WIN OR LOSE: A STUDY ON THE EFFECTS OF VIDEO GAME VIOLENCE

Tamirat Abegaz, University of North Georgia

Cindi Smatt, University of North Georgia

Richelle Oakley, University of North Georgia

Matthew Freeman, University of North Georgia

ABSTRACT

As more types of media and software are being developed and introduced to the world, people begin to question how or if these media can affect humans and their behaviors. Since the 1970s, there have been many controversies surrounding a certain type of software – video games. From games being pulled off shelves due to public outrage to lawsuits being filed, video games have been the subject of blame for a few atrocities committed over the past twenty or so years. Several studies indicated that video games, whether violent or not, influence the behavior of individuals interacting with the artifacts. However, extant research found that video games did not trigger significant negative behaviors. This study aims to assess if there is a significant relationship between watching simulated violence in the form of video games and a negative emotional state. We examined the impact of watching short video clips of video game play by administering the Self-Assessment Manikin (SAM) on human subjects to gauge their emotional state, ranging from negative to positive emotional state. The games were chosen based on several criteria suggested by the Entertainment Software Rating Board (ESRB), which governs the content ratings in a game and assigns an age requirement for purchase and use. The results indicated that there is no huge deviation in emotional state from viewing one game to another. However, some subjects showed a very slight adverse reaction of feeling uncomfortable to viewing the more violent video game play.

Keywords: Emotional state, Media violence, Video games, Video game violence, SAM, ESRB

INTRODUCTION

Over the last twenty years, there has been an exponential increase in the number of devices and types of media available for entertainment use (Almeida, Lima, Pereira, & Silva, 2018; Xavier, Pitangui, Silva, Oliveira, Beltrão, & Araújo, 2015). From cell phones, which are used multiple times a day, to television and video games, people are constantly exposed to a variety of media and software. The effects of this type of non-stop digital interaction on humans has begun to be explored by researchers (Boyd, 2014; Boyd and Ellison, 2010). However, in many cases, the studies have focused on television or social media rather than other media types. More recently, there has been an interest to examine video game software, specifically whether ot not it has the potential to change a person's mood, behavior, or actions. This interest is typically sparked when either a game is released that has questionable material for minors (such as most of the Grand

Theft Auto entries) or if a tragic event took place where the perpetrator was shown to have played violent video games.

A prime example refers to the 1999 Columbine High School massacre, where media outlets discussed that violent video games may have had an impact on the perpetrators (Giumetti and Markey, 2007). While the motivations were never quite clear, the media focused on the fact that the two students loved a certain video game – Doom. Doom is a first-person shooter video game where the main protagonist's goal is primarily shooting demons from Hell. The two perpetrators often discussed the game and even compared the other students of the school to the demons in the game. The game also gives users the ability to create levels, and it was rumored that the two perpetrators had created a level where they re-created the school layout in order to practice. However, none of the game levels examined by the police indicated those rumors to be true. Parents of some of the students attempted to sue the video game makers, but these efforts were all unsuccessful. Four years later in 2003, another murder took place by a 16-year old (Wilson & McGill, 2018; Radford, 2002) who attempted to blame a popular video game – Grand Theft Auto III. During court, the perpetrator pled insanity due to being obsessed with the video game. Eventually, the perpetrator withdrew his insanity defense and was convicted of murder. These are only a couple events where video games were pushed into the spotlight for horrific events that took place. This brings to light the concept that there may be a connection between one's emotional state before and after viewing violent video games. As such, this study explores whether the level of violence in a video game affects the emotional states of those viewing the video game play. Thus, the research question is "Do violent video games induce negative emotions?"

The remainder of this paper is organized as follows. In the background section, we provide related works relevant to this research. The approach section discusses the research framework and the methodology used to examine the impact of violent video game play on participant emotional states. We conclude the paper by presenting the experimental results and providing a conclusion and future research directions.

BACKGROUND

A number of studies indicated environmental stimuli, such as vision, olfactory, gustatory, auditory, and vestibular, are known to influence individual emotional states, which in turn impact human behavior (Basch & Fisher, 1998; Lane Chua, & Dolan, 1999; Muramatsu & Hanoch, 2005; Dolan, 2002; Isen 2004; Carstensen et al., 2011). Whether it is positive or negative, various research has indicated that individuals' emotional state plays an important role in influencing how they behave and act (Weiss, & Cropanzano, 1996; Junça-Silva, et al., 2018; Bower, 2012; Core & Huntsinger, 2007). These studies also show that people's judgments generally influenced by their immediate emotional states at the time of decision-making. For instance, Clore & Huntsinger (2007) described that emotion influences the content and style of thought. In a similar study, Bower pointed out that the emotional state at a particular time could influence judgment through biased retrieval of related information from the memory (Bower, 2012). Video games are powerful and new area of research on their impact on human behavior.

Arguably, video games are one of the best technological tools ever created for that can be used for both entrainment and education purposes. Unfortunately, with the growing trend of violent acts

occurring throughout the world and especially our own country, there has been an increased desire to determine the cause. One of the most common explanations cited has been violence in media – from movies and television shows to video games. The latter has often been the media that is most blamed for the various atrocities committed over the past thirty years since it has an interactive element that the other types of media do not. It is interesting to note that while there have been several news articles or productions that put the spotlight on video games as the source of the increased aggression in gamers, research studies haven't reached to a definitive collusion as to whether video games triggers violence.

A number of studies indicated that video games whether violent or not play an important role in influencing the behavior of individuals interacting with the artifacts (Dominick, 1984; Fumhe & Naidoo, 2015; Welsh, 2016). For instance, Welsh as raised interesting questions about the impact of video games on violent including "*How could playing a digital game about killing be involved in killing? How does this virtuality participate in reality?"* (Welsh, 2016, p. 12)." Similarly, a study conducted by Fumhe and Naidoo in 2015 examined the implications of violent video games and their effect on player aggression (Fumhe & Naidoo, 2015). The study used the GAM (General Aggression Model) research model on 101 subjects in South Africa to determine the level of aggression shown by players and how it related to violent video games. Their study also investigated the relationship between excessive gaming, pathological gaming, and if the interactivity of the game such as improved graphics or controllers that resembled more realistic items such as guns affected aggressive behavior. Their findings somewhat supported two of their hypotheses in that excessive gaming can lead to pathological gaming, and that pathological gaming can lead to very slightly more aggressive tendencies. However, their third hypothesis that the increased interactivity of improved graphics or more realistic controllers was not supported. This is contrary to a study done by Kim et al, which indicated that using realistic controllers did increase player aggression and physical presence in the virtual environment (Kim et al., 2011).

Another study by Ashbarry colleagues explored the idea of blood and gore affecting the arousal level of gamers (Ashbarry et al, 2011). Their findings showed that subjects that were playing a game that had gore activated did not have higher levels of arousal than those who had gore turned off. While the study done by Robert and Brodbeck (2008) determined that there is not an increase in aggressive behaviors among video gamers, they did find that recreational video gamers did show a somewhat higher level of aggression than non-gamers (Hudak, 2003). On the other hand, various research findings indicated that video games do not trigger significant negative behavior (Bushman & Anderson, 2002; Thayer, 2017; Anderson et al., 2003). For instance, a study by Alexander Thayer found that the Columbine school shooting had little to no impact on the actual views discussed by the editorial staff at news outlets (Thayer, 2017). The opposite was true since violent video games were not to blame quite as often as they were previously. This paper focuses on verifying the validity of these claims and as to whether there is any merit to them.

APPROACH

Video Game Selection

Whether television, movies, or in this case, video games, one of the first steps in determining how people can be affected or influenced by violence in any media is to decide on the levels of violence

that should be shown to those involved in the study. This can be a rather sensitive subject for parents as most do not wish for their children to experience or commit acts of violence – even in the virtual world. Therefore, this study will only recruit adult subjects that are eighteen or older as to avoid upsetting parents or potentially causing too much anxiety for younger audiences. To gauge the reactions of the subjects, the study will be using three different levels of violence: extreme, neutral or mild violence, and completely non-violent. We use the video game ratings provided by Entertainment Software Rating Board (ESRB), an "American self-regulatory organization that assigns age and content ratings to consumer video games" (ESRB Ratings, 2019). Interestingly, the ESRB was created in 1994 due to the backlash of video games with controversial content such as excessive violence and other mature content (Kohler, 2009).

Violent Game Selection

Originally, the study was incorporating a different type of game – one that dealt more with gun violence. However, first person shooters are some of the most popular video games available right now based on the sales figures of recent years. As a result, many players have, unfortunately, become very desensitized to gun violence in video games. Therefore, showing footage of a game like Call of Duty may not have much of an impact. Therefore, for the extreme violence game, *Mortal Kombat XL* has been chosen for the Sony PlayStation 4 console. *Mortal Kombat XL* is a 2.5D fighting game with signature gameplay features such as 'fatalities,' 'brutalities,' 'fatal blows,' and 'krushing blows.' *Mortal Kombat XL* is rated M for Mature by the ESRB and uses the following criteria as reasons for the rating: "Blood and Gore, Intense Violence, Strong Language, Use of Alcohol" (ESRB, 2015). The primary reasons for choosing this game is for the first two descriptions by the ESRB. Due to it being a fighting game that includes extremely gruesome ways to kill opponents, it is one of the most violent, non-shooting games available for consumers to purchase currently.

Neutral Game Selection

For the neutral or mild violence game, *Crash Bandicoot N. Sane Trilogy* was selected for the PlayStation 4. *Crash Bandicoot N. Sane Trilogy* is a multi-level game with signature gameplay features such as spinning, jumping, and smashing crates. For this level of violence, it was necessary that a game was chosen that was not viewed as overly violent while at the same time, it not being entirely non-violent. The ESRB rated the game E for Everyone (ages 10+) based on the criteria of the game having "Cartoon Violence" and "Comic Mischief" (Entertainment Software Rating Board, 2007). The level of violence and mischief is on the level of what one would expect to see in an early morning children's television show or movie. There is no blood or gore involved, and the violence is often viewed in a very comical way.

Decorous Game Selection

Finally, *Flower* (also for the PlayStation 4) was chosen for the completely non-violent video game. *Flower* is a multi-level game with signature game play features such as controlling wind speed and direction and changing flower petal pitch and roll. In today's market, a game such as *Flower* is incredibly unique and rare. It is often difficult to find many console video games that have absolutely no violence at all. Even games that many would consider to be for children such as

Super Mario or Sonic have cartoon violence such as destroying enemies or getting hit by enemies themselves. While most people would not consider that to be very violent, it still contains a small level of violence which many label as "cartoon" or "comic" violence. On the other hand, *Flower* has none of those elements. It is a video game about flower petals flying through beautiful vistas bringing darkened areas to life. The ESRB has no descriptors for it like they normally would for other video games; it is simply rated E for Everyone (Entertainment Software Rating Board, 2013, 2015).

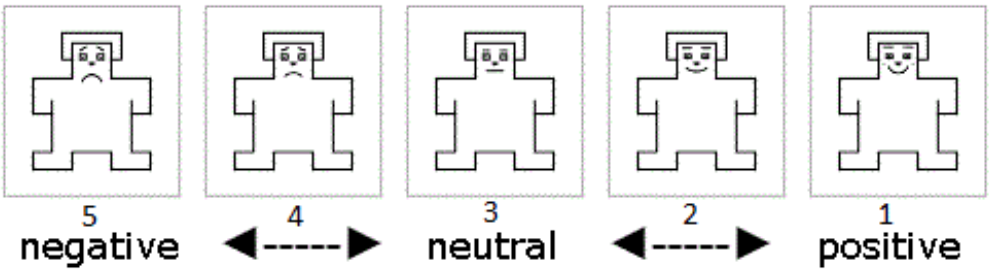
Procedure

Self-Assessment-Manikin (SAM) was used to rate the emotional scale of the users (Bradley & Lang, 1994; Irtel, 2007). SAM is a non-verbal pictorial assessment technique that directly measures the pleasure (valence), arousal, and dominance associated with a person's affective reaction to a wide variety of stimuli (Bradley & Lang, 1994). SAM measures the positive, neutral, and negative emotional states associated with viewing each set of images (see Figure 1). The positive state shows SAM smiling at right end. Neutral figure in the middle represents no change of emotional state. The negative state shows SAM frowning at the left end. We chose to use SAM as it is language-independent and has been effectively administered to both children and adults (Bynion & Feldner, 2017). Thus, our approach to assessing the impact of violent video games on participant's emotional state allows for variation in backgrounds and age. Additionally, SAM has been previously used in extant research on video game user emotional states to assess the impact of mental health messages (Poppelaars, Lichtwarck-Aschoff, Kleinjan, & Granic, 2018), the impact of color (Joosten, Van Lankveld, & Spronck, 2010), the influence of movement (Pasch, Bianchi-Berthouze, van Dijk, & Nijholt, 2009), and the impact of age and game type (Nacke, Nacke, & Lindley, 2009).

After the video games were selected, the implementation phase began. All procedures employed in the study comply with the ethical standards on human experimentation stated in the Institute of Review Board (IRB) application at a public university in the Southeastern United States. The games were purchased and the video footage captured of typical video game play. Flyers and emails were sent out and distributed to gain participants for the study. The goal was to obtain forty subjects of eighteen years or older as to try to gain as much data as possible with a valid sample size. The subjects were informed of the potential risks involved in the study such as possibly feeling some discomfort or anxiety at seeing extreme violence as well as a potential risk of a reaction due to epilepsy. While the chances of these occurring are small, they remain a risk to which the participants were informed.

A website was created that served two purposes: one contained the videos that were used for the study and a separate website described the study and provided information about the video games used in the study. The website used for the study included the potential warnings as described, the video of video game play itself, and a button to click on that displayed the next video after the Self-Assessment Manikin (SAM) 5-point test was given to the subject. The SAM test was used to determine the emotional state of the subject and includes five images of facial expressions ranging from negative to positive emotions. Figure 1 below shows the SAM test image that was shown to the subjects.

Figure 1. The SAM scale that was used to measure subject's emotional state.



Study Design

The goal of this study was to examine the effects that video game violence has on subjects – whether watching video game violence influenced how subjects feel, their mood, and behaviors. Varying levels of violence ranging from extreme to completely non-violent were used to determine this impact through the subject watching gameplay footage of video games. The Self-Assessment Manikin (SAM) scale was used in between each video.

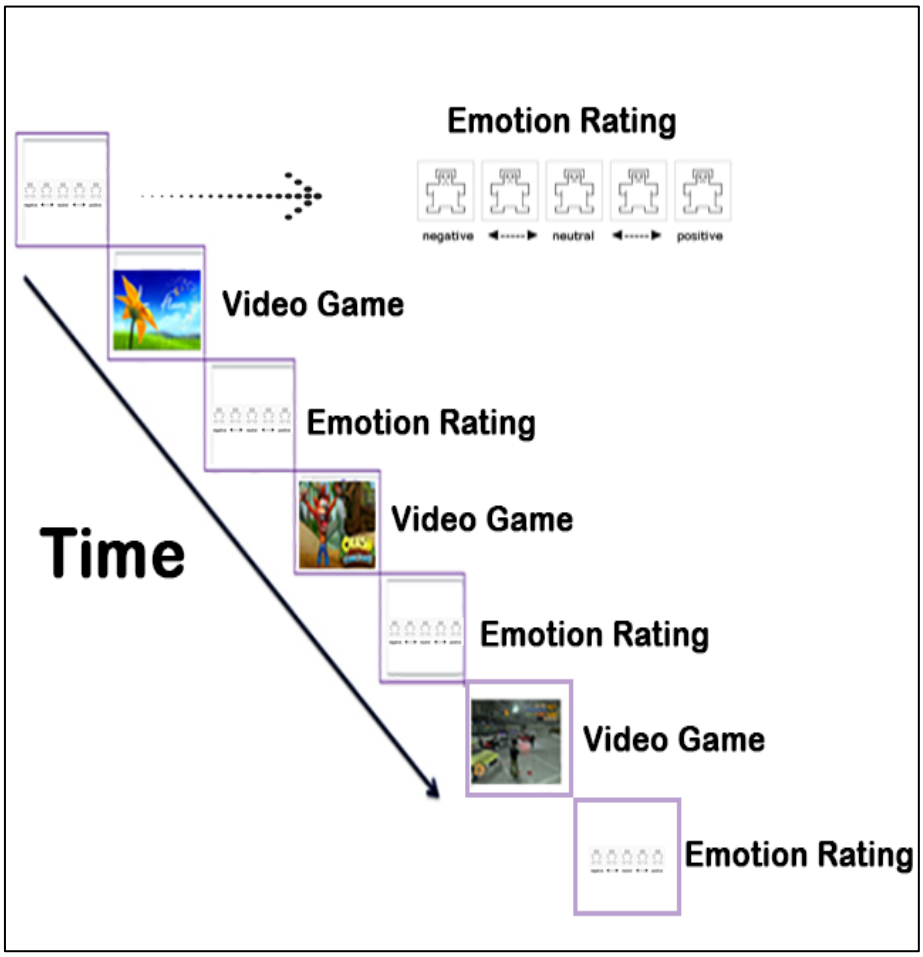
This study employed a within-subject study design. To measure emotional ratings more precisely, mean scores were used instead of the median. In addition, normality was assumed even though some of the trials did not pass the normality test (Erceg-Hurn and Vikki, 2008; Lovelace & Brickman, 2013). The conditions were ordered using an incomplete/partial counterbalancing using Latin square model to reduce the learning effect, biases and tiredness due to usage order. For baseline emotional value, each participant was asked to rate their emotional state prior to being exposed to the emotional design elements. After that, all of the three video games (Neutral, Violent, or Decorous) were presented to the each of the participants (see Figure 2). The dependent variable (DV) was emotion rating (i.e., 1=strongly positive, 2=positive, 3=neutral, 4=negative, and 5=strongly negative). Therefore, one-way repeated measures ANOVA was used to analyze the statistical significance of the effects of video game violence.

Figure 2. The website prototype

Figure 2 shows the website prototype which was created as a part of the study. The prototype shows the link for consent form document, which informed the potential risks involved in the study such as possibly feeling some discomfort or anxiety at watching extreme violence as well as a potential risk of a reaction due to epilepsy. Additionally, the website also includes the video, the play button, and the next button that displays the next video after the Self-Assessment Manikin (SAM) 5-point test was given to the subject.

Figure 3 shows the detailed process, which starts capturing the baseline emotion, before conducting the study. Each participant was asked to rate their emotional state prior to being exposed to the video game. After each video game, participants were asked to their emotional state.

Figure 3. The process of emotion ratings



RESULTS

In total, thirty-four participants were recruited for this study. As presented in Table 1, twenty-seven of participants were males and the rest were female participants. In addition, thirty of the participants were with age ranging between 18 and 35. There have been positive results based on the smaller sample size thus far. For the most part, there is no direct correlation between video

game violence and the potential for negative effects it has on the emotional states of the subjects. However, a few subjects did feel somewhat uncomfortable seeing the Mortal Kombat (violent) game footage due to the brutal actions of the player character during the Fatality section of the video.

Table 1. Mortal Kombat Data

Categories	Description	Number of Subjects	Percentage
Age Range	18-35	30	89%
	36-64	4	11%
Gender	Male	27	79%
	Female	7	21%
SAM-scale Rating	1	5	15%
	2	10	29%
	3	15	44%
	4	4	12%
	5	0	0%

A majority found the footage of the non-violent video game (*Flower*) as well as the neutral game (*Crash Bandicoot*) to be entertaining and made the subjects feel a happier emotional state. Roughly 67% of the subjects said they felt a 2 or 1 on the Self-Assessment Manikin 5-point scale which indicates they felt primarily "happy" or "positive" after viewing *Flower* footage. The other 33% of subjects remained "neutral" (a score of 3) with no positive or negative reaction after viewing the footage.

On the other hand, *Mortal Kombat* was poised to be the most interesting and divisive video game that was tested. In order to test how different age groups might respond the footage, the age range is large with subjects ranging from 18 years old to 64 years old. Of the thirty-four subjects thus far, 11% were aged 50 or older with the remaining 89% of subjects ranging from 18 to 35. Our goal was to see if age was to be a major influence on whether the subject was disturbed or uncomfortable viewing the *Mortal Kombat* footage. The subjects aged 50 or older were more uneasy viewing the video game, and as a result, all four scored a four on the Self-Assessment Manikin scale. A four is not the most negative option on the scale, however, it is very close. Unfortunately, due to the small sample size of older subjects, we were not fully able to confirm our second hypothesis that age is a factor in how one might react to such footage.

As shown in Table 1, the remaining 89% of subjects aged 18 to 35 years old voted "neutral," "mostly positive," or "very positive." Of the thirty other subjects, 50% chose three ("neutral"), 33.3% chose two ("mostly positive"), and the remaining 16.7% chose one ("very positive") on the SAM-scale. Based on Table 1, 44% of subjects were on the positive end of the SAM-scale, 12% of subjects were on the negative end, and 44% were neutral.

Table 2. Descriptive statistics for SAM scores

	Mean	Std. Deviation	N
Baseline	2.3529	1.20309	34
Neutral	2.0588	.23883	34
Violent	2.5294	.89562	34
Decorous	1.9706	.45960	34

As seen in Table 2, the overall average of SAM scores for each game hovered around two on the test, which is on the happy side of the spectrum. The overall average of all the tests was 2.23, which is also on the "happy" side of the SAM test. We anticipated the overall average of each game to be slightly higher than what we observed. As an overall average, we expected to see around a 2.50 rating on the SAM scale; however, we observed an average of 2.20 instead.

Figures 4 through 7 show where the average was for each test as displayed on the SAM scale itself. This is simply an easy way to visualize where the overall average was for each test.

Figure 4. Average of Test #1 on SAM Scale (Baseline)

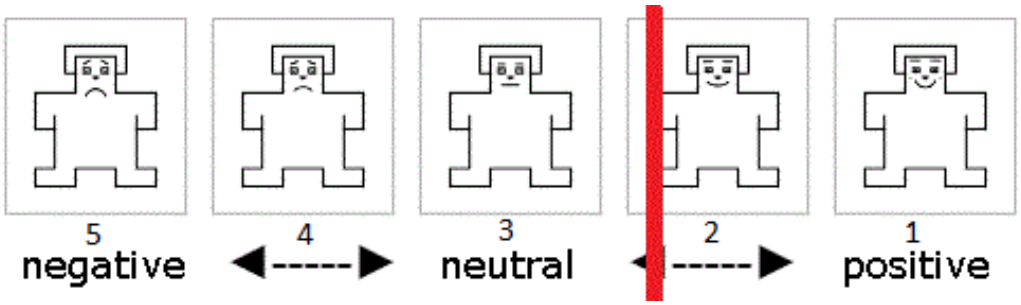


Figure 5. Average of Test #2 on SAM Scale (Neutral game)

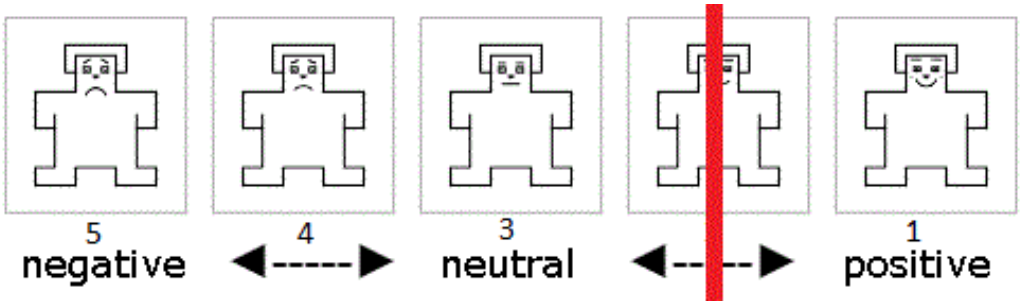


Figure 6. Average of Test #3 on SAM Scale (Violent game)

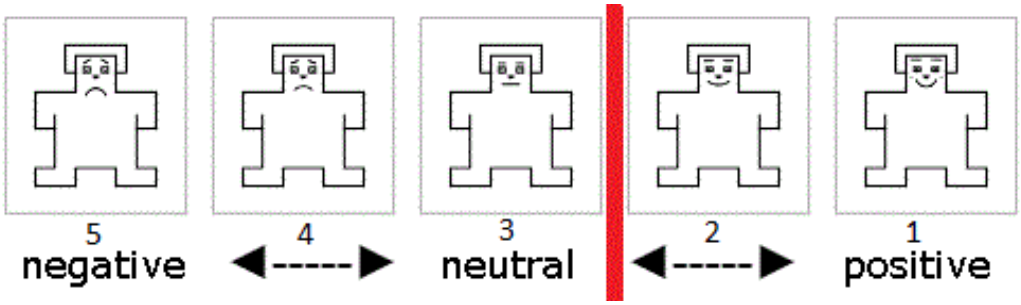
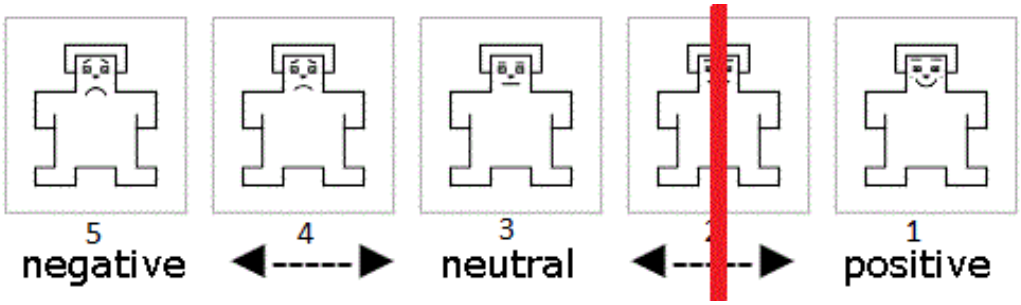
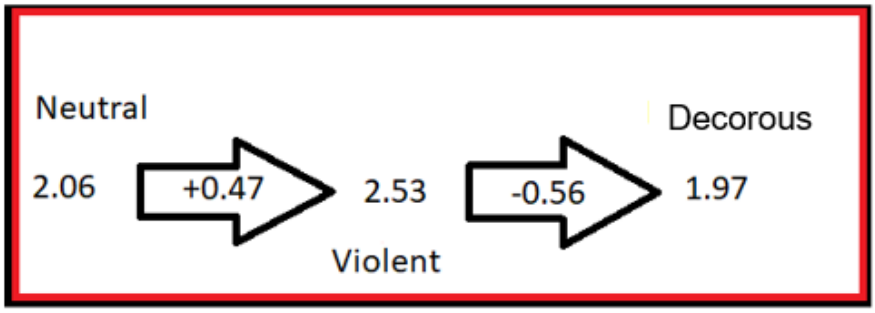


Figure 7. Average of Test #4 on SAM Scale (Decorous/Non-Violent game/)



The largest shift occurred when viewing Mortal Kombat XL (the violent game). From the first game footage (neutral) to the second game footage (violent), the average shifted 0.47 points to the left, which means the average was a bit more negative. After viewing the non-violent game, the average shifted back to the right by 0.56 points. This shows that watching the violent game footage did have a small effect on the emotional states of the subjects. Figure 8 shows this shift.

Figure 8. The shifting of SAM averages



The descriptive statistics depicts difference in the mean score. However, further data analysis was required to determine the statistical significance. As stated in the Study Design, one-way repeated measures ANOVA was used to analyze the statistical significance of the effects of video game on violence. The SPSS ANOVA analysis of the impacts of video game violence on violence behavior indicated that there is no significant difference between video games and violent behavior, $F(3,2.3)=4.23,\ p(0.07) > 0.05$. In other words, the average shift between each game was very small, implying that impact of violent video games has little impact on negative emotional state.

LIMITATIONS AND FUTURE WORK

Most of the research on video game violence has been done in the context of college student samples. This body of research has proven contoversial due to the difficuly in having a control condition of non-violent games that were similar to the violent games on qualities other than violent content (Ferguson, et.al., 2015). We tried to account for this limitation with the games that were chosen and the fact that the participants didn't actually play the games but viewed game footage. This also addresses the concern that emotional feelings are influenced by compettiveness of the participants. Due to the fact that the participants didn't play the games but only viewed footage of the games, we address the ptoential impact of competitive on the emotional state of the participants. In addition, the sample sizes are extremely small and the margin of error could be significant.

More testing and an increased sample size will help determine if these hypothesises hold true. The study will continue to add new subjects in order to determine the validity of the hypothesises discussed in this paper. Four subjects out of thirty-four is simply not enough to examine if there is a correlation between age and the emotional states of the subjects. However, the results are promising thus far. Overall, the results indicated that there is not huge deviation from one game to another; however, some subjects have shown a very slight adverse reaction of feeling uncomfortable to the more violent games. A future direction for this study could be to add the componet of actually playing each game and then gauging the emotional states. Additionally, a comparison of partipants who view the short video of the game and ones who play each game would be an interesting next step.

CONCLUSION

While it is difficult to draw conclusions based on a smaller sample size, there are a few details which emerge upon examining the data collected thus far. In total, 88% of particpants were either not influenced by the violent video game footage (neutral rating of 3) or it had a positive reaction to their emotional state (positive rating of 1 or 2). The remaining 12% were a bit less positive and scored "mostly negative" on the SAM-scale. However, there is a potential negative impact on the emotional states of the subjects upon viewing the violent video game footage. As seen in Figure 6, the *Mortal Kombat XL* footage resulted in the largest shifts in the SAM scale averages. On prelimiary examinination of the subjects' age ranges, it shows that age could pontentially be a deciding factor on reactions to the violent video game footage. Younger participants emotional states were less likely to be affected by the different levels of violence in video games whereas older particpants were more likely to feel negatively towards it. We felt that this could be due to the fact that younger generations are exposed to much more violence on screens and may have formed an immunity to the violence.

Video games are one of the best technological tools that are used for both entertainment and educational purposes. In this sense, individuals may be exposed to "potentially" harmful situations while not actually engaged in the activity. A number of studies indicated that video games, whether violent or not, play an important role in influencing the behavior of individuals interacting with them. Several research findings reported that video games do not trigger significant negative behavior. On the other hand, a number of studies indicated that there is clear and unequivocal link

between video games and violent behavior. In fact, the American Psychological Association confirms a link between playing violent video games and aggression (American Psychological Association, 2015). This paper focused on verifying the validity of these studies. In other words, the study tries to verify if there is a significant relationship between watching simulated violence in the form of video games and real word violence. The methodology created involved human subjects being asked to watch short clips of various games and gauging their emotional state before and after incorporating the Self-Assessment Manikin (SAM) 5-point Likert scale which ranges from negative to positive emotional state. The games were chosen based on several criteria suggested by the Entertainment Software Rating Board (ESRB), which governs the content ratings in a game and assigns an age requirement for purchase and use.

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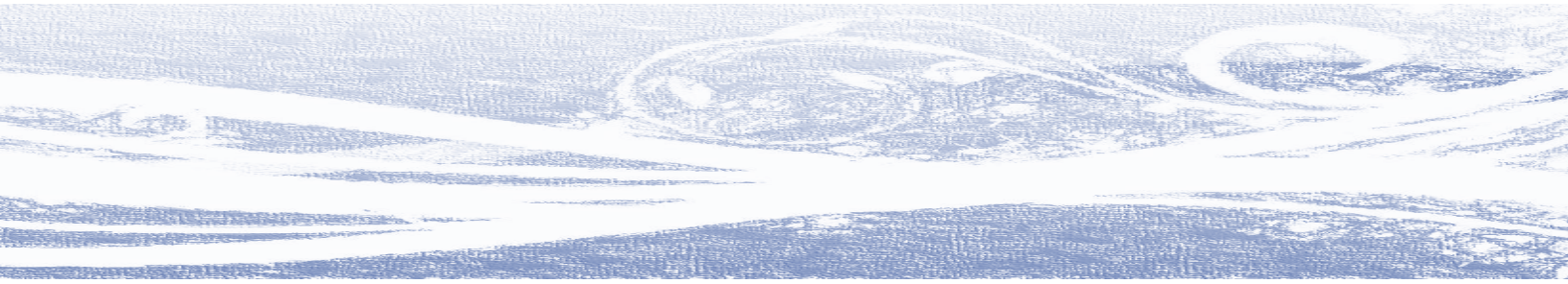

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