttons were being pushed. The same familiarity also led to less frustration during game play and this too increased Presence in players.

Empirical evidence also suggests that there is more Presence experienced in violent video games than in non-violent ones (Nowak, Krcmar, & Farrar, 2006). If this is the case, and if it is true, as argued above, that Presence is related to attitude change, then violence could be an indirect factor in attitude change during video gaming. Nowak, Krcmar and Farrar (2006) do argue, however, that perceiving a game as violent may be linked to greater immersion in a violent story line. Presence may increase the effects of any biases that may appear in the game due to higher Engagement in the experience, as such, violent video games would have more of an effect on players regarding the same biases. Nowak, Krcmar and Farrar (2006) found that the participants that experienced greater Presence and perceived the game to be very violent were more hostile. This requires further investigation. Why violence is linked to Presence is not yet understood. However, in order to affect Presence however, the violence in games needs to be contextual.

**Contextual Violence**

Schneider, Lang, Shin, and Bradley (2004) proposed that first person shooter games with a story lead to more immersion and character identification. In their study, participants played a first person shooter game, (i.e. game with a first person perspective in which the player’s main aim is to eliminate/kill the opposition). Some participants played the game contextualized by a story, whereas others played it without contextualisation. The story condition increased involvement and arousal in the game, suggesting that Presence interacts with cognitive processes more complex than simple arousal. Violent games can provide high Presence experiences through other mechanisms. Many violent games use a first-person perspective, which has been noted by Scheumie et al (2001) as more effective in producing Presence than a third person perspective. Persky and Blascovich (2007) further suggest that immersive platforms intensify the content specific effects of violent games. Their study also
suggested that this change was limited to violent media. This means that both platform and content in games determines the outcomes of game play.
Character Identification

In Oatley’s (1994) Simulation Theory it is noted that emotions in media can be caused due to a memory link to similar emotional episodes in an individual’s life. This could explain why mediated experience can evoke the “same reactions and emotions as a real experience” (Schumie et al., 2001, p.187). If this is linked to attitudinal changes then this is of great importance, especially in violent societies. In such societies, people may have been involved in episodes similar to those presented in the media. This means that greater emotion will be experienced, and a stronger identification with characters can occur. It also means that since they have had similar experiences to the media experience, the reactions and emotions they experience in the mediated environment will not create a propaganda effect around the mediated scenario (Schumie et al., 2001). Furthermore, identification with a character is held as producing emotions as “one becomes like the character, even becomes the character” (Oatley, 2004, p. 111). As such, the positive and negative experiences of the character can elicit the respective emotions in the individual player. It is suggested that character identification can affect the beliefs and behaviours of media recipients.

Character identification can lead to the player subscribing to similar beliefs as the character and behaving accordingly. This is the Proteus effect, i.e. ‘the effect of transformed self-representation on behaviour’ (Yee & Bailenson, 2007, p. 3). It was found using computer-mediated communication (CMC) wherein an individual had an avatar. The attractiveness and height of the avatar affected the confidence that participants displayed in the online environment. Presence might increase the Proteus effect, as the game presents the virtual world to the player from the physical perspective of the character, and the other virtual characters in the world interact with and respond not to the player, but to the game character. Thus, feeling more immersed in the environment could lead to greater character identification and the Proteus effect. This suggests that in-game reasoning and behaviour may translate into real world behaviour.

This possibility was addressed by Klimmt, Schmid, Nosper, Hartmann & Vorderer (2006). Players have been found to make the distinction between in-game violence and real-world violence, and use this distinction to suppress moral reasoning towards the use of violence in games. It is suggested that this suppression makes the in-game violence enjoyable to the player (Klimmt et al., 2006). However, the qualitative interviews used in Klimmt et al’s (2006) study showed that the suppression in some cases was due to no “real creatures” being
attacked. As such, it is possible that when faced with human enemies in games, players make a different moral judgment. If this is so then it is possible that post game hostility effects can occur in a dangerous manner as they will not be held in check by the game/reality distinction. A possible judgment is the adherence to the social norms of a group.

**Group Effects in Mediated Environments**

Lee (2004) found that in CMC uniform virtual appearance of CMC partners triggered depersonalization and conformity behaviour when group identity was salient in an intergroup encounter. Her results showed that depersonalization increased group norm conformity, both directly and indirectly, through group identification. Postmes, Spears, Skakel and de Groot (2001) found that when anonymous, players will be more likely to conform to any priming they may receive in task instruction in CMC or the group. Conformity to the group was found when the priming provided was then socially transmitted within the group in the study.

However, Sassenberg and Boos (2003) found that if a social category norm was not present, CMC led to lower attitude change than direct communication. Persistence of the attitude beyond the CMC environment was not mentioned. Postmes and Spears’ (1998) analyses indicated that groups and individuals conform more to situation-specific norms when they are deindividuated. This could mean that for video games which promote deindividuation and provide a clear social norm, priming for certain norms could have the same effect on players. This would be especially true for military themed games (a popular subtype of violent games), which encourage the player to consider themselves as belonging to a particular group, with clear social norms regarding violence and behaviour towards the outgroup (the enemy side). Contrary to this though, Klimmt et al. (2006) report that dehumanization of enemy characters does not appear to be the typical moral management strategy when dealing with humanoid enemies in games. It is, however, still a strategy, and players can experience a deindividuated state during game play.

This deindividuated state is thought to arise more easily under conditions of physiological arousal (Zimbardo, 1969). As previously stated exposure to violent video games increases physiological arousal (Anderson and Bushman, 2001), and Presence can be associated with physiological arousal if the virtual environment affords that arousal (Meehan, Insko, Whitton & Brooks, 2002). These findings also apply to viewing violent television (Bushman & Huesmann, 2000). A violent game which has clear social norms which leads to both Presence
and a deindividuated state might then lead to a persistence of those norms outside the game environment. This possibility is supported by the findings of Huesmann & Kirwil (2007) wherein participants being shown violent media had reduced emotional and physiological responses to the violence. It is possible that these opinions and attitudes may also persist and that players may respond to stimuli in the real world with the norms experienced during game play.

*Actions According to Norms*

Sheese & Graziano (2005, p. 354) claim that ‘playing violent video games may undermine pro-social motivation and promote exploitive behaviour in social interactions’. Their study put participants in a violent and non-violent version of a game, and found that defection (exploiting one’s partner while still trusting them) from the pairs the participants were put in was higher in the violent version. Participants were given the choice to cooperate for mutual gain, withdraw from the interaction, or exploit their partner for the game task. Despite the violent group being more prone to exploiting their partners, they also exhibited more trust in their partners during the game task. This suggests that their perceptions of others were not altered. It is possible that players’ perceptions are linked to goals presented as norms in the game.

After their exploratory interview-based study, Clarke and Duimering (2006) propose that aspects perceived to be most behaviourally relevant to goal attainment of first person shooter games are the most salient to gamers. Also, situational stimuli were evaluated differently depending on if they were perceived to support or to hinder goal attainment. This could be due to the norms presented in the priming of the game. It is the game that determines the goals one has to pursue and thus one’s perspective will be guided by what one’s goals are. Successfully completing a sufficient number of competitive scenarios is expected to make playing video games enjoyable (Vorderer, Hartmann, & Klimmt, 2003). Players will therefore feel positive or negative emotions depending on their success in those situations. Since violence leads to success in most violent video games, it is expected that players will enjoy the violence in part due to the success it brings them in the game.

Furthermore, Klimmt *et al.* (2006) have shown that in order to make video game violence enjoyable players often engage in moral management strategies such as narrative-normative justification (norming violence as part of achieving the end goal or as a part of competition).
and dehumanizing game characters. It may be possible then, that if the norms were changed, more pro-social behaviour could be seen by the players, and different norms and attitudes could be perpetuated. It may also be possible to foster these norms outside the gaming environment despite Klimmt et al.’s (2006) findings that players make a game-reality distinction during play. As such there is a possible link between opinions and attitudes presented in the games, Presence, and conformity to those opinions and attitudes. This is interesting in terms of Social Learning Theory in that the diffusion of responsibility and the dehumanization of victims during aggression has been presented as disinhibiting aggression (Bandura, Underwood, & Fromson, 1975). Nonetheless, it is unclear whether these opinions persist outside of the gaming environment. This warrants investigation. The links between enjoyment of media violence, and support for actual violence are also unclear.
Violence and Enjoyment

Weaver & Wilson (2009) edited five TV programs into three versions: graphically violent, sanitized violent, and non-violent. After viewing, participants reported their enjoyment of the content and emotional reactions to the content. It was found that the non-violent clip was enjoyed considerably more than the violent clips. Their results stood regardless of the participants’ sex, sensation seeking tendencies and trait aggression. Diener and Woody (1981) conducted a similar study wherein participants viewed either a high violence show or a low violence show. They found that the low violence show was significantly more enjoyable than the high violence show. This finding held in adults, adolescents and children. This is contrary to the view that violence in television increases enjoyment that is supported in most of the literature (e.g. Jones, 2002). Sparks, Sherry, & Lusben (2005) found no difference between the non-violent and violent groups in their study. Edited versions of the film The Fugitive were viewed in the 2 groups. Therefore, it can be said the relationship between the enjoyment of viewing content and the violence in the viewing content is unclear.

Tan (1996) theorizes that emotions in film/television viewers occur due to the viewer imagining him/herself as a part of the fictional world presented. This theory suggests that a viewer would experience Presence while viewing. This can also be applied to video games, but the notion that film is a stimulus that creates an almost irresistible illusion for viewers is of great importance (Tan, 2000). It is possible that it is character identification that leads to the content affecting the receiver, but it is also possible that merely feeling immersed in a displayed environment may foster effects on the receiver. Therefore, any links shown between emotion, Engagement and content may help in explaining the suspected relationships between violent media and support for violence.

This links with the proposition by Weaver & Wilson (2009) that while people may enjoy the thrills and special effects associated with violent television, the violent acts themselves are not enjoyed due to the social sanctions imposed on violent behaviour. This is the proposed grounding for a theory based on evolutionary psychology. Aggression overall has been linked with social costs, and to avoid those costs, people tend to avoid aggression, or potentially enjoying it. They therefore may not enjoy experiencing media violence as it would be linked to the social costs of actual violence. Hence, further exploration is needed into the links
between enjoyment of media violence, and support for actual violence, as well any links between non-violent media and support for violence. The effects of violent media on hostility and/or the support for violence are presently also unclear.

Effects of Violent Media

Exposure to either movie violence or video game violence has been associated with increased support for violence in pre-teens (Funk, Baldacci, Pasold, & Baumgardner, 2004). Higher aggression and support for violence from movie violence or video game violence has also been recorded in adolescents and adults (Huesmann, 2007; Cohen, Smailes, Kasen, & Brook, 2002). Despite these associations, it is unclear if aggressive people are drawn toward violent media or if the violent media increases their hostility (Johnson et al., 2002).

Barlett, Harris, & Bruey (2008) conducted a study wherein participants played versions of a video game with no, low, medium, or maximum blood and then had their hostility investigated. It was found that the maximum blood group had increased hostility and physiological arousal. However, it has been found that some adolescents seek violent media to help cope with anger, loneliness or to forget problems (Olson et al., 2007). This poses the question as to whether it is angry/aggressive individuals that seek out violent media, or if it is violent media that causes them to have the increases in hostility. Further questions have been asked on the effects of embodied violence (i.e. having the player’s physical actions being mimicked by the in-game character) in games on hostility.

Embodiment and Violence

Skalski, Lange, & Tamborini (2006) note a concern regarding the creation of stronger mental models for antisocial behaviour, e.g. firing a gun, or punching when natural controls are used. Persky and Blascovich (2007) further suggest that immersive platforms intensify the content specific effects of violent games. Their study also suggested that this change was limited to violent media and not non-violent media. Markey & Scherer (2009), however, found that while participants that played the violent game tended to be more hostile, this was not increased by using embodied controls in the form of the Nintendo Wii. Their study involved players playing Manhunt 2 as a violent game, or Tiger Woods Golf 2008 as a non-violent game on either the Playstation 2 (conventional controls), or Nintendo Wii (embodied controls). They also found that psychoticism moderated the effects on participants. This study
referenced Giumetti and Markey’s (2007) call for the examination of various personality traits to determine how they moderate the effects of violent video games. Their study was conducted in an American context. As yet, no South African studies have been reported.

**Gender Differences**

Some gender differences have also been found in the after-effects of (violent) video game play. Anderson and Murphy (2003) suggest that the effect of violent video games on aggression in females might be greater when the player controls a same sex character, and that the effect on aggression was at least partially mediated by increases in revenge motivation. Additionally, Eastin (2006) notes that aggression and Presence in females are potentially increased by playing as a same sex character. As most violent video games have a male lead character, it is expected that females will be less affected by violent video games than males. This is also linked to gaming experience.

Krahé and Möller (2004) note that males play more video games and enjoy them more. The measures in their study also found significant relationships between attraction to violent electronic games and the acceptance of norms condoning physical aggression. Hartmann and Klimmt (2006) revealed women’s dislike of violent content in their study. The study involved women filling in a questionnaire on their opinions concerning gender role portrayal and violence in video games. Women’s dislike for violent content in media would explain why they would have less gaming experience, and would be less likely to condone aggression. Bushman (2002) states that partaking in imaginary aggression has been found to be a potent priming activity increasing the accessibility of aggressive thoughts and the probability of subsequent aggressive behaviour. From this, Krahé and Möller (2004) suggest that media socialization from video games presenting physical aggression as enjoyable and appropriate is part of the reason males endorse physical aggression more than females. They did find, however, that normative acceptance of physical aggression increased as a function of exposure to violent games across gender.

In a more recent study, Olson, Kutner, Warner, Almerigi, Baer, Nicholi, & Beresin (2007) reported that the factors most strongly correlated with playing mature violent video games were being male, using games to manage anger, and frequent game play. Their study involved written self-report surveys on video gaming habits given to adolescents aged 12-14.
in 2 different North American schools. Polman, Orobio de Castro, & van Aken (2008) stated that the differences in aggression after game play in males as opposed to females may be due to differences in daily activities, namely playing violent video games. It was suggested that violent video game play “activated pre-existing violence schemata that they had previously acquired through frequent game playing” (Polman and Orobio de Castro, 2006 in Polman, Orobio de Castro, & van Aken, 2008, p. 262). Kutner & Olsen (2008) note a lack of clarity as to whether aggressive children are drawn to violent games or if the violent games trigger aggressive behaviour. They also state that boys playing video games for long stretches of time is normal, and that it should be concerning if a boy does not play at all. Conversely, a girl playing for long periods would also be unusual. These studies have all been conducted in a first world context, and study is needed in a third world context.

**Conclusion**

The literature has shown that opinions and attitudes in video games can be transferred onto players, but it is not certain if the opinions and attitudes persist outside of the gaming environment. Also, it is not known whether persistence of attitudes and opinions may be mediated by the level of violence in a game. Uncertainty regarding the effects of violent television on support for violence has also been shown. However, violent television has been found to elicit Presence and so can be expected to have similar effects to violent gaming. Furthermore it is unclear how long these effects last for if they do occur. Lastly, it is unclear if the use of embodied controls will impact any possible after game effects. As greater Presence is elicited by embodied controls, it is suspected that greater hostility effects may occur through them. 3 studies were conducted to investigate these questions in light of the central tenet that video games can affect players’ attitudes, opinions and cognition post play and that this will be especially true in games wherein an in-game character mimics the physical actions of the player.

Study 1 aimed to investigate persistence of attitudes and opinions in players of violent versus non-violent games immediately after game play. I hypothesised that the attitudes and opinions in the violent game would persist in players outside the gaming environment immediately after game play, i.e. that violent game play would lead to higher support for violence.
Study 2 piloted the behavioural measure of violence to be used in Study 3. The measure aimed to investigate the effects of media on decision making (cognition and behaviour). This would show if merely support for violence, or if both attitudes and hostile behaviour were increased by violent media use. It also investigated the differences in the persistence of the attitudes and opinions from television in viewers of violent and non-violent television. The study tested 2 hypotheses. It was hypothesised that viewing a violent film clip would lead to higher support for violence. Also, it was hypothesised that viewing the violent clip would increase the participants’ allocation of resources to military ends in response to perceived or actual threats. This would suggest an increase in hostile cognition and behaviour.

Study 3 aimed to investigate if there is a long lasting persistence in support for violence after game play, and if so, if it is more prevalent when using embodied controls. The study also investigated if this support would extend beyond attitudes to decision making. It was hypothesised that the attitudes and opinions in the games would persist in players outside the gaming environment immediately after game play, i.e. violent game play would lead to higher support for violence. Also, the embodied group was expected to have stronger support for violence, and that this would extend into their decision making. It was further hypothesised that any effects would return to baseline by 24 hours after play.
STUDY 1

Overview and predictions for Study 1

Study 1 aimed to investigate persistence of attitudes and opinions immediately following violent versus non-violent game play. The study first assessed whether any persistence of attitudes and opinions occurred in the players immediately after play. It was hypothesised that the attitudes and opinions in the violent game would persist in players outside the gaming environment immediately after game play, i.e. that violent game play would lead to higher support for violence.

METHOD

Participants

79 UCT psychology students (8 male, 71 female) between the ages of 18 and 25 participated in this study. 40 (4 male, 36 female) played the violent version of the game used (violent group) and 39 (4 male, 35 female) played the non-violent version (non-violent group). The participants were all fluent English speakers, and provided written informed consent to participate. They were informed of the possibility of violent content, were assured that they could withdraw at any time, and that their data would be kept confidential. (Note: Their level of gaming experience was factored in post-testing). Participants were awarded course credits for their participation. Unfortunately, due to time constraints, the gender bias in the sample (which is reflective of the psychology student population of the University) could not be corrected once discovered.

Measures

Computer Game

An adapted map from the first person shooter Delta Force Xtreme (Novalogic, 2005) was used for game play. Players take the role of an elite Delta Force soldier and go through missions in which they must eliminate hostile forces, rescue prisoners, and prevent further terrorist activity. The same map was used for both conditions with the following difference:
The violent condition involved players going through the map being attacked by the artificial intelligence (AI) on the map. They had to use violence resulting in bloodshed to succeed in the task (See Figure 1). The non-violent condition had players accomplishing the level task without using violence, and having peaceful (non-reactive) AI spread over the map. No bloodshed or violence was contained in this version (See Figure 2). The same map and number of computer generated persons was used in both measures. This ensured that violence was the only variable manipulated. To familiarize the player with the controls and as a beginning of the priming information a small training mission was played. In both versions of training the AI comprised of friendly personnel on the player’s base. Therefore, the AI in the violent version wore United States army uniforms, the AI in the non-violent version wore United Nations peace keeper uniforms as these were consistent with the priming information provided.

*Figure 1: Game play in Violent condition*
Figure 2: Game play in Non-violent condition

**Priming Material**

The priming material given to the participants consisted of a brief story about the character the participant was portraying in the game, and why this character had joined the organization they represented in the mission. In the violent condition, the participant was a US soldier wanting to help other countries enjoy the freedoms he experiences in the USA. The prime had a definite aggressive tone (See Appendix A). In the non-violent condition, the participant was a UN peacekeeper wanting to aid countries without interfering in their internal affairs. The tone in this prime was peaceful (See Appendix B). The mission briefings instructed the participant to either retrieve a laptop in the violent condition (See Appendix C), or mark all vehicles and communication equipment in the non-violent condition (See Appendix D), before being extracted from the area.

**Scales**

All measures were completed in English as computer based scales, beginning immediately after the game experience was over.

*Individual and National Violence Attitude Questionnaire (INVAQ)*

We constructed the Individual and National Violence Attitude Questionnaire (INVAQ), a Likert-scale questionnaire, to document the participants’ attitudes toward the appropriateness of personal and national violence as a solution to problems (See Appendix E). Participants
answered the questions from 1 (strongly disagree) to 7 (strongly agree) to indicate their support for violence. Examples of questions are: “It is right to use violence to gain resources”; and “It is right to use violence to solve national disputes”. Participants’ scores on this scale were used as the main dependent variable. The measure produced a Cronbach’s α of 0.86.

**Differential Emotion Scale, second edition (DES-II)**

The Differential Emotion Scale, second edition (DES-II) (Izard, 1991) (See Appendix F) was administered to allow participants to rate the degree to which they felt certain emotions during the gaming experience. It was suspected that emotions would play a part in any potential after-effects of game play, and thus this measure seemed important. The questions are on a Likert scale with 1 being “not at all” and 7 being “very much”. Examples of the emotions described in the scale are “did you feel” alert, down hearted, and surprised, etc. The scale contains 30 items and has been validated and confirmed to be suitable for research use by Fenzalida, Emde, Pannabecker and Stenberg (2005). Items in the scale were factorised into negative and positive emotion prior to parametric testing.

**Independent Television Commission Sense of Presence Inventory (ITC-SOPI)**

The Independent Television Commission Sense of Presence Inventory (ITC-SOPI) (Lessiter, Freeman, Keogh & Davidoff, 2001) was administered to participants after game play. This was administered to find out if the participants responded perceptually and psychologically to the game world. Items are scored from 1 (strongly disagree) to 7 (strongly agree). The inventory measures Spatial Presence, Engagement, Negative Effects and Naturalness. (See Appendix G). Spatial Presence is the participant’s feeling of being located in the game world (Example: “I felt I wasn’t just watching something”). Engagement relates to the participant’s enjoyment and psychological involvement with the game (Example: “I responded emotionally”). Negative Effects involves any negative physical effects of being in the displayed environment, e.g., eyestrain or nausea (Example: “I felt nauseas”). Lastly, Naturalness concerns the realism and believability of the content in the displayed environment (Example: “The content seemed believable to me”) (Lessiter et al., 2001).

Items assessing the 4 components were all reliable: Spatial Presence (21 items) α = 0.94, Engagement (13 items) α = 0.89, Negative Effects (8 items) α = 0.77, Naturalness (6 items) α
= 0.76 (Lessiter et al., 2001). Lessiter et al. (2001) tested the inventory’s validity and noted it satisfactory. Scores from each factor measured are analysed individually.

Computer Experience Questionnaire

The Computer Experience Questionnaire was developed by my co-supervisor David Nunez. This questionnaire examined the participants’ current gaming and media habits so that their INVAQ, DES-II and Presence results could be contextualised in terms of how accustomed they were to game play (See Appendix H). Therefore, questions included: “Rate how often you play computer or video games” (Never – Everyday), “Rate how much you enjoy violent computer or video games” (I dislike them intensely – I like them intensely).

Procedure

The experiment was run over a period of 4 weeks. Participants were tested individually. Each participant was welcomed to the venue (ACSENT computer laboratory), and pseudo-randomly assigned to one of the two conditions using counter-balancing. The first participant was instructed to sit at the violent group computer station while the second participant was instructed to sit at the non-violent group computer station. All subsequent participants were assigned in this way.

Before entering the map for the main task, the subjects completed a training mission, which involved walking around a small base camp consisting of tents, a firing range and command building. In the violent condition, participants would walk to various waypoints (important points) in the base before using the firing range to test their weapon. In the non-violent condition, participants would also walk to the waypoints, but would use the range to test the smoke grenades they would use as markers in their mission. Training took 5 minutes to complete. Once training was complete, the priming material and mission briefings were provided to the participants. Despite the route the players needed to take being shown in the mission briefing, it was verbally described to the participants to ensure understanding of the task by potential novices. Once they completed reading the material, they donned headphones and began the mission.

The main mission had the player navigate a valley leading to a helicopter meant to extract them from the area. The participant would go past ruins, bunkers and a base camp before
reaching the chemical plant close to the waiting helicopter. Reaching the helicopter ended the mission, but if the mission was not completed within 10 minutes the game was ended manually. In the violent condition, the artificial intelligence (AI) was set to attack the participant, while in the non-violent condition the AI was set to not notice or respond to the participant. Another difference was that in the briefing for the violent mission the participant was instructed to retrieve a laptop from the base camp, whereas in the non-violent mission the participant was only told to mark all vehicles and communication equipment in the valley using the smoke grenades they were carrying. If participants died during the mission they could enter the map again in various points in the map so as to retain the progress they had made, and to control frustration. The researcher remained on hand in case any problems or questions arose.

When game play was completed, participants completed the INVAQ, DES–II, and the ITC-SOPI. These questionnaires took approximately 20 minutes to complete. Thereafter, the participants were debriefed as to the exact nature of the study, and any questions/ concerns they had were dealt with. They were then thanked for their participation, and awarded the course credit.

<table>
<thead>
<tr>
<th>Table 1: Study 1 Procedure Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (min)</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>45</td>
</tr>
</tbody>
</table>

Data analysis

In reporting descriptive statistics, means and standard deviations will be reported as Mean ± SD. The data met the assumptions for normality required for parametric testing. Either 2 (Group) x 2 (Gender) Factorial ANOVAs or 1-way ANOVAs with either Group or Gender as the independent variable were used. Factor analysis was used on the DES-II to provide greater accuracy before further testing could be conducted. The significance level (p) of the results in this study was altered to 0.01 to compensate for the increased likelihood of Type 1 error due to the number of inferential analyses conducted. It was thought that Bonferroni corrections would result in too stringent thresholds being applied.
RESULTS

INVAQ results (means and standard deviations reported as Mean ± SD)

The INVAQ was used to measure the participants’ attitudes (i.e. support for) violence. It was found to be a reliable measure (Cronbach’s Alpha = 0.860). All items in the questionnaire were retained and averaged into a Violence score. A 2 (Group) x 2 (Gender) Factorial ANOVA revealed an interaction between gender and group, that was not significant at the adjusted alpha level, $F(1, 75) = 5.91; p = .02; R^2 = 0.17$ (See Figure 3). As seen in Figure 3, females had virtually no difference in scores between groups (Violent Group Females = 2.52 ± 0.11, Non-violent Group Females = 2.54 ± 0.11). Males in the non-violent group also had similar scores ($M = 2.56 ± 0.33$). However, males in the violent group had higher scores ($M = 3.75 ± 0.33$), i.e. higher support for violence than males in the non-violent group and females altogether. This is an intriguing finding, especially given the small number of males in the study.

![Figure 3: INVAQ across gender and condition](image-url)
Gaming behaviour and experience

1-way ANOVAs were conducted to examine gender differences in gaming behaviour and experience. Male participants were found to play more video games, $F(1, 77) = 9.86; p = .002$; Multiple $R^2 = 0.15$; and more violent video games, $F(1, 77) = 15.29; p = .002$; $R^2 = 0.17$; than their female counterparts (See Table 2). Male participants also enjoyed violent video games more than female participants, $F(1, 77) = 10.13; p = .002$; $R^2 = 0.19$.

Table 2: Gaming experience of participants

<table>
<thead>
<tr>
<th></th>
<th>Female Mean (SD)</th>
<th>Male Mean (SD)</th>
<th>F</th>
<th>p</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often video games are played (monthly)</td>
<td>0.68 (0.58)</td>
<td>1.38 (0.77)</td>
<td>9.86</td>
<td>0.002</td>
<td>0.15</td>
</tr>
<tr>
<td>How often violent video games are played (monthly)</td>
<td>0.31 (0.53)</td>
<td>1.13 (0.83)</td>
<td>15.29</td>
<td>0.002</td>
<td>0.17</td>
</tr>
<tr>
<td>Enjoyment of violent video games (0 – 5)</td>
<td>1.17 (0.97)</td>
<td>2.63 (0.52)</td>
<td>10.13</td>
<td>0.002</td>
<td>0.19</td>
</tr>
</tbody>
</table>

The expected positive correlation between how often video games were played and enjoyment of violent video games appeared ($r = 0.40, p < 0.001$). A stronger correlation was found between how often violent video games were played and enjoyment of violent video games ($r = 0.54, p < 0.001$).

Analysis of the DES-II (means and standard deviations reported as Mean ± SD)

The DES-II was factor analyzed using a varimax standardized rotation. Considering items which had a factor loading higher than 0.7 yielded 2 factors: positive emotion and negative emotion. The resulting factor structure (See Table 3) supports the theoretical distinction between positive and negative emotion (Izard, 1991). The negative emotion factor explains
0.423 of the total variance (eigenvalue 12.692), while the positive factor explains 0.089 of the total variance (eigenvalue 2.696).

Table 3: DES-II items in the positive and negative emotion factors

<table>
<thead>
<tr>
<th>Positive Emotion ($R^2 = 0.089$)</th>
<th>Negative Emotion ($R^2 = 0.423$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delighted ($r = 0.86$)</td>
<td>Scomful ($r = 0.83$)</td>
</tr>
<tr>
<td>Joyful ($r = 0.85$)</td>
<td>Feeling of revulsion ($r = 0.82$)</td>
</tr>
<tr>
<td>Happy ($r = 0.74$)</td>
<td>Repentant ($r = 0.80$)</td>
</tr>
<tr>
<td></td>
<td>Afraid ($r = 0.80$)</td>
</tr>
<tr>
<td></td>
<td>Downhearted ($r = 0.79$)</td>
</tr>
<tr>
<td></td>
<td>Scared ($r = 0.78$)</td>
</tr>
<tr>
<td></td>
<td>Contemptuous ($r = 0.78$)</td>
</tr>
<tr>
<td></td>
<td>Angry ($r = 0.78$)</td>
</tr>
<tr>
<td></td>
<td>Disgusted ($r = 0.77$)</td>
</tr>
<tr>
<td></td>
<td>Guilty ($r = 0.75$)</td>
</tr>
<tr>
<td></td>
<td>Disdainful ($r = 0.75$)</td>
</tr>
<tr>
<td></td>
<td>Blameworthy ($r = 0.74$)</td>
</tr>
<tr>
<td></td>
<td>Sad ($r = 0.74$)</td>
</tr>
<tr>
<td></td>
<td>Fearful ($r = 0.73$)</td>
</tr>
<tr>
<td></td>
<td>Mad ($r = 0.72$)</td>
</tr>
<tr>
<td></td>
<td>Feeling of distaste ($r = 0.70$)</td>
</tr>
</tbody>
</table>

Figure 4: Skree plot of Eigen values of positive and negative emotion factors

Two 2(Group) x 2 (Gender) ANOVA with positive emotion and negative emotion as the dependent variables showed no substantial differences in female participants regarding negative emotion across conditions (Violent Group Females = 3.39 ± 0.22, Non-violent Group Females = 3.00 ± 0.22). Males were found to differ more, but this was not statistically significant (Violent Group Males = 2.43 ± 0.66, Non-violent Group Males = 1.07 ± 0.66). Female participants were found to have experienced more negative emotion as a main effect
regardless of which game condition they were in (Males = 1.75 ± 0.47, Females = 3.20 ± 0.15), \( F(1, 77) = 8.41; p = .005; R^2 = 0.09 \). A negative correlation was found between negative emotion and how often video games were played by females (\( r = -0.33, p < 0.005 \)). The same correlation in males produced \( r = -0.22 (p = 0.60) \). Males in the violent group (2.67 ± 0.54) experienced the most positive emotion, but this was not statistically significant (Non-violent Group Males = 1.83 ± 0.54, Violent Group Females = 2.01 ± 0.18, Non-violent Group Females = 1.84 ± 0.18).

**Presence** *(means and standard deviations reported as Mean ± SD)*

As predicted, there were no significant differences found in the Spatial (Violent Condition = 3.07 ± 0.13, Non-violent Condition = 3.07 ± 0.13), Negative Effects (Violent Condition = 2.20 ± 0.12, Non-violent Condition = 2.13 ± 0.12) or Naturalness (Violent Condition = 3.05 ± 0.14, Non-violent Condition = 3.04 ± 0.14) factors of the ITC-SOPI between groups and genders. However, a 2(Group) x 2 (Gender) ANOVA only exposed a Gender/Group interaction trend in Engagement, \( F(1, 75) = 6.05; p = .02; R^2 = 0.10 \) (See Figure 4); with male participants feeling less Engagement in non-violent condition (\( M = 2.5 ± 0.33 \)) than in the violent condition (\( M = 3.8 ± 0.33 \)), while female participants experienced no substantial differences in Engagement (Violent Group Females = 3.2 ± 0.11, Non-violent Group Females = 3.1 ± 0.11).
However, a 2(Condition) x 2(Gender) ANOVA on the Negative Effects of Presence between genders revealed that female participants did experience more Negative Effects of Presence compared to male participants as a main effect regardless of gaming condition, $F(1, 77) = 8.03; p = .005; R^2 = 0.11$; but these were low enough for them to still experience Presence (Males = $1.5 \pm 0.25$, Females = $2.2 \pm 0.08$). There was a positive correlation between the Negative Effects of Presence and negative emotion across gender ($r = 0.58, p < 0.001$), and in males particularly (Male $r = 0.66, p = 0.07$; Female $r = 0.53, p < 0.001$). Similar correlations were found between negative emotion and Engagement ($r = 0.23, p = 0.03$), with a stronger female correlation ($r = 0.25, p = 0.03$), than male correlation ($r = 0.23, p = 0.58$). Positive correlations were also found between positive emotion and Engagement ($r = 0.26, p = 0.01$). Finally, Engagement and INVAQ scores showed a positive correlation ($r = 0.21, p = 0.06$).

**DISCUSSION**

Postmes, et al. (2001), Yee and Bailenson (2006), and Nelson (2002) support attitude change being able to occur during game play, but so far it has not been established whether the change will persist outside of the gaming environment immediately after game play. This study aimed to determine if this persistence exists and if it occurs more subsequent to violent
video games. Tentative support was found for violent video games leading to a persistence of attitudes and opinions immediately after game play, but only in males. Males in the violent group had higher scores ($M = 3.75 \pm 0.33$), i.e. higher support for violence than males in the non-violent group ($M = 2.56 \pm 0.33$) and females altogether (Violent Group Females $= 2.52 \pm 0.11$, Non-violent Group Females $= 2.54 \pm 0.11$). This main finding was not statistically significant. However, the result may be informed by males having more experience with games in general (Males $=1.38 \pm 0.77$, Females $= 0.68 \pm 0.58$) and with violent video games in particular (Males $= 1.13 \pm 0.83$, Females $= 0.31 \pm 0.53$), as well as enjoying them more (Males $= 2.63 \pm 0.52$, Females $= 1.17 \pm 0.97$). Females also experienced more negative emotion (Males $= 1.75 \pm 0.47$, Females $= 3.20 \pm 0.15$) and Negative Effects of Presence (Males $= 1.5 \pm 0.25$, Females $= 2.2 \pm 0.08$) to a statistically significant level regardless of gaming condition. Females also showed almost no differences in Engagement between groups (Violent Group Females $= 3.2 \pm 0.11$, Non-violent Group Females $= 3.1 \pm 0.11$), while males in the violent group experienced more Engagement during game play (Violent Group Males $= 3.8 \pm 0.33$, Non-violent Group Males $= 2.5 \pm 0.33$), but this was not statistically significant. These will be discussed.

**Gender differences in gaming experience**

Consistent with Krahé and Möller’s (2004), and Olson et al’s (2007) findings, males in both groups in the current study had significantly more gaming and violent video gaming experience. Additionally, they enjoyed violent video games more than the female participants. Understandably, female participants experienced more negative emotion during the experience in both groups. If one does not enjoy video games, one may experience feelings of aversion or boredom during the experience. Results suggest a negative correlation between previous gaming experience and negative emotion in female participants. It appears that prior gaming experience may impact on a player’s current gaming event (Bracken and Skalski, 2006). Furthermore, females appear to dislike violent content (Hartmann and Klimmt, 2006). There were similar findings regarding Presence.

**Differences in Presence**

Female participants experienced significantly more Negative Effects of Presence in both groups, and it is possible that this could be due to a lack of gaming experience. A positive
correlation was found between negative emotion and the Negative Effects of Presence, as well as a negative correlation with how often they played video games. Male participants tended to experience less Engagement in the non-violent condition than in the violent condition. This coupled with the fact they enjoy violent video games points to Nowak, Krcmar and Farrar (2006) being correct in stating that more Presence is experienced in violent video games than in non-violent video games, and that people that play more video games tend to experience more Presence. The importance of Engagement as a factor of Presence is that even though participants had similar Spatial and Naturalness experiences in the gaming environment, the males seemed to attribute different meanings to the stimuli across conditions, i.e. they would engage with the content. Spatial Presence differences were not expected due to the immersion factors being kept constant in the conditions. Males in the violent group having experienced more Engagement coincides with previous findings that more Presence is experienced in violent video games (Nowak, Krcmar, & Farrar, 2006). This is especially important as it is mostly the emotional involvement with the content that was increased in the violent condition.

Males having experienced more Engagement was also expected because they seemed to enjoy playing violent video games more than females (Nowak, Krcmar and Farrar, 2006). Males would already know how to respond to the violent stimuli due to past gaming experience, and would thus gain more Engagement from the experience. With no violence in the non-violent condition, no significant gender differences would be produced there (Nunez, 2007). However, due to the small number of males in the sample, a stronger study is needed to produce more conclusive results. Eastin (2006) suggests that Engagement and Presence may be lower in females: due to females playing a male character in the game. The higher Engagement in the violent condition in the incidence of priming material adheres to Schneider et al’s (2004) suggestion of greater immersion and character identification when a first person shooter has a story. It also is in line with current game production trends. It was also found that players experienced appropriate emotional responses to the actions of their in-game character as they engaged with the game.

**Emotion, game play and Engagement**

As expected, positive correlations were found between positive emotion and Engagement. Considering that Engagement involves physical enjoyment and fun (Lessiter et al., 2001),
This is likely. However, a positive correlation was also found between negative emotion and Engagement. This was especially true in females regardless of group. It is possible that in feeling negative emotion arousal was increased and hence they engaged more with the content. This ties in with Oatley’s (2004) view that identification with a character can induce emotions in response to the positive or negative experiences of the character (Simulation Theory). It is important to note that the female participants in the violent group had a high in-game mortality rate. Also, females overall appeared uneasy during game play and most apologised for their performance post game play, claiming that they had played poorly. As such, the negative emotions are not strange in light of Simulation Theory. This is also highlights the active role players have in the game, in that the players were drawn in by the negative experiences of the character in a bid to try to change them to positive experiences. It is possible that this active role could lead to game play affecting a player’s support for violence immediately after game play.

Support for violence after game play

This study examined if attitudes and opinions in the violent game (i.e. support for violence) would have a greater persistence in players outside the gaming environment immediately after game play as part of the central tenet that video games can affect players’ attitudes, opinions, cognition and behaviour post play. The results of the main measure of the study (INVAQ) while not significant, presented very interesting trends that support the central tenet. While there were no significant differences between males and females in the violent condition, males scored higher on the INVAQ. This, coupled with their previous gaming experience, concurs with Polman, Orobio de Castro, & van Aken’s (2008) findings on daily activities informing the increases found in aggression after game play. However, males in the violent condition also seemed to have higher scores than males in the non-violent conditions, i.e. their aggression responded to the game content. This leaves open the question of whether aggressive people are drawn toward violent media or if the violent media increases their hostility (Johnson et al., 2002). Further study with a larger male contingent is required to gain clearer results.

Females had almost equal INVAQ scores between groups. It can be argued that this is partly due to them playing a male character (Anderson and Murphy, 2003). Despite females having identified with the character’s experiences, they may not have fully related to the character on
a gender basis. Another possibility is that the females were not as familiar with games and the in-game violence as males, and thus their support for violence was not altered because they did not feel fully involved in the game due to the lack of familiarity with the content (Nowak, Krcmar and Farrar, 2006). A third possibility is that as Markey & Scherer (2009, p. 410) stated: “violent video games only adversely affect some individuals and those who are affected have a preexisting disposition which causes them to be susceptible to such violent media”.

Considering that the violence in the violent condition was contextualized by the priming material and the mission briefing, Schneider et al. (2004) are supported in suggesting that first person shooter games with a story lead to more immersion and character identification. The correlation between Engagement and the INVAQ score points to the priming material being a mediator of the differences between conditions. This is in line with Nowak, Krcmar and Farrar’s (2006) argument that when people perceive a game to be violent they become more immersed in the game and its story. This could also help explain why females did not have a large response to the violent game. Given how weak the correlation was, this is merely speculative though.

Support for predictions

It was hypothesised that the attitudes and opinions in the violent game would persist in players outside the gaming environment immediately after game play, i.e. that violent game play would lead to higher support for violence. Males had more general gaming experience ($p < .002$) and were found to have more positive experiences during play (enjoyment of video games, $p < .0009$; Engagement, $p = .02$). In light of these findings it was found that violent game play potentially had greater effects on more frequent gamers.

Despite there being no significant interaction between groups and genders in the INVAQ scores ($p = .02$) the prediction was supported by males ($M = 3.75 \pm 0.33$) having shown higher support for violence than females ($M = 2.52 \pm 0.11$) in the violent group. Furthermore, males in violent group ($M = 3.75 \pm 0.33$) had higher scores than males in the non-violent group ($M = 2.56 \pm 0.33$), but these differences were found to not be statistically significant.
due to the small male sample. Similar trends were not found between males (\(M = 2.56 \pm 0.33\)) and females (\(M = 2.52 \pm 0.11\)) in the non-violent group or between females in the violent (\(M = 2.54 \pm 0.11\)) and non-violent groups (\(M = 2.52 \pm 0.11\)). This may be linked to males having experienced less Engagement with the non-violent game (\(M = 2.5 \pm 0.33\)) than with the violent game (\(M = 3.8 \pm 0.33\)). While there was a large enough female contingent for findings on them to be reliable, the small male contingent warrants verification of their results. There seems to be tentative support for increased support for violence in males following violent video game play.
Support for predictions

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Limitations and further study

Considering the gender effect found in the results, an equally distributed sample in terms of gender would need to be tested to further the study. Also, the differences between the conditions can be better explored in males with a larger sample. For instance, the trends regarding support for violence may be significant with a larger sample. A larger sample would increase the power of the results. Also, a non-violent game that did not have military themes might have produced greater differences between groups. Participants in the non-violent group may have responded to the military theme despite there being no actual conflict in that version of the game. It would also be prudent to get a baseline of support for violence prior to game play.
Conclusion

Though further study is needed on the topic, the prediction that attitudes and opinions in video games can affect the player immediately after game play was tentatively supported in males in the violent group. Support for this hypothesis helps verify the central tenet that video games can affect players’ attitudes, opinions and cognition post play. However, statistically significant results with a more gender equal sample are needed to draw solid conclusions. As such, further study is required.
STUDY 2

Overview and predictions for Study 2

Study 2 piloted the behavioural measure of violence to be used in Study 3. The behavioural measure assessed a participant’s hostility through decision making in the form of a strategy game wherein the participant was running a country. The INVAQ only measures attitudes, and as such, the strategy game measure was designed to see if any attitudinal changes translated into behaviour through decision making. The INVAQ and ITC-SOPI were used to check if the results of the behavioural measure were coherent with attitudinal and Presence results, thus approving it for use in Study 3. Since the literature has shown that after-effects of violent media exposure are not limited to video games, video clips were used in this study. It was hypothesised that the attitudes and opinions in the violent video clip would persist in players outside the viewing environment immediately after viewing, i.e. that violent viewing play would lead to higher support for violence. Also, it was hypothesised that viewing the violent clip resulting in more favourable attitudes towards the use of violence would translate into decision making that would reflect an increase in the participants’ allocation of resources to military ends in response to perceived or actual threats.

METHOD

Participants

40 UCT psychology students between the ages of 18 and 25 were used in this study. Unfortunately, the gender data of this study were lost, and so cannot be reported. 20 participants viewed the violent clip (violent group) and 20 viewed the non-violent clip (non-violent group). The participants were informed of the possibility of violent content, that they could withdraw at any time, and that their data would be kept confidential. All participants were fluent English speakers and provided written informed consent to participate. They were awarded course credits for their participation.
Materials

Video clips

All materials in this study were in English. The violent and non-violent video clips used were taking from the World War 2 drama *Saving Private Ryan* (Dreamworks SKG & Paramount Pictures, 1998). Each clip was 10 minutes long. The violent clip was of a beach landing that left many casualties. It therefore contained violent acts through its entirety (See Figure 5). The non-violent clip contained dialogue wherein the soldiers reminisce about life prior to going to war. There were no violent acts in the entire clip (See Figure 6).

*Figure 6*: Screenshot from the violent clip. During the clip soldiers are burnt, decimated by artillery rounds and/or shot.

*Figure 7*: Screenshot from the non-violent clip. During the clip no violent acts occur.
Behavioural measure of violence

As a behavioural measure of the effects of violent game play, a strategy game was developed to record the participants’ allocation of resources between military/security projects and health/social welfare projects. Players were placed in the position of a president of a virtual country, who had to divide up limited resources between peaceful and violent projects (e.g. education versus military spending). They were given a brief on the previous year, and how the coming year was looking (both in terms of social and security needs). They then had to allocate resources according to what they felt was needed. The game would then make the allocation and proceed to the next year. The allocations were presented as a ratio (positive numbers = violent, negative numbers = peaceful) that was calculated by the strategy game program itself. The players played 5 turns (5 years), excluding the baseline turn, to complete the game. Two equivalent versions of the strategy game were used. The only differences between them were the background colour and on which sides of the screen the social and security needs were placed on (See Appendices I and J).

The game was manipulated to produce situations where the player felt at risk, safe or frustrated and their strategies for dividing up the resources were used as a measure of the effect of the video clip. The game was set up so that we could manipulate the outcomes of the players’ moves in order to place them in a frustrated condition to see how they responded. This was used to determine the aggressiveness of participants’ reactions to perceived and actual threats. It therefore measured hostile cognition and behaviour. It has been found that repeated exposure to violent media may make aggressive cognition and actions chronically accessible, thus increasing the likelihood that an individual will behave in an aggressive manner, especially when frustrated (Anderson & Dill, 2000).

The turns in the game were Baseline, Low Challenge – Negative Feedback, Low Challenge – Positive Feedback, High Challenge – Positive Feedback, High Challenge – Negative Feedback. The Baseline turn was neutral, i.e. the briefing the player received noted that both security and social conditions were favourable. The player then received positive feedback after the allocation was made. Low Challenge – Negative Feedback had the briefing state that there were minor problems and potential threats (both social and security) that needed to be addressed. After allocation, the player was given negative feedback (i.e. told that the country was now in more trouble due to the allocation made). Low Challenge – Positive Feedback
was the same except with positive statements given after the allocation. This was meant to make the participant feel safe. The High Challenge turns had the briefing portray the country as being at high security risk as well as their being urgent social problems. These turns were used to make the participant feel at risk. Positive Feedback was meant to make the participant feel less at risk, while Negative Feedback was meant to make the participant feel more at risk. The High Challenge – Negative Feedback was also intended to frustrate the participant. At the end of the turn the participant would be told that the country was essentially in social ruin and had failed to deal with the security threats in time due to the allocation made. After the feedback from this turn, the participant made one more allocation.

It was expected that after experiencing the violent condition, the subjects would be more likely to support spending on violent projects, as well as respond more punitively to threats to their virtual countries especially after the High Challenge – Negative Feedback turn.

Scales

*Individual and National Violence Questionnaire (INVAQ)*

To note the participants’ attitudes toward the appropriateness of personal and national violence as a solution to problems we used the Individual and National Violence Attitude Questionnaire (INVAQ), a Likert-scale questionnaire constructed in the 2007 study (See Study 1). 7 questions were added to the questionnaire, and this increased Cronbach’s alpha to 0.906 (See Appendix K).

*Activity and argumentativeness questionnaire*

The Activity and Argumentativeness Scale (See Appendix L) was developed to investigate what kinds of, and how much physical activity the participants took part in as well as how argumentative the individual was. Specifically, the first part investigated how much aggressive physical contact occurred in the physical activities. This was to investigate approximately how much aggression an individual may experience weekly. This is important since it is unclear whether aggressive individuals are drawn to violent media or if it is the media that increases an individual’s aggression (Johnson *et al.*, 2007). 4 rating scale questions were posed to participants concerning how often they exercise and what types of exercise they engage in.
The second part of the scale examined how argumentative an individual was. Argumentativeness has been associated with violent media exposure, and it was thus prudent to investigate if this would link into the results on attitude and behaviour (Greene & Krcmar, 2005). This section of the questionnaire comprised of 5 dichotomous items on whether the individual is the cause of the arguments, and 2 rating scale questions on how often the individual is in verbal or physical fights.

**Independent Television Commission Sense of Presence Inventory (ITC-SOPI)**
The Independent Television Commission Sense of Presence Inventory (ITC-SOPI) is a 44 item scale that measures Presence over four factors: physical space (Spatial Presence), Engagement, Naturalness, Negative Effects. It was detailed in Study 1.

**Computer experience questionnaire**
The Computer Experience Questionnaire investigated the levels of gaming experience the participants have, and noted trends on gaming behaviour within the sample. It was detailed in Study 1.

**Video Game Attitude Questionnaire (VGA)**
The video game attitude questionnaire is a 7 item scale constructed for this study that investigated a participant’s attitudes toward video game play (See Appendix M). Items were scored on a 5 point Likert scale from 1(strongly disagree) to 5 (strongly agree). Examples include “Video games are fun”, “Video games help me escape from reality”, and “I prefer video games which require thought rather than reflexes”.

**Video Clip Assessment**
The video clip assessment questionnaire is a 5 point Likert scale that aimed to investigate participant’s attitudes towards the clip viewed (See Appendix N). It was constructed to be loose indicator of positive and negative attitudes towards the clip. The questions were more specific than the DES-II and thus provided a clearer picture of what emotions the participants experienced while viewing the clip. The 11 items in it were scored from 1(strongly disagree) to 5 (strongly agree). Examples include “I found the clip disturbing”, “I enjoyed the clip”, and “The content is something I am used to seeing on television”.

University Of Cape Town
Procedure

The study was run over 2 weeks. On arrival each student was welcomed to the study, randomly assigned to a group and advised that there may be violent content in the study, and that they could leave at any time if they felt unwilling to continue. Each student was provided a private computer station, and up to 4 students were run at a time. The students were instructed that they were to watch a 10 minute film clip, at the end of which, they were to call the researcher over to take them into the next phase of the study. When the participants called the researcher over, they were advised that they would now play a short strategy game, and then complete a series of computer-based questionnaires. They were asked to choose between 2 equivalent versions of the strategy game and questionnaire set. Once the game started, all instructions for that and the questionnaires were provided in the programme being used. The INVAQ, ITC-SOPI, Activity and Argumentativeness Scale, VGA, and Video Clip Assessment ran once the strategy game was completed. At the end of the questionnaires, the programme ended, and the participants were debriefed as to the specific nature of the study, and advised on courses of action if they had any problems in relation to what they saw or did. They were then thanked, and given course credit.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Welcome and briefing</td>
</tr>
<tr>
<td>5</td>
<td>Video clip viewing</td>
</tr>
<tr>
<td>15</td>
<td>Strategy game play</td>
</tr>
<tr>
<td>20</td>
<td>Questionnaires</td>
</tr>
<tr>
<td>40</td>
<td>Debriefing and dismissal</td>
</tr>
</tbody>
</table>

Table 4: Study 2 Procedure Timeline

Data analysis

In reporting descriptive statistics, means and standard deviations will be reported as Mean ± SD. The data met the assumptions for normality required for parametric testing. 1-way ANOVAs with Group (Violent / Non-violent) as the independent variable were used. The gender data of this study was lost and could thus not form part of the analysis. The significance level (p) of the results in this study was altered to 0.01 to compensate for the increased likelihood of Type 1 error due to the number of inferential analyses conducted. It was thought that Bonferroni corrections would result in too stringent thresholds being applied.
RESULTS

**Behavioural measure** *(means and standard deviations reported as Mean ± SD)*

At baseline, the non-violent group tended towards military spending slightly more than the violent group with mean scores of 1.4 ± 0.48 and 1.1 ± 0.62 respectively. A 1-way ANOVA (DV = allocation ratio; IV = Group) found this difference statistically non-significant, but both groups did lean towards military spending in their allocation. Upon receiving a high challenge – negative feedback turn, both groups increased their military spending (Violent Group = 2.4 ± 0.75, Non-violent Group = 2.0 ± 1.57), but it was the violent group that had the highest spending and the bigger difference between baseline and manipulation (Non-violent Group difference – 0.6; Violent Group difference – 1.4). A 1-way ANOVA (DV = difference between baseline and manipulation; IV = Group) showed this difference to not be statistically significant. The differences between the baseline and the low challenge – negative feedback turn were minuscule.

<table>
<thead>
<tr>
<th>Table 5: Behavioural Measure Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Violent 1.1 (0.62)</td>
</tr>
<tr>
<td>Non-violent 1.4 (0.48)</td>
</tr>
</tbody>
</table>

**Support for violence** *(means and standard deviations reported as Mean ± SD)*

Similarly, a 1-way ANOVA (DV = INVAQ score; IV = Group) revealed no significant differences in the INVAQ scores (Violent Group = 2.86 ± 0.13, Non-violent Group = 2.81 ± 0.14).

**Clip assessment** *(means and standard deviations reported as Mean ± SD)*

5 1-way ANOVAs (IV = Group) were conducted on the participants’ responses to the clip assessment questions (See Table 6 for means). The violent group noted being disturbed by their clip, $F_{(1,32)} = 54.58, p < .0001, R^2 = 0.63;$ and found it violent, $F_{(1,32)} = 64.91, p < .0001, R^2 = 0.66.$
While not statistically significant, they also found that the clip evoked more emotion in them (Violent Group = 4.17 ± 0.23, Non-violent Group = 3.75 ± 0.24). The non-violent group affirmed enjoying the clip more, but this was also not significant (Violent Group = 2.89 ± 0.30, Non-violent Group = 3.88 ± 0.32).

Table 6: Clip Assessment Means

<table>
<thead>
<tr>
<th>Group</th>
<th>Disturbing</th>
<th>Violent</th>
<th>Evoked Emotion</th>
<th>Enjoyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NV</td>
<td>1.38 (0.23)</td>
<td>2.25 (0.21)</td>
<td>3.75 (0.24)</td>
<td>3.88 (0.32)</td>
</tr>
<tr>
<td>V</td>
<td>3.72 (0.21)</td>
<td>4.61 (0.20)</td>
<td>4.17 (0.23)</td>
<td>2.89 (0.30)</td>
</tr>
</tbody>
</table>

Presence

A further 4 1-way ANOVAs were conducted on the factors of Presence between groups. There were no statistically significant differences found between the groups. All scores were virtually equal between groups (See Table 7).

Table 7: Means of the 4 factors of Presence

<table>
<thead>
<tr>
<th>Group</th>
<th>Spatial Engagement</th>
<th>Naturalness</th>
<th>Negative Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>NV</td>
<td>2.22 (0.18)</td>
<td>3.43 (0.17)</td>
<td>3.14 (0.18)</td>
</tr>
<tr>
<td>V</td>
<td>2.46 (0.17)</td>
<td>3.29 (0.16)</td>
<td>3.36 (0.17)</td>
</tr>
</tbody>
</table>

Argumentativeness

Both groups do not engage in physical activities with much (aggressive) physical contact in a month. Results also showed that the groups were in few to no arguments or physical fights in a month. Both also scored low in argumentativeness, and had virtually equal results (See Table 8).

Table 8: Activity and argumentativeness means

<table>
<thead>
<tr>
<th>How much aggressive physical contact (per month)</th>
<th>How often are you in arguments (per month)</th>
<th>How often are you in physical fights (per month)</th>
<th>Argumentativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>NV 0.63 (0.19)</td>
<td>1.43 (0.26)</td>
<td>0.06 (0.08)</td>
<td>0.69 (0.04)</td>
</tr>
<tr>
<td>V 0.33 (0.18)</td>
<td>1.77 (0.24)</td>
<td>0.16 (0.07)</td>
<td>0.69 (0.04)</td>
</tr>
</tbody>
</table>
DISCUSSION

Study 2 piloted the behavioural measure of violence to be used in Study 3. The INVAQ and ITC-SOPI were used to check if the results of the behavioural measure were coherent with attitudinal and Presence results, thus approving it for use in Study 3. It was hypothesised that viewing the violent clip would result in more favourable attitudes towards the use of violence, and these would translate into decision making that would reflect an increase in the participants’ allocation of resources to military ends in response to perceived or actual threats. Both groups were found to not be argumentative. Although the non-violent group tended towards military spending more than the violent group as a baseline (Violent Group = 1.1 ± 0.62, Non-violent Group = 1.4 ± 0.48) and both groups increased their spending upon frustration, it was the violent group that had the highest spending when frustrated (Violent Group = 2.4 ± 0.75, Non-violent Group = 2.0 ± 1.57) and the bigger difference between baseline and manipulation (Violent Group difference = 1.4; Non-violent Group difference = 0.6). However, there were virtually no differences in the INVAQ scores (Violent Group = 2.86 ± 0.13, Non-violent Group = 2.81 ± 0.14) or Presence between groups. The violent group did, however, being disturbed by their clip (Violent Group = 3.72 ± 0.21, Non-violent Group = 1.38 ± 0.23), $F(1, 32) = 54.58, p < .00001, R^2 = 0.63$. These results will be discussed.

Behavioural measure

This study aimed to pilot a behaviour measure to enable its use in Study 3. The measure is essential as it examines the cognition and behaviour aspects of the central tenet (video games can affect players’ attitudes, opinions, cognition and behaviour post play). The main measure of the study (behavioural measure) did not produce any statistically significant results, but did produce trends that may prove to be socially significant. The expected trends regarding hostile decision making in the data occurred, thus supporting the future use of the strategy game, but not as convincingly as hoped. Upon frustration, the violent group had a larger tendency towards military/violent spending than the non-violent group though the differences between groups were small. This trend was unexpected, and suggests the behavioural measure may be more sensitive than the INVAQ. The sensitivity comes from participants having a consequence attached to their response. This is loosely consistent with Huesmann’s (2007, pS10) notion that “Those who watch the violent clips tend to behave more aggressively than those who view non-violent clips, and they adopt beliefs that are more
accepting of violence”. The use of an interactive form of media (i.e. video games) may have seen greater differences (Polman, Orobio de Castro, & van Aken, 2008). However, the loss of the gender data precluded exploration into any potential gender/group interactions. The behavioural measure’s findings must be looked at in light of the INVAQ scores and Presence results to determine if it is fit for use in Study 3.

Support for violence

As in Study 1, support for violence was used a gauge of attitudes and opinions. It was also used as a check of the behavioural measure in this study. The INVAQ scores in this case were almost equal. Considering that the violent group had minutely higher scores, it cannot be stated with any surety that both attitudes and behaviour were affected by the clip viewed. However, the differences in the behavioural measure were not significant, and so, no conclusive effect was found in either the attitudinal or behavioural measure. It is possible that this is because violent media potentially only affects those with a pre-existing disposition which causes them to be susceptible to such violent media (Markey & Scherer, 2009). Both groups were not argumentative or involved in any acts of physical aggression. Also, it could be that, as per Polman, Orobio de Castro, & van Aken (2008), higher effects would have been seen if the participants had an active role in the media (e.g. played a game) as opposed to merely watching. A further possibility is that support for violence and military allocation may have been increased in the non-violent group by seeing the gentle side of soldiers. A clip that has no military themes might have produced different results. The small differences between the groups in both the behavioural measure and the INVAQ suggest some consistency between the two measures, and hence support its use in Study 3. The Presence results would also have to be consistent for the pilot to be considered successful.

Presence and enjoyment

While Presence was experienced by both groups, there were no significant differences between groups, and the scores were almost equal in all the factors. This is contrary to the finding that immersion into a violent story line is linked to greater Presence (Nowak, Krcmar, & Farrar, 2006). However, one could claim that the violent group was marginally more present than the non-violent group. It is possible that the violent group being significantly disturbed by the clip lowered their Presence, and subsequently any potential after-effects of
violent media. This would be in line with purported directly proportional relationship between Presence and enjoyment (Lessiter et al., 2001). Therefore, the ITC-SOPI, INVAQ and behavioural measure all had minute differences with the violent group scoring higher. This consistency supports the use of the behavioural measure in Study 3.

**Support for predictions**

It was hypothesised that the attitudes and opinions in the clips would persist in viewers once viewing is over in that viewing the violent clip would result in more favourable attitudes towards the use of violence, and these would translate into decision making that would reflect an increase in the participants’ allocation of resources to military ends in response to perceived or actual threats.

This was not supported by the INVAQ scores being almost equal \( (p = .77) \). Also, despite the violent group having shown a greater increase in military allocation in their behavioural measure ratios than the non-violent group (1.1 - 2.4 versus 1.4 - 1.8 respectively) the differences between groups were small and the results were not statistically significant. However, this does support the prediction that any effects on attitude would translate into behaviour as scores in both were similar. Furthermore, the pilot rested on the behavioural measure having similar results to the INVAQ and ITC-SOPI to be held as successful. Results showed a consistency, but it cannot be ruled out that this may have been due to chance. However, the behavioural measure was approved for Study 3 because when under stress the violent group acted as expected and had more hostile decision making. This was in line with the INVAQ and Presence findings.

**Limitations and further study areas**

The limitations of this study were the small sample size, and gender data being lost. The gender data would have been useful in examining the differences in support for violence as in Study 1, and now for decision making in this study. Given the findings of Study 1, it would be expected that males would have had higher support for violence, and would have had more military spending in the behavioural measure. Furthermore, a less graphic clip that the violent group would find enjoyable rather than disturbing might have been more prudent. Linked to that, the non-violent clip still involved military personnel. It is possible that support for
violence and military allocation may have been increased in the non-violent group by seeing the gentle side of soldiers. Further studies can thus include a less gory clip for the violent group, and a clip that involves no military undertones for the non-violent clip. Another option would be to use violent video games to add certainty since they are held as having more effects on aggression than violent television (Polman, Orobio de Castro, & van Aken, 2008). Physiological arousal during the clips and redoing the questionnaires after some hours and/or days are other avenues that can be explored. It would also be prudent to get a baseline of support for violence prior to exposure to the media.

**Conclusion**

Therefore, the behavioural measure of violence has been shown to be adequate for use in the main study. In terms of receptive media, no significant differences were found in support for violence or hostile decision making. This does not support the predictions of the study. Thus, the central tenet of the dissertation is not supported, but further study is required to obtain conclusive results.
STUDY 3

Overview and predictions for Study 3

Study 3 aimed to investigate if there is a long lasting persistence in support for violence after game play, and if so, if it is more prevalent when using embodied controls. The study further aimed to investigate if this support extends beyond attitudes to decision making. It was hypothesised that the attitudes and opinions in the games would persist in players outside the gaming environment especially in the embodied group, i.e. the violent game would increase support for violence in players. The embodied group was thus expected to have stronger support for violence, and this would extend into their decision making. It was further hypothesised that any effects would return to baseline by 24 hours after play. Any effects 24 hours and 4 days later were assumed to be from the violent game due to theme of self preservation presented in it, and that it was played last in Session 1.

METHOD

Participants

80 students (40 male, 40 female) from the University of Cape Town were recruited for this study. All were 18 or above (Average age = 22), since the violent game in the study carried an 18+ rating. The participants were all fluent English speakers, and provided written informed consent to participate. They were recruited mainly from the psychology, and computer science departments, and participated voluntarily. They were compensated for their time with R150. The participants were required to attend 3 sessions. They were informed of this, the exposure to violent media, their ability to withdraw at any time, and the confidentiality of their data when they signed up. The participants were randomly assigned to either the Playstation 2 group (20 male, 20 female), or the Nintendo Wii group (20 male, 20 female). (Note: Their level of gaming experience was factored in post-testing).
Measures

Gaming equipment
The Nintendo Wii and Playstation 2 were the gaming consoles used. The Nintendo Wii is a next generation gaming console, which uses motion detectors to track players’ movements, and as such removes a layer of abstraction from the game, hence increasing embodiment in the gaming experience (See Figure 7). The games used were: *Wii Sports Tennis* (Nintendo, 2006) for the non-violent condition and *Manhunt 2* (Rockstar Games, 2007) for the violent condition. The games are rated family (4+), and mature (18+) respectively and hence were suitable for play by the participants. The participants were informed of the violence in the game used for the violent condition and asked if they still wished to participate. Wii Sports Tennis mimics a game of tennis in a third person view and has the player use the controls to hit the ball over the net to try gain a point against the computer opponent (See Figure 8). The controls are used as a tennis racket would be. Manhunt 2 is a third person action game wherein the player controls a mental asylum escapee who must kill computer generated opponents to survive. Players have to mimic attack motions with the controllers to kill opponents (See Figure 9).

![Figure 7: Control with next generation controller. The player's movements correspond with the game character's movements. Control is achieved through the player moving the controller as one would if one were actually performing the action.](image-url)
Figure 98: Game play in Wii Sports Tennis

Figure 109: Game play in Wii version of Manhunt 2. The player must follow the control prompts on screen to perform an execution. The motions correspond with the actions of the in-game character.

For the conventional controls group equivalent games on the Playstation 2 were used. The participants only push buttons to control the actions of the in-game character (See Figures 10 & 11). While Manhunt 2 was available on both consoles, there was no direct equivalent non-violent game. European Tennis Pro (Phoenix, 2003) was used. It was a suitable choice due to the graphic, content and sound similarities (See Figure 12).
Figure 1011: Control with traditional game controller. The player’s movements do not correspond with the game character’s movements. Control is achieved through the player pushing buttons with his thumbs.

Figure 1112: Game play in Playstation 2 version of Manhunt 2. The player merely pushes a button to perform executions.
Figure 12.13: Game play in European Tennis Pro. The graphics and in-game content made it suitable as an equivalent for Wii Sports Tennis on the Playstation 2.

Physiological measure

Heart Rate (HR) was measured using the Polar FS3c Fitness Heart Rate Monitor Watch (Polar, 2006). It provided real-time heart rate data as well as the average and maximum rates for each participant, while still allowing them to move without restriction. As it is meant for exercise, it is light and allows virtually full mobility for the user. An ambulatory monitoring device would have been too restrictive in terms of participant movement for use in this study.

Scales

Likert-scale questionnaires

Likert-scale questionnaires were used to note the participants’ attitudes towards the appropriateness of personal and national violence as a solution to problems, and gaming experience. The scales were in English, and had statements regarding the abovementioned topics and had the participants express agreement or disagreement on a seven-point scale. As such, how closely the participant’s feelings match the question or statement on a rating scale was determined. Apart from the Individual and National Violence Questionnaire (INVAQ), all tests were only done electronically.

Individual and National Violence Questionnaire (INVAQ)

The Individual and National Violence Questionnaire (INVAQ), which was used in the previous studies ($\alpha = 0.905$) tested participant’s attitudes towards the use of violence. This is
different from the version detailed in Study 1 in that additional questions improved the $\alpha$ from 0.860 to 0.905. A higher score indicates high support for the use of violence. It was presented both as split halves (13 items & 14 items) after the game play sessions in paper format (Split half relation = 0.899, Guttman split half relation = 0.896). It was then done as a whole (27 items) in electronic format in the subsequent sessions.

**Independent Television Commission Sense of Presence Inventory (ITC-SOPI)**
The Independent Television Commission Sense of Presence Inventory (ITC-SOPI) was administered to participants after game play. This was administered to ensure that the participants experienced Presence (See Study 1). The inventory was only administered on the first day and was followed by the Video Game Attitude Questionnaire (VGA).

**Video Game Attitude Questionnaire (VGA)**
The Video Game Attitude Questionnaire (VGA) investigated participants’ feelings toward video game play in general on a five point Likert scale (See Study 2). It was administered only done on the first day, as part of the post-game play battery.

**Video Clip and Game Assessment**
An assessment of the video clip that formed part of the game play of *Manhunt 2* was also included to gauge enjoyment/disturbance (i.e. positive and negative emotion) experienced during the game (See Study 2). Participants were also asked to similarly rate their experience of the game itself. This would inform how much Presence would be experienced by the participants. Participants were asked to rate both the game itself and the clip in this assessment. It was also only administered on the first day.

**Rating scale questionnaires**

**Computer Experience Questionnaire**
The Computer Experience Questionnaire investigated the levels of gaming experience the participants have, and noted trends on gaming behaviour within the sample (See Study 1).

**Beck Depression Inventory (BDI)**
The Beck Depression Inventory II (Beck, Steer, & Brown, 1996) is a multiple choice test measuring the presence and degree of depression in adolescents and adults. It consists of 21
items, each with 4 statements rated 0 to 3. Higher ratings in the responses indicate characteristics of severe depression. This was used as a distracter task in Session 1 to mask the exact nature of the study.

*Activity and Argumentativeness Scale*

The Activity and Argumentativeness Scale was developed to investigate what and how much physical activity the participants took part in. Within that, it investigates how much aggressive physical contact occurs in the physical activities. The second part of the scale examines how argumentative an individual is (See Study 2).

*State-Trait Anxiety Inventory Form Y (STAI)*

The Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) contains two 20 item scales: Trait, which examines intensity of feelings of anxiety in general, and State, which examines intensity of feelings of anxiety at that moment. The Trait scale was used in Session 2 and the State was used in Sessions 2 and 3 as distracter tasks.

*Behavioural measure of violence*

The behavioural measure was successfully piloted in Study 2 and was thus used in Study 3 (See Study 2). Two equivalent versions (the only differences between them were the background colour and on which sides of the screen the social and security needs were placed on) of the game were used since the game would be played more than once (See Appendices I & J). It was expected that after experiencing the violent condition, the subjects will be more likely to support spending on violent projects, as well as respond more punitively to threats to their virtual countries.

*Procedure*

*Session 1*

Participants were tested individually. The first session consisted of game play and questionnaires. Each participant was welcomed to the study and briefed on the procedure for the 3 sessions. Once briefed, the BDI was completed, followed by the attachment of the heart
rate monitor. The participant was then taken to the gaming room to play the non-violent game (European Tennis Pro for the Playstation 2 group, and Wii Sports Tennis for the Nintendo Wii group). Each participant’s starting, ending, average and maximum heart rate data was recorded. Upon completion, the participant was taken back to the laboratory where (s)he played a version of the strategy game and a completed a split half of the INVAQ. This was followed by a return to the gaming room to play the violent game (Manhunt 2 for both groups). Heart rate data was once again recorded, and once game play was complete, each participant completed the other half of the INVAQ and played an equivalent version of the strategy game. To end the session, each participant was required to complete the ITC-SOPI, Video Game Attitudes questionnaire, the Activity and Argumentativeness Scale, and the Computer Experience questionnaire. Once the session was complete, the participant was reminded to attend the remaining sessions, and thanked for their attendance so far.

Table 9: Study 3 Session 1 Procedure Timeline

<table>
<thead>
<tr>
<th>SESSION 1</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (min)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Welcome and briefing</td>
</tr>
<tr>
<td>5</td>
<td>BDI - II</td>
</tr>
<tr>
<td>10</td>
<td>Attachment to HR monitor and NV game play</td>
</tr>
<tr>
<td>20</td>
<td>Strategy game A and INVAQ portion</td>
</tr>
<tr>
<td>30</td>
<td>V game play</td>
</tr>
<tr>
<td>40</td>
<td>Strategy game B and INVAQ portion</td>
</tr>
<tr>
<td>50</td>
<td>Questionnaires</td>
</tr>
<tr>
<td>65</td>
<td>Detachment of HR monitor &amp; dismissal</td>
</tr>
</tbody>
</table>

Session 2 (24 hours after Session 1)

The second session consisted of the State-Trait Anxiety Inventory, a version of the strategy game, and the INVAQ. Participants were again tested individually. Each participant was welcomed and briefed on the day’s procedure. Once, briefed, the State-Trait Anxiety Inventory was completed. The State-Trait Anxiety Inventory was the only measure of the day presented on paper. Following this, a version of the strategy game was played, and an electronic version of the INVAQ was completed. Once all measures were completed, each participant was thanked and reminded of the final session 3 days later.
Table 10: Study 3 Session 2 Procedure Timeline

<table>
<thead>
<tr>
<th>SESSION 2</th>
<th>Time (min)</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>Welcome &amp; briefing</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>STAI State and Trait</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Strategy game A</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>INVAQ</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Dismissal</td>
</tr>
</tbody>
</table>

Session 3 (4 days after Session 1)

The third session differed from the second only in that only state anxiety was measured in the State-Trait Anxiety Inventory, and the INVAQ was done before the version of the strategy game. Upon completion of all the measures, each participant was debriefed on the nature of the study, and were allowed to voice any questions/concerns they had about the study. Following debriefing, each participant was paid and thanked for their participation in the study.

Table 11: Study 3 Session 3 Procedure Timeline

<table>
<thead>
<tr>
<th>SESSION 3</th>
<th>Time (min)</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>Welcome &amp; briefing</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>STAI State</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Strategy game B</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>INVAQ</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Payment &amp; debriefing</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Dismissal</td>
</tr>
</tbody>
</table>

Data analysis

In reporting descriptive statistics, means and standard deviations will be reported as $\text{Mean} \pm \text{SD}$. The data met the assumptions for normality required for parametric testing. Either 2 (Group) x 2 (Sex) Factorial ANOVAs or 1-way ANOVAs with either Group (embodied or conventional) or Sex as the independent variable were used. The significance level ($p$) of the results in this study was altered to 0.01 to compensate for the increased likelihood of Type 1 error due to the number of inferential analyses conducted. It was thought that Bonferroni corrections would result in too stringent thresholds being applied.
RESULTS

Support for violence (means and standard deviations reported as Mean ± SD)

The first of the main measures (attitudes and opinions) produced only 1 significant finding. In Session 1 split halves of the INVAQ were performed. A Repeated Measures ANOVA (DV = INVAQ scores, IVs = Group and Sex) was performed on the data. Post non-violent play found males in both groups had significantly more support for violence (Males = 3.38 ± 0.10, Females = 2.92 ± 0.10), $F(1, 77) = 10.41, p = .001, R^2 = 0.11$; while post violent play males still had more support for violence, but not to a significant level (Males = 2.96 ± 0.12, Females = 2.69 ± 0.12). Furthermore, the difference between males and females was marginal. Also, the scores for both males and females were lower in the post violent play half. The combined score showed males having more support for violence than females (Males = 3.16 ± 0.09, Females = 2.80 ± 0.09), but this too was not significant.

Between the groups (embodied and conventional) only non-significant differences were found. As in Study 2, the groups had almost equal scores.

A further Repeated Measures ANOVA (DV = INVAQ scores, IVs = Group and Sex) was done including the scores from all 3 sessions no significant results were found except for the difference post non-violent play, as noted above. By Session 2 both groups had scores approximately equal to the combined score of session 1. These scores were lower than post non-violent play in both groups, but higher than post violent play. A very similar result was found in Session 3, with scores lowering by 0.9 in both groups. This trend was echoed between the sexes. Males retained more support for violence, but had their scores drop in comparison to post non-violent play and combined score in Session 2. Females retained approximately the same score. By Session 3, both sexes maintained the pattern, but had slightly decreased scores (0.9 decrease in females, and 0.4 decrease in males).
**Behavioural measure**

The second of the main measures (behaviour) produced no significant results. A Repeated Measures ANOVA (IVs = Group and Sex) was conducted on the differences between the Baseline and High challenge, Negative feedback turns post non-violent and violent play. No significant results were found.

The embodied group allocated more resources to military spending throughout the measure after the non-violent game. On manipulation, both groups had higher military allocations. After violent play it was the conventional group that had higher military allocations throughout the measure (See Table 12).

**Table 12: Differences between the Baseline and High challenge, Negative feedback turns**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>NV Difference</th>
<th>V Difference</th>
<th>Day 2 Difference</th>
<th>Day 3 Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodied</td>
<td>Male</td>
<td>0.1 (0.27)</td>
<td>0.9 (6.24)</td>
<td>-0.6 (6.58)</td>
<td>-0.3 (2.10)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Female</td>
<td>0.5 (0.27)</td>
<td>-0.2 (6.24)</td>
<td>-0.2 (6.58)</td>
<td>-4.2 (2.10)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Combined</td>
<td>0.3 (0.19)</td>
<td>0.4 (4.41)</td>
<td>-0.4 (4.65)</td>
<td>-2.3 (1.48)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Male</td>
<td>0.2 (0.27)</td>
<td>11.8 (6.24)</td>
<td>-8.2 (6.58)</td>
<td>1.1 (2.10)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Female</td>
<td>0.4 (0.27)</td>
<td>-0.1 (6.24)</td>
<td>0.1 (6.58)</td>
<td>-0.5 (2.10)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Combined</td>
<td>0.3 (0.19)</td>
<td>5.8 (4.41)</td>
<td>-4.0 (4.65)</td>
<td>0.3 (1.48)</td>
</tr>
</tbody>
</table>

The baseline and low challenge - negative feedback turns of Session 2 saw a return to the trend of the non-violent baseline. However, greater allocations were made by both groups. On manipulation, both groups tended towards social spending, and the conventional group had the highest difference between manipulation and baseline (See Table 12).

Session 3 saw higher allocation by the embodied group at baseline, and higher allocation by the conventional group at the manipulation. However, the embodied group tended towards social spending while the conventional group tended slightly towards military spending and had the same difference it did after non-violent play (See Table 12).

**Computer experience (means and standard deviations reported as Mean ± SD)**

Males played marginally more games on average than females (Males = 0.65 ± 0.14, Females = 0.13 ± 0.14), and played games more often (Males = 1.60 ± 0.14, Females = 0.73 ± 0.15).
Within this, males played violent video games often (Males = $1.32 \pm 0.15$, Females = $0.31 \pm 0.15$). Given the figures, it can be stated that the sample were not avid gamers.

Using 1-way ANOVAs (IV = Sex) it was found that that the abovementioned results were all statistically significant with the exception of males playing more games on average (See Table 13).

### Table 13: Inferential Statistics of Computer Experience Between Sexes

<table>
<thead>
<tr>
<th></th>
<th>F (1, 76)</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often VG played</td>
<td>16.47</td>
<td>0.0001</td>
<td>0.17</td>
</tr>
<tr>
<td>How often VVG played</td>
<td>21.86</td>
<td>0.00001</td>
<td>0.22</td>
</tr>
</tbody>
</table>

#### Attitudes towards video games (means and standard deviations reported as Mean ± SD)

Flowing from the previous results, 1-way ANOVAs (IV = Sex) found that males enjoyed violent video games more than non-violent games (Males = $2.80 \pm 0.19$, Female Mean = $1.94 \pm 0.20$), $F_{(1, 76)} = 9.10, p = .003, R^2 = 0.10$; and preferred games that represent conflict/war (Males = $2.80 \pm 0.18$, Females = $1.84 \pm 0.18$), $F_{(1, 76)} = 13.66, p = .0004, R^2 = 0.15$.

#### Argumentativeness

As per Study 2, both groups do not engage in physical activities with much (aggressive) physical contact and were in few to no arguments or physical fights in a month. Both also scored low in argumentativeness with marginal differences (See Table 14). The sexes reflected similar results.

### Table 14: Activity and argumentativeness questionnaire means between groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>How often are you in physical fights (per month)</th>
<th>Argumentativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodied</td>
<td>Male</td>
<td>0.1 (0.06)</td>
<td>0.7 (0.05)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Female</td>
<td>0.0 (0.06)</td>
<td>0.6 (0.05)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Combined</td>
<td>0.05 (0.04)</td>
<td>0.63 (0.03)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Male</td>
<td>0.1 (0.06)</td>
<td>0.7 (0.05)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Female</td>
<td>0.0 (0.06)</td>
<td>0.7 (0.05)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Combined</td>
<td>0.05 (0.04)</td>
<td>0.71 (0.03)</td>
</tr>
</tbody>
</table>
Assessment of clip within violent game and game itself (means and standard deviations reported as Mean ± SD)

When asked to assess the clip that contextualized Manhunt 2 and the game itself, males found it more exciting (Males = 3.30 ± 0.17, Female Mean = 2.57 ± 0.18). All other results in this section were almost equal.

A 1-way ANOVA (IV = Sex) showed that the only trend that was significant with the adjusted p was males finding the game and clip more exciting, \(F(1, 76) = 8.22, p = .005, R^2 = 0.09.\)

Physiological arousal (means and standard deviations reported as Mean ± SD)

In examining the descriptive statistics (See Table 15) found for the physiological data (beats per minute) 2(Group) x 2(Sex) Factorial ANOVAs (DV = difference between starting and average heart rate) were conducted. No significant interactions were found with the adjusted significance level.

Table 15: Means of Physiological Data

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>NV Start</th>
<th>NV Ave</th>
<th>NV Diff</th>
<th>V Start</th>
<th>V Ave</th>
<th>V Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodied</td>
<td>Male</td>
<td>86</td>
<td>96</td>
<td>10</td>
<td>76</td>
<td>84</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.13)</td>
<td>(3.22)</td>
<td>(2.30)</td>
<td>(3.37)</td>
<td>(2.96)</td>
<td>(280)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Female</td>
<td>93</td>
<td>100</td>
<td>7</td>
<td>89</td>
<td>94</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.21)</td>
<td>(3.31)</td>
<td>(2.30)</td>
<td>(3.47)</td>
<td>(3.13)</td>
<td>(2.80)</td>
</tr>
<tr>
<td>Embodied</td>
<td>Combined</td>
<td>90</td>
<td>98</td>
<td>8</td>
<td>82</td>
<td>89</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.29)</td>
<td>(2.33)</td>
<td>(2.52)</td>
<td>(2.25)</td>
<td>(1.98)</td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>Male</td>
<td>83</td>
<td>85</td>
<td>2</td>
<td>79</td>
<td>83</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.05)</td>
<td>(3.14)</td>
<td>(2.30)</td>
<td>(3.29)</td>
<td>(2.89)</td>
<td>(280)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Female</td>
<td>90</td>
<td>92</td>
<td>2</td>
<td>85</td>
<td>91</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.13)</td>
<td>(3.22)</td>
<td>(2.30)</td>
<td>(3.47)</td>
<td>(3.04)</td>
<td>(2.80)</td>
</tr>
<tr>
<td>Conventional</td>
<td>Combined</td>
<td>86</td>
<td>89</td>
<td>2</td>
<td>82</td>
<td>87</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>(2.23)</td>
<td>(2.27)</td>
<td>(1.63)</td>
<td>(2.49)</td>
<td>(2.19)</td>
<td>(1.98)</td>
</tr>
</tbody>
</table>

However, as expected (due to the physical rigour of the motion capture controls), the embodied group had greater increases from baseline during game play in the non-violent game (embodied group = 8 ± 1.63, conventional group = 2 ± 1.63). However, the differences experienced by both groups during violent play were equal (embodied group = 4 ±1.98, conventional group = 4 ±1.98).
Between the sexes, females had higher heart rates through both non-violent and violent play.

**Presence** *(means and standard deviations reported as Mean ± SD)*

The groups (embodied and conventional) experienced identical amounts of Presence during game play: Spatial Presence (embodied group = 3.05 ± 0.12, conventional group = 2.66 ± 0.12), Engagement (embodied group = 3.41 ± 0.10, conventional group = 3.20 ± 0.10), Naturalness (embodied group = 2.93 ± 0.13, conventional group = 2.57 ± 0.13) and Negative Effects (embodied group = 2.34 ± 0.12), conventional group = 2.24 ± 0.12).

Between the sexes, there were also no significant effects found: Spatial Presence (Males = 2.69 ± 0.12, Females = 3.00 ± 0.12), Engagement (Males = 3.26 ± 0.10, Females = 3.34 ± 0.10), Naturalness (Males = 2.67 ± 0.13, Females = 2.81 ± 0.13), Negative Effects (Males = 2.21 ± 0.12, Females = 2.37 ± 0.12).

2 (Group) x 2 (Sex) ANOVAs showed no significant differences in Group or Sex as main effects. Furthermore, no significant interactions were found, and any differences were too small to be considered a trend.

**DISCUSSION**

Study 3 investigated if there is a long lasting persistence in support for violence after game play, and if so, if it is more prevalent when using embodied controls. Furthermore, it investigated if the support extends beyond attitudes and opinions to decision making (cognition and behaviour). It was hypothesised that violent game play would increase support for violence in players. The embodied group was thus expected to have stronger support for violence, and this would extend into their decision making. It was further hypothesised that any effects would return to baseline by 24 hours after play.

Unexpectedly, results showed that males had significantly more support for violence after non-violent play (Males = 3.38 ± 0.10, Females = 2.92 ± 0.10), \( F_{(1, 77)} = 10.41, p = .001, R^2 = 0.11 \). For the remainder of the study they had more support for violence, but the differences between sexes and groups were too small to be considered. Therefore, no effect was seen on support for violence. While hostile decision making increased after violent play (especially in
the conventional group), it decreased sharply upon frustration in Session 2 (embodied group difference = -0.4 \pm 4.65, conventional group difference = -4.0 \pm 4.65), but began to tend towards the initial scores in Session 3 (especially in the conventional group). However, none of the results found were statistically significant, and as with support for violence, the differences were too small to be held as conclusive. Therefore, no effect was seen on cognition and behaviour.

It was also found that males significantly enjoying violent video games more than females (Males = 2.80 \pm 0.19, Female Mean = 1.94 \pm 0.20), and finding the violent game exciting (Males = 3.30 \pm 0.17, Female Mean = 2.57 \pm 0.18). Despite the results not being significant, as expected, the embodied group had higher heart rates. Females also experienced more arousal and Presence. The sample was not argumentative, and had virtually equal Presence results like in Study 2. These results will be discussed.

**Support for violence**

There was no effect found regarding support for violence, i.e. violent game play did not affect a player’s attitudes and opinions on violence. This is contrary to the view that violent game play increases support for violence (Huesmann 2007). It also supports the claim that embodied controls do not increase hostility (Markey & Scherer, 2009). By Session 2, both groups had scores lower than their baseline, but higher than after the violent game play. The support decreased again by Session 3, but was not lower than the split half completed straight after the violent game play. If not for the changes being tiny and non-significant this would suggest that any effects on attitudes and opinions that the violent game may have had were almost gone after 24 hours, and more so by 4 days post play. It is possible that the effects of violent video games are short term in adults, as per Bushman’s (2006) findings. This can only be verified with significant results. Also, it is uncertain whether the marginal decreases in scores were due to chance or players having made the game-reality distinction in their moral reasoning in order to enjoy play, and recognize the stark differences in consequence between virtual and actual violence, for example (Klimmt et al., 2006). Similarly, given that the sample was not argumentative and did not experience physical aggression often if at all, it is possible that there was no effect because violent media potentially only affects those with a pre-existing disposition which causes them to be susceptible to such violent media (Markey & Scherer, 2009). However, this study cannot state which of these or any other possibilities
was the cause of finding no effect regarding support for violence. Similar results were found in the behavioural measure.

**Behavioural measure**

As with the support for violence, the embodied group had higher military spending in the behavioural measure as a baseline. This remained the same after the low challenge – negative feedback turn and manipulation. However, after violent game play, the conventional group had the greater allocations the entire measure. This supports the point that embodied controls do not increase hostility (Markey & Scherer, 2009). However, this support is tentative due to the small differences found and the lack of statistical significance.

By the baseline of Sessions 2 and 3, the embodied group had a larger allocation, as they did in the non-violent baseline. At the manipulation stage of both stages, though, the conventional group had the greater allocation as they did after violent play. However, in Session 2 both Groups actually tended towards social spending (i.e. upon frustration they made less hostile decisions). In Session 3 the embodied group tended towards social spending after frustration, but the embodied group stayed with military spending and recorded the same difference they did in Session 1 after the non-violent play. So then, hostile cognition and behaviour seemed to be lowered by violent play in both groups. This follows the findings of Weaver & Wilson (2009) that the violent acts in violent media are not enjoyed in themselves due to the evolutionary social consequences. As such, it can be said that the same social costs can potentially hinder hostile actions in a simulation of perceived and actual threats. However, this is highly speculative given the miniscule differences.

The inter-sex results are interesting in that females had higher allocations during the first baseline, low challenge – negative feedback turn and manipulation. From there, males had higher allocation both after the violent game play and in Session 2. However, the baseline of Session 3 saw females have their largest allocations before the males took the lead after the manipulation. Males having greater allocations after violent play could be related to them attaching norms of game play to the measure. They are used to applying hostile means to achieve goals in games, and it is possible that both the violent game and the frustration caused by the version of the measure done after non-violent play triggered these norms. Again, more conclusive results are needed. As in the literature review, this links to Clarke &
Duimering’s (2006, p. 18) proposition that aspects of games most salient to gamers are “those perceived to be most behaviourally relevant to goal attainment”, and that “the evaluation of various situational stimuli depended on the extent to which they were perceived either to support or to hinder goal attainment”. It is possible that Session 2’s results were an experiment by the participants to see if going against what they had done the previous day would yield less frustrating results. Again more conclusive results are needed, but it appears that hostile cognition and behaviour in the form of decision making were slightly reduced 24 hours after play, and stayed lower in the embodied group, while moving closer to the baseline in the conventional group. Why the embodied group adhered to social spending upon frustration in Session 3 also requires further investigation.

**Presence, arousal and enjoyment**

Strangely, the embodied group did not experience significantly more Presence than the conventional group. This contrasts the findings of Skalski, Lange, & Tamborini (2006) and IJsselsteijn et al. (2000). However, the Presence results were consistent with the attitudinal and behavioural measures in that there were marginal differences between groups and sexes, and no significant results were obtained. Also, the expected similarities between Presence and physiological arousal occurred, but the physiological results were significant. Furthermore, despite significantly enjoying violent video games, and finding the game significantly more exciting, males were not significantly more present than females. This could be in part because females were more aroused, but without significant results this is uncertain. This would be interesting to study further.

**Support for predictions**

The first prediction of this study (violent game play would increase support for violence in players) was not supported. Despite males having more gaming and violent media experience (how often are games played $p \leq .001$; how often are violent games played, $p = .001$), positive attitudes towards video games (enjoy violent video games more than non-violent games, $p = .003$; prefer games that represent conflict/war, $p \leq .001$) and the violent clip and game (clip and game exciting, $p = .005$) females were more physiologically aroused after both non-violent and violent play but did not have significantly more Presence. After violent
play both groups and genders decreased their support for violence after violent game play thus opposing the prediction. Statistically significant results are needed to verify this trend.

The second prediction was that any effects would return to baseline by 24 hours after play. This is inconclusive because the support for violence in both genders and groups returned almost exactly to what they were at the beginning of the study. However, violent cognition was found to be lower 24 hours and 4 days after game play by both groups. These changes were neither large, nor significant, and so no certain support can be given by them. The results loosely suggest that while opinions and attitudes acquired through game play may be short term, the cognition and behaviour acquired has a longer persistence. This opposes the prediction. The results can thus be held as inconclusive.

The third prediction that the embodied group would have stronger support for violence, and that this would extend into their decision making was not supported. The embodied group experienced higher physiological arousal but had very similar Presence results to the conventional group: Spatial Presence (embodied group = 3.05 ± 0.12, conventional group = 2.66 ± 0.12), Engagement (embodied group = 3.41 ± 0.10, conventional group = 3.20 ± 0.10), Naturalness (embodied group = 2.93 ± 0.13, conventional group = 2.57 ± 0.13) and Negative Effects (embodied group = 2.34 ± 0.12), conventional group = 2.24 ± 0.12). Also, the INVAQ scores between groups were practically equal. The prediction was opposed by there being a decrease in support for violence after violent game play. Furthermore, the embodied group had less hostile cognition after violent play. These findings directly oppose the third prediction.

These findings were, however, not statistically significant and so cannot be held as conclusive. Further study is required to verify the trends observed.

**Limitations and further study**

A hindrance is that it was not possible to get participants that would have equal allocations as a baseline in the behavioural measure. Also, participants may have discovered that that the behavioural measure was a manipulation. Further limitations include not comparing Presence experienced after violent game play with that experienced after non-violent play. The lack of an equivalent non-violent game on both consoles is also a possible limitation of the study. It
must also be stated that Manhunt 2 has a 3rd person view. A 1st person shooter may have been better bearing in mind Scheumie et al’s (2001) conclusion that 1st person perspective in a game is more effective in producing Presence than a third person perspective. This can be done in a future study. Also, the study comprised of university students. Testing a markedly aggressive group or a child sample would be another way to further this study. Also, controlling for prior exposure to real-life and virtual violence exposure would be prudent. Studies exploring the links between players’ motivation for play and after-effects of play are paramount in this field. Now that both sexes have been tested, an avenue for future testing would be to have single sex samples. Similarly, finding games wherein players could pick a same sex character would also help further the study. Furthermore, due to participants having noted a preference for playing against another individual, investigation of the after-effects of online play would be prudent.

**Conclusion**

Therefore, the first prediction that violent play will increase support for violence was not supported. It was found that support for violence and hostile decision making decreased after violent video game play, and that this effect began to dissipate as early as 24 hours after game play. However, the effects on hostile decision making went past mere normalizing, and actually increased past what they were at the original baseline after 24 hours. Despite this, upon frustration, both groups moved towards social spending. The prediction of effects dissipating after 24 hours is thus not well supported. Also, embodied controls were not found to have a greater effect on support for violence. The central tenet that video games can affect players’ attitudes, opinions, cognition and behaviour post play and that this will be especially true in games wherein an in-game character mimics the physical actions of the player is thus not supported.
GENERAL DISCUSSION

Context

South Africa having a high crime rate, as previously mentioned, may have led to the participants having more support for violence and hostile decision making in general due to frustration/fear regarding the crime rate. Also, some participants that watch the news would have experienced more violent media whether they enjoyed it or not. This emphasizes the importance of context in studies. In light of this context, the findings of all 3 studies will be discussed.

Experience

In all 3 studies males had more computer experience, enjoyed violent media more and thus had more experience with it as per Krahé and Möller (2004). It was therefore expected that males would experience more Presence (Nowak, Krcmar and Farrar, 2006). Following from this, it was expected that males would feel more emotion, particularly positive emotion during the experience (Lessiter et al., 2001). It was also found that males tended to use video games to escape reality more than females. Motivation for game play is an area that should be explored in future studies as it may shed light on who may be adversely affected by violent media. Markey & Scherer (2009) suggest that certain pre-existing dispositions may affect who is adversely affected by violent game play. As yet, there is no clear answer, but it would appear that argumentativeness is related to using video games to escape reality. This lends support to the claim that gaming is sometimes used as a coping mechanism by males (Olson et al., 2007). This can be linked to the meaning players attach to play and the emotions they experience during play.

Presence and emotion

The males in Study 1 had more Presence, especially Engagement. That is to say that they had more emotional involvement with the content. This is consistent with the findings of both Krahé and Möller (2004), and Nowak, Krcmar and Farrar (2006). The violent group was also seen to engage more with the gaming content as in Nowak, Krcmar, & Farrar (2006). However, a positive correlation was found between negative emotions and Engagement,
especially in females. Due to a lack of gaming experience, the females had a high in-game mortality rate. As such, it can be stated that a part of the negative emotions they were experiencing was caused by a feeling of poor performance, but that another part of it was caused by them identifying with the negative experiences of the in-game character (Oatley, 2004).

Unexpectedly, in Study 3 there were virtually no differences in Presence between the sexes. Considering the differences in gaming experience, this goes against Nowak, Krcmar and Farrar’s (2006) claim that more gaming experience increases Presence. Also, despite males being more excited by the violent game, they did not experience more Presence. Females on the other hand, experienced more arousal but were not more present than males. This warrants further investigation into the links between arousal, emotions and Presence.

In terms of Presence between conditions, Study 1 showed the violent group having higher Engagement with the game content. Conversely, Study 2 showed no real differences in Presence between the groups. In Study 2 the violent group was disturbed by the clip, but were still drawn into it and found it realistic. It is possible that both groups may have experienced more Presence if the clips had been contextualized. This is in light of Schneider, Lang, Shin, and Bradley’s (2004) statement that greater immersion and identification occurs when violence is contextualized by a story. As such, it makes sense that Study 1’s violent group had greater engagement since priming material was provided before game play, but that Study 2 showed no group differences.

Presence data was not collected after non-violent game play in Study 3. The main difference explored was Presence between groups (embodied controls versus conventional controls). In contrast to the findings of Skalski, Lange, & Tamborini (2006) and IJsselsteijn et al. (2000), the embodied group did not experience more Presence.

**Support for violence**

Study 1 corroborates Huesmann’s (2007) findings that violent game play, and exposure to violent media can increase support for violence. The violent group showed higher support for violence. Furthermore, being male and frequent game play linked with playing violent video games as per Olson et al. (2007). This in turn links to violent video game play activating
“pre-existing violence schemata that they had previously acquired through frequent game playing” (Polman and Orobio de Castro, 2006 in Polman, Orobio de Castro, & van Aken, 2008). Study 2 found no effect, and thus opposes Huesmann (2007).

Study 3 also contradicts Huesmann (2007) in that support for violence decreased in participants in both groups and sexes after violent game play. As such, though males may have had pre-existing violence schemata from their previous gaming experience, these seemed to not be activated by violent game play. This contrasts Polman, Orobio de Castro, & van Aken (2008) and points to the possibility that initiative response patterns will not be generalized to new settings once game play is over/the model is absent as presented in Social Learning Theory (Bandura, Ross & Ross, 1961; Silven & Williamson, 1987). In terms of the embodied group, this means that embodied controls did not negatively impact on individuals more than traditional controls, they in fact positively affected them. This quells the theoretical concern on this point raised in Markey and Scherer (2009). It was shown that in adults the effects of violent video on support for violence are potentially short term (Bushman, 2006). Conclusive results are needed to verify this possibility. The conflicting results do point to there being other factors involved in the effects of video games on players. However, statistically significant results are needed to verify these findings. The results also showed that the effects of violent media on decision making (the other main measure of the thesis) need further investigation.

Effects on decision making

Studies 2 and 3 also involved investigating the effects of violent media on decision making in the face of perceived or actual threats using a rigged strategy game. Study 2 found that the violent group made marginally more hostile decisions, i.e. behaved more hostile. This is consistent with Huesmann (2007). After non-violent play in Study 3 the embodied group had more hostile decision making. However, after violent play the conventional group was more hostile when frustrated. The conventional group had more hostile allocations for the majority of the remainder of the study. This further lends support to the idea that embodied violence in games may decrease support for violence and possibly hostility, but this is speculative due to the lack of significant results. If true though, this corroborates Weaver and Wilson’s (2009) adage violent acts in violent media are not enjoyed in themselves, but it is the thrills or effects in their context that make the experience enjoyable. They further state that evolutionary
consequences of aggression may cause most people to shy away from hostility where possible, even when frustrated. However, both groups had higher military allocations as a baseline in sessions 2 and 3, but tended more towards social spending when frustrated, especially in Session 2. This suggests that while frustration decreased hostile decision making in the embodied group, both groups were more hostile as a baseline. This both supports and opposes the proposition that violent game play increases hostility in players (Bushman, 2002). As such, further study is needed into the effects of embodied controls on hostility. Equally interesting results were found between the sexes.

The inter sex data of Study 2 was lost and so it cannot be discussed, but Study 3 presented interesting inter sex data. Females had more hostile allocations after non-violent play. From there, males had more hostile allocations with exception of the baseline turn of Session 3 wherein females had their most hostile allocation in the study. It is possible that males were executing the measure in line with the norms of most games they play, and so tended to end up more hostile in the presence of perceived or actual threats. This is consistent with Clarke and Duimering (2006) in that more experienced gamers (mostly males) would act according to perceived goal attainment that they experience in games while executing the measure. However, the differences were tiny and so while interesting, the findings are not definitive.

**Limitations and further study**

The lack of statistically significant results demands further study to verify the trends observed seen in these studies. Considering the trends found, further study is prudent. Also, the samples in all 3 studies were university students. Using a younger sample would help clarify any differences between adults and children in terms of short and long term after-effects of game play. Additionally, using a purely aggressive or docile sample would also illuminate the links between aggressive behaviour and violent media reception. It must be noted that while the behavioural measure sought to examine hostile decision making, this does not necessarily mean that the same decisions will be made in real life situations. As such, examinations of real life hostile decisions after violent game play should be investigated. Exploring the differences in presence and enjoyment between non-violent and violent games using embodied controls would also be forthcoming. Furthermore, exploration into character identification using embodied controls would provide clarity in video game studies.
Conclusions

Therefore, the results are inconclusive on whether violent video game play increases a player’s support for violence. While an increase was found with a small male sample, no further differences were found in the latter studies. However, the after-effects of violent game play appear to be short term in adults. Also, embodied controls were not found to increase the effects of violent gaming. Unfortunately, most of the results were not statistically significant, and the majority of the differences between groups and/or sexes were small. These conclusions suggest that further study is needed to verify the findings.
CONCLUSION

Evaluation of evidence for central hypothesis

Support for the hypothesis that that video games can affect players’ attitudes and opinions post play and that this will be especially true in games wherein an in-game character mimics the actions of the player was only found in Study 1. Study 1 showed that some players’ support for violence, and hence their attitudes and opinions are affected by the instance of violence in a game. Violence in a game increased support for violence particularly in males in a South African sample. Study 2 showed no attitudinal differences between the violent and non-violent groups. However, violence in the clip fostered marginally more hostile decision making in the presence of a perceived or actual threat. Study 3 did not support the hypothesis in that support for violence and hostile decision making were affected by the instance of violence in the games played, and they were reduced by the use of the embodied controls, but all differences were marginal and non-significant. Therefore, it cannot be said with any surety that the players’ attitudes and opinions were more affected after game play when their actions were mimicked by the in-game character.

Conclusion

Therefore, the main hypothesis has not been well supported, and the lack of statistically significant results means the results must be held as inconclusive. Despite this, the trends in decision making show that embodied controls reduce hostile cognition in the face of frustration and this suggests that violent games on embodied consoles like the Nintendo Wii can be helpful, and should thus not be condemned by the greater public without investigation. Further study is needed to ascertain on which people video game violence can be harmful so that the relationships between anti-social behaviour and video games as well as pro-social behaviour and video games can be clarified. This will enable the gaming industry to return video games to their initial purpose: harmless entertainment.

To further this study, the use of a sample with a history of physical violence would be warranted. This would address the issue of personality factors mediating the effects of video game play. Additionally, running studies on only casual or frequent gamers would help reveal
any differences in effects on the 2 groups. These potential differences are important in terms of what games should be widely released. Also, while the young adults of today are the target market of most violent video games, younger children still manage to gain access to such games. Therefore, an expansion of this study would be to investigate the central hypothesis is children. Lastly, conducting a longitudinal study on the effects of violent video game play on both novices and experienced players would illuminate how short term the effects actually are. This can be done in both adults and children. Currently, in the context of this study, however, it is still uncertain if video games can affect players’ attitudes, opinions, cognition and behaviour post play and if this would be especially true in games wherein an in-game character mimics the physical actions of the player.
REFERENCES


APPENDIX A: Violent condition priming material

I joined the Army just after 9/11. I had heard about terrorism, seen it in the movies, how some dictator in Africa or the middle east somewhere would train fanatics to kill innocent people. I don’t really understand why they are doing it – probably because they envy our freedom and our way of life – but I decided that day to stop talking about it and get involved.

Army life was hard. I was good at it, so I was promoted to corporal quickly. As soon as I could, I volunteered to go to Afghanistan for a year, and I saw combat there. Those poor people, living basically in mud huts, were being oppressed by the Taliban. We sorted them out. Now they have a primitive democracy and some of the freedoms we have. That year made me realize I could help people all over the world gain their freedom. I volunteered for Iraq.

Iraq is different. Unlike Afghanistan, these people don’t know how to appreciate our help. Women and children will hide insurgents and smuggle weapons. It is extremely dangerous to even walk down the street. The Afghans are good people, but the Iraqis don’t seem to realize that we are trying to give them a better life. Good thing for them, we know better - we will create a free and democratic Iraq even if we have to stay here 50 years. We will crush the insurgency, one suicide bomber at a time.
APPENDIX B: Non-violent priming material

I joined the Royal Dutch Army when I finished school in Amsterdam. It was during the Bosnian war, and the Dutch army was doing a lot of peacekeeping – making sure people had food and medicine, protecting international observers. I thought that this was a way I could really make a difference, to make the world a better place.

We trained in various parts of Europe – we got to meet people of different countries, learn languages, and how to interact with people without imposing our culture on theirs. We also learnt how to deal with weapons, of course, but we have been trained to only use violence as a last resort. Our mission is to ensure peace and the rule of international law, not to invade other countries.

For the last few months, we have been deployed in Iraq – the Iraqi resistance want to appeal to the UN to help end the war, so they have been letting us inspect their bases and installations so that they can present an independent audit of their forces to the security council. It is important work, but very tense. We generally do not carry weapons, and both the Iraqis and Americans are skeptical about us. But ultimately, peaceful negotiations are the only way this war is going to end, so we will keep doing this as long as we have to.
APPENDIX C: Violent mission briefing

TOP SECRET

Your mission is to retrieve a laptop that contains the enemy’s plans for a new offensive in our area. It is extremely important that you succeed – the enemy’s strength in the area is such that we cannot oppose them without these plans.

The laptop is located somewhere inside a small valley where the enemy has set a small camp near to a petroleum refinery. Enemy resistance will be high. Follow the waypoints on your GPS, and search each building for the items.

You will be dropped off in a ruined village at the South end of the valley. At the North end of the valley (past the refinery) a helicopter will be waiting to pick you up once you have completed your mission. Good Luck.
APPENDIX D: Non-violent mission briefing

TOP SECRET

Your mission is to audit the number of vehicles and communications equipment fielded by one of the groups in this conflict. We need to have an exact count of the strength of this group, so that we can set up a peace proposal for the area. The forces in the area will be aware of your mission, and will not interfere with your work.

You are to mark all vehicles and helicopters (whether in working order or destroyed) as well as communications equipment by marking them with a smoke grenade. If the equipment is inside a building, drop the smoke grenade outside the building. Follow the waypoints in your GPS to guide you through the camps in the valley.

You will be dropped off in a ruined village at the South end of the valley. At the North end of the valley (past the refinery) a helicopter will be waiting to pick you up once you have completed your mission. Good Luck
APPENDIX E: The Individual and National Violence Attitude Questionnaire (INVAQ)

E.1 Overview
This is a 20 item scale measuring support for individual and national violence. Questions are answered on a 7 point scale (1 = Strongly disagree, 7 = Strongly agree). The questionnaire had a Cronbach’s alpha of 0.860.

E.2 Presentation
The INVAQ was presented electronically. Subjects were presented with the statement and 7 check boxes for a response. They then clicked on the “Next” tab to proceed to the next statement, and could not return to previous questions once they moved on. The order of the questions was the same for all participants.

E.3 Items
1. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence before you were possibly attacked.
2. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence if attacked to protect yourself.
3. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence as retaliation if the attacker was seen at a later stage after having attacked you.
4. It is right to use violence to protect others who cannot protect themselves.
5. It is right to use violence to protect others who can protect themselves but do not.
6. It is right to use violence to protect your property.
7. It is right to use violence in the name of your country.
8. It is right to use violence in the name of your religion.
9. It is right to use violence to calm your anger.
10. It is right to use violence to promote obedience.
11. It is right to use violence to gain or preserve your freedom.
12. It is right to use violence as part of tradition in the form of rituals or initiation
13. It is right to use violence to gain information that could save a life or lives.
14. It is right to use violence in the advancement of mankind in the form of experimentation.
15. It is right to use violence to secure resources.
16. It is right to use violence to get a point across.
17. It is right to use violence for fun.
18. It is right to use violence to solve national disputes.
19. It is right to use violence against yourself.
20. There are instances where the use of violence is justified.

Overview

This is the second edition of Izard’s differential emotions scale, the DES-II (Izard, 1991). This scale contains 30 items, each either a word or phrase describing an emotion; subjects are asked to rate the degree to which they felt that emotion during the experience on a seven point scale (1 = Not at all, 7 = Very much). The Izard DES-II has been recently validated and psychometrically evaluated for research use (Fuenzalida et al., 2005).

Presentation

The DES-II was presented electronically. Subjects were shown the instruction “During your experience in the displayed environment, did you feel...” underneath which appeared the item, and under that seven checkboxes for response. Subjects chose when to see the next item (by clicking a “next” button), but could not go back to previously completed items. The order of item presentation was randomized for each subject.

Items

The following 30 items comprise the DES-II. The 19 highlighted items represent those used in the study following the factor analysis (those with a factor loading higher than 0.7). Green items formed the positive factor, red items for the negative factor.

- Alert
- Sheepish
- Afraid

- A feeling of distaste
- Joyful
- Mad

- Blameworthy
- Delighted
- Attentive

- Enraged
- Downhearted
- Scared

- Guilty
- Angry
- A feeling of revulsion

- Disgusted
- Surprise
- Bashful

- Disdainful
- Astonished
- Contemptuous

- Happy
- Discouraged
- Sad

- You were concentrating
- Shy
- Scornful

- Fearful
- Amazed
- Repentant
APPENDIX G: The Independent Television Commission’s Sense of Presence Inventory (ITC-SOPI)

G.1 Overview

This instrument is a cross-media measure which has been thoroughly evaluated in terms of validity and reliability (Lessiter et al., 2001). The scale was developed by factor-analyzing 63 Likert-type items created from a review of the literature, which led to four factors (in decreasing eigenvalue order):

1. **Sense of physical space (spatial presence):** The degree to which the subject has a sense of being in the space of the VE, and that the objects and characters in the VE occupy the space as the subject.

2. **Engagement:** A sense of psychological involvement with and enjoyment of the VE content.

3. **Naturalness (Ecological validity):** The sense that the VE and its content are lifelike or realistic.

4. **Negative effects:** Measures negative physiological effects (such as dizziness and eyestrain) – this factor is negatively correlated with the other three factors.

The final form of the scale retained only 44 of the original 63 items over the four factors (physical space: 19 items; engagement: 13 items; naturalness: 5 items; negative effects: 6 items). The four factors are conceptually independent, so that a single presence value cannot be produced by the scale – rather, each measure produces four independent values which are supposed to measure separate aspects of the experience (although in practice the first three factors often correlate significantly with each other (Lessiter et al., 2001; Nunez & Blake, 2006). Further details of this scale can be found in section 2.4.1.4 in Chapter 2.

G.2 Presentation of items

In all studies reported, the items were presented in the order given by Lessiter et al. (2001), namely: a1, a2, a3, a4, a5, a6, b1, b2, b3, b4, b5, b7, b8, b9, b10, b11, b12, b13, b14, b15, b16, b17, b18, b19, b20, b21, b22, b24, b25, b26, b27, b28, b29, b30, b31, b32, b33, b34, b35, b36, b37, b38.

All items were presented with a seven point Likert response scale, anchored by “Strongly disagree” on the left (scoring 1) and “Strongly agree” on the right (scoring 7), as suggested by Lessiter et al. (2001).
### G.3 Items in each factor

**Sense of physical space (spatial presence)**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>b12</td>
<td>I felt I wasn’t <em>just</em> watching something.</td>
</tr>
<tr>
<td>b13</td>
<td>I had the sensation that I moved in response to parts of the displayed environment</td>
</tr>
<tr>
<td>b18</td>
<td>I had a sense of being in the scenes displayed.</td>
</tr>
<tr>
<td>b19</td>
<td>I felt that I could move objects (in the displayed environment).</td>
</tr>
<tr>
<td>b22</td>
<td>I could almost smell different features of the displayed environment.</td>
</tr>
<tr>
<td>b24</td>
<td>I had a strong sense of sounds coming from different directions within the displayed environment.</td>
</tr>
<tr>
<td>b25</td>
<td>I felt surrounded by the displayed environment</td>
</tr>
<tr>
<td>b28</td>
<td>I felt I could have reached out and touched things (in the displayed environment)</td>
</tr>
<tr>
<td>b29</td>
<td>I sensed that the temperature changed to match the scenes in the displayed environment.</td>
</tr>
<tr>
<td>b31</td>
<td>I felt that <em>all</em> my senses were stimulated at the same time.</td>
</tr>
<tr>
<td>b33</td>
<td>I felt able to change the course of events in the displayed environment.</td>
</tr>
<tr>
<td>b34</td>
<td>I felt as though I was in the same space as the characters and/or objects.</td>
</tr>
<tr>
<td>b35</td>
<td>I had the sensation that parts of the displayed environment (e.g. characters or objects) were responding to me.</td>
</tr>
<tr>
<td>b36</td>
<td>It felt realistic to move things in the displayed environment.</td>
</tr>
<tr>
<td>b38</td>
<td>I felt as though I was participating in the displayed environment.</td>
</tr>
<tr>
<td>b4</td>
<td>I felt I could interact with the displayed environment.</td>
</tr>
<tr>
<td>b7</td>
<td>I felt that the characters and/or objects could almost touch me.</td>
</tr>
</tbody>
</table>
## Engagement

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>a1</td>
<td>I felt sad that my experience was over</td>
</tr>
<tr>
<td>a3</td>
<td>I had a sense that I had returned from a journey</td>
</tr>
<tr>
<td>a4</td>
<td>I would have liked the experience to continue</td>
</tr>
<tr>
<td>a5</td>
<td>I vividly remember some parts of the experience</td>
</tr>
<tr>
<td>a6</td>
<td>I’d recommend the experience to my friends.</td>
</tr>
<tr>
<td>b1</td>
<td>I felt myself being ‘drawn in’.</td>
</tr>
<tr>
<td>b16</td>
<td>My experience was intense.</td>
</tr>
<tr>
<td>b17</td>
<td>I paid more attention to the displayed environment than I did to my own thoughts (e.g., personal preoccupations, daydreams etc.).</td>
</tr>
<tr>
<td>b2</td>
<td>I felt involved (in the displayed environment).</td>
</tr>
<tr>
<td>b3</td>
<td>I lost track of time.</td>
</tr>
<tr>
<td>b30</td>
<td>I responded emotionally</td>
</tr>
<tr>
<td>b32</td>
<td>The content appealed to me.</td>
</tr>
<tr>
<td>b8</td>
<td>I enjoyed myself.</td>
</tr>
</tbody>
</table>

## Naturalness (Ecological Validity)

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>b11</td>
<td>The content seemed believable to me.</td>
</tr>
<tr>
<td>b15</td>
<td>I felt that the displayed environment was part of the real world.</td>
</tr>
<tr>
<td>b20</td>
<td>The scenes depicted could really occur in the real world</td>
</tr>
<tr>
<td>b27</td>
<td>I had a strong sense that the characters and objects were solid.</td>
</tr>
<tr>
<td>b5</td>
<td>The displayed environment seemed natural.</td>
</tr>
</tbody>
</table>
Negative effects

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>a2</td>
<td>I felt disorientated</td>
</tr>
<tr>
<td>b10</td>
<td>I felt tired.</td>
</tr>
<tr>
<td>b14</td>
<td>I felt dizzy.</td>
</tr>
<tr>
<td>b21</td>
<td>I felt I had eyestrain.</td>
</tr>
<tr>
<td>b26</td>
<td>I felt nauseous.</td>
</tr>
<tr>
<td>b37</td>
<td>I felt I had a headache.</td>
</tr>
</tbody>
</table>
Appendix H: Computer Experience Questionnaire

H.1 Overview
This questionnaire was developed by my co-supervisor, David Nunez (DPhil) and was used in all 3 studies. 15 items were presented to the participants in order to assess their level of computer and gaming experience. Their television viewing habits were also investigated.

H.2 Presentation
The questionnaire was presented electronically. Subjects were presented with the question and between 3 and 6 check boxes for a response. They then clicked on the “Next” tab to proceed to the next question, and could not return to previous questions once they moved on. The order of the questions was the same for all participants.

H.3 Items
1. Rate your level of computer experience
   None
   Basic
   Intermediate
   Expert

2. Rate your average WEEKLY TV viewing
   0-8 hours
   9-16 hours
   17-24 hours
   25-32 hours
   33-40 hours
   41 hours or more
3. What is the TV size you watch the most?
   Small/portable (14" or less)
   Medium (15"-28")
   Large (more than 28")

4. Rate your average WEEKLY computer and video game playing
   0-8 hours
   9-16 hours
   17-24 hours
   25-32 hours
   33-40 hours
   41 hours or more

5. How would you rate your knowledge of how 3D images are produced
   None
   Basic
   Intermediate
   Expert

6. Rate how often you play computer or video games
   Never
   Occasionally (once/twice a month)
   Often but less than 50% of days
   50% of days or more
   Every day

7. Rate how often you play violent computer or video games
   Never
   Occasionally (once/twice a month)
   Often but less than 50% of days
   50% of days or more
   Every day
8. How would you rate your level of TV/Film production knowledge?
   - None
   - Basic
   - Intermediate
   - Expert

9. Rate how often you watch violent television programs or films
   - Never
   - Occasionally (once/twice a month)
   - Often but less than 50% of days
   - 50% of days or more
   - Every day

10. How would you rate your level of how virtual reality works?
    - None
    - Basic
    - Intermediate
    - Expert

11. Rate how much you enjoy violent television programs or films
    - I dislike them intensely
    - I dislike them
    - I am neutral about them
    - I like them
    - I like them intensely

12. Rate how much you enjoy violent computer or video games
    - I dislike them intensely
    - I dislike them
    - I am neutral about them
    - I like them
    - I like them intensely
13. How often do you watch the news on television?
   Never
   Occasionally (once/twice a month)
   Often but less than 50% of days
   50% of days or more
   Every day

14. How often do you read newspapers or news magazines?
   Never
   Occasionally (once/twice a month)
   Often but less than 50% of days
   50% of days or more
   Every day

15. How often do you read news on the internet?
   Never
   Occasionally (once/twice a month)
   Often but less than 50% of days
   50% of days or more
   Every day
APPENDIX I: Behavioural Measure Screenshots

**SUMMARY: LAST YEAR**

**DEFENSE ADVISOR**
Welcome to the President’s office Sir. I am your military and security advisor, and I will give you briefings at the end of each year, summarising our military and police strength, as well as any major events that occurred.

**WELFARE ADVISOR**
Congratulations on winning the election. My job is to give you updates each December about how the year went for us, in terms of the economy, social developments, and the population in general.

**INTELLIGENCE REPORTS**

**JOINT INTELLIGENCE ASSESSMENT**

These reports represent the views of the Director of Intelligence and Information. They are intended to give you an overview of the world by major intelligence agencies. They provide a summary of the security situation, economic trends, and political developments.

- **Security**: Current threats and emerging issues.
- **Economy**: Global economic trends and impact on our country.
- **Politics**: Major political developments and stability.

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- **Security**: Current threats and emerging issues.
- **Economy**: Global economic trends and impact on our country.
- **Politics**: Major political developments and stability.
BUDGET ALLOCATION

Available tax funds for this year: US$586 million

Defense and security: US$250 million
Welfare and social projects: US$336 million

CLICK AND DRAG ON THE BAR ABOVE TO SELECT DIVISION OF Tax FUNDS

END TURN

PROCESSING TURN...
APPENDIX J: Behavioural Measure Alternate Version Screenshots

PREVIOUS YEAR'S SUMMARY

Development Minister

Congratulations on winning the election. My job is to give you updates each December about how the year went for us, in terms of the economy, social developments, and the population in general.

Head of Defense

Welcome to the President’s office. I am your military and security advisor, and I will give you briefings at the end of each year, summarizing our military and police strength, as well as any major events that occurred.

REPORTS - INTELLIGENCE

JOINT INTELLIGENCE ASSESSMENT
Office of Intelligence and Information

These reports are a summary by major world intelligence agencies. They represent security and economic experts' best predictions of what the year ahead will hold. They should be used to base policy decisions, such as distribution of government funds. For the coming year, the economy is predicted to be stable, and although several terrorist groups are known to target your country’s assets, no specific threats are expected.
BUDGET DISTRIBUTION

Available tax funds for this year: US$586 million

Social care and development: US$265 million

Police and national security: US$321 million

Click and drag to see the bar above double click to allocate tax modes

THINKING...
APPENDIX K: The Individual and National Violence Attitude Questionnaire (INVAQ) (As used in Studies 2 and 3)

K.1 Overview
This is a 27 item scale measuring support for individual and national violence. Questions are answered on a 7 point scale (1 = Strongly disagree, 7 = Strongly agree). The questionnaire had a Cronbach’s alpha of 0.905, split half relation of 0.899, and a Guttman split half relation of 0.896.

K.2 Presentation
The INVAQ was presented electronically. Subjects were presented with the statement and 7 check boxes for a response. They then clicked on the “Next” tab to proceed to the next statement, and could not return to previous questions once they moved on. The order of the questions was the same for all participants: 18, 2, 21, 8, 17, 3, 12, 16, 22, 23, 13, 4, 6, 14, 24, 7, 9, 11, 19, 1, 10, 25, 20, 26, 27, 15, 5.

K.3 Items
1. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence before you were possibly attacked.
2. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence if attacked to protect yourself.
3. While walking alone at night, notice someone suspicious walking behind you. It would be right to use violence as retaliation if the attacker was seen at a later stage after having attacked you.
4. It is right to use violence to protect others who cannot protect themselves.
5. It is right to use violence to protect others who can protect themselves but do not.
6. It is right to use violence to protect your property.
7. It is right to use violence in the name of your country.
8. It is right to use violence in the name of your religion.
9. It is right to use violence to calm your anger.
10. It is right to use violence to promote obedience.
11. It is right to use violence to gain or preserve your freedom.
12. It is right to use violence as part of tradition in the form of rituals or initiation.
13. It is right to use violence to gain information that could save a life or lives.
14. It is right to use violence in the advancement of mankind in the form of experimentation.
15. It is right to use violence to secure resources.
16. It is right to use violence to get a point across.
17. It is right to use violence for fun.
18. It is right to use violence to solve national disputes.
19. It is right to use violence against yourself.
20. There are instances where the use of violence is justified.
21. Violence against an enemy should be part of defence.
22. Any nation should be ready with a strong military at all times.
23. Killing of civilians should be accepted as an unavoidable part of war.
24. Universities should use armed police against students who destroy university property.
25. Every nation should have a war industry.
26. Our country has the right to protect its borders forcefully.
27. War is often necessary.
Appendix L: Activity and Argumentativeness Questionnaire

L.1 Overview
The questionnaire consists of 11 items. 4 questions were posed to participants concerning how often they exercise and what types of exercise they engage in. The amount of physical and aggressive physical contact within the exercise was also rated. Participants further rated the frequency of arguments, and physical fights they participate in during a month. Dichotomous items were used when investigating if the participant is usually the cause of the arguments.

L.2 Presentation
The questionnaire was presented electronically. Subjects were presented with the question and between 2 and 5 check boxes for a response. They then clicked on the “Next” tab to proceed to the next question, and could not return to previous questions once they moved on. The order of the questions was the same for all participants.

L.3 Items
1. How often do you exercise in a week?
   - Not at all
   - Once-twice
   - 3-4 times
   - 5-7 times

2. What type of exercise is it?
   - Martial arts
   - Contact sport
   - Non-contact sport
   - Non-sport activity
3. How much physical contact with other people is there in the activity?
   None
   A little
   A moderate amount
   A lot

4. How much aggressive contact is there in the activity?
   None
   A little
   A moderate amount
   A lot

5. How often are you in arguments in a month?
   Never
   Few
   Moderate
   Weekly
   Daily

6. How often are you in physical fights in a month?
   Never
   Few
   Moderate
   Weekly
   Daily

7. Do you tell your friends openly when you disagree with them?
   Yes
   No

8. Do you often find yourself disagreeing with people?
   Yes
   No
9. When people annoy you, do you tell them what you think of them?
   Yes
   No

10. When people disagree with you do you find yourself getting into arguments easily?
    Yes
    No

11. Do your friends say that you are somewhat argumentative?
    Yes
    No
Appendix M: Video Game Attitude Questionnaire (VGA)

M.1 Overview
This is a 7 item scale investigating a participant’s attitudes toward video game play. Questions are answered on a 5 point scale (1 = Strongly disagree, 5 = Strongly agree).

M.2 Presentation
The VGA was presented electronically. Subjects were presented with the statement and 5 check boxes for a response. They then clicked on the “Next” tab to proceed to the next statement, and could not return to previous questions once they moved on. The order of the questions was the same for all participants.

M.3 Items
1. Video games help me escape from reality
2. Violent video games are more fun than non-violent video games
3. I prefer video games that represent conflict
4. Video games are fun
5. I prefer to video games against another person rather than against the computer
6. Video games are a waste of time
7. I prefer video games which require thought rather than reflexes
Appendix N: Video clip assessment

N.1 Overview
11 questions are posed to participants regarding the video clip viewed. It aims to investigate their attitudes towards the clip viewed. Questions are answered on a 5 point scale (1 = Strongly disagree, 5 = Strongly agree).

N.2 Presentation
The questionnaire was presented electronically. Subjects were presented with the statement and 5 check boxes for a response. They then clicked on the “Next” tab to proceed to the next statement, and could not return to previous questions once they moved on. The order of the questions was the same for all participants.

N.3 Items
1. The clip I watched is best suited to a drama
2. The clip evoked some emotion in me
3. The clip is best suited to an action movie
4. I found the content of the clip violent
5. I found the clip exciting
6. The content is something I am used to seeing on television
7. The clip was explicit
8. There was nothing special in the clip
9. The clip was gory
10. I found the clip disturbing
11. I enjoyed the clip