Western University

Scholarship@Western

Undergraduate Honours Theses | Psychology

Spring 5-15-2020

DOES WATCHING OTHER PEOPLE PLAY VIDEO GAMES PROMOTE AGGRESSION

Kimberly M. Clarke

DOES WATCHING OTHER PEOPLE PLAY VIDEO GAMES PROMOTE AGGRESSION

by

Kimberly Clarke

Department of Psychology

Submitted in Partial Fulfillment

of the requirements for the degree of

Bachelor of Arts

In

Honours Psychology

Faculty of Arts and Social Science

Huron University College

London, Ontario

April 30, 2020

HURON UNIVERSITY COLLEGE

CERTIFICATE OF EXAMINATION

Advisor: Christine Tsang

Reader: Mark Cole

The Thesis by:

Kimberly Clarke

Entitled:

Does Watching Other People Play Video Games Promote Aggression

Is accepted in partial fulfilment of the requirement for the degree of

Bachelor of Arts

in

Honours Psychology

Abstract

Previous studies have shown that playing violent video games can cause an increase in aggressive thoughts, aggressive feelings, and physiological arousal towards aggression. Streaming of violent video games has become a trend among video gamers and the effects of watching violent video game streams may be similar to actually playing violent video games. However, there is very little research on the effects of video game streaming. The current study tests the effects of streaming of video games on levels of aggression. Participants were randomly assigned to watch 5 minutes of either of two video game streaming. They were asked to complete the Buss & Perry Aggression scale as well as the Word Competition Task. A Two-way between subject's ANOVA was conducted with streaming type (violent or non-violent) as an independent variable, as well as gender as a predictor variable. The covariates were trait aggression, that included the sum of physical aggression, verbal aggression, anger, and hostility scores and age. The dependent variable measured the accessibility of aggressive thoughts in individuals' cognitions and was determined by words completed on the Word Completion Task. The results indicated that there was a significant main effect of streaming type, where those individuals' who watched the violent video game streaming completed a higher percentage of aggressive words in the word completion task. There was no main effect of gender on the percentage of aggressive words completed, however, after controlling for the streaming type, men completed more aggressive words compared to females in the violent video game streaming. There was a significant interaction between gender and streaming type on the percentage of aggressive words, more specifically that males completed a higher percentage of aggressive words in the violent streaming condition. This present study discusses the implication of exposure to violent video game as well as the long-term effects.

Acknowledgements

I am indebted to the entire thesis committee for the continues support and opportunity that was provided to me throughout this process. To my advisor, Dr. Tsang, I want to thank you for the endless patience as well as amazing knowledge and advice that was given to me along the way. Your continuous engagement with my paper has given me an amazing learning experience and allowed me to expand my psychological knowledge. I would also like to thank my second reader, Dr. Cole, for assisting in ensuring that my paper is written to the best potential.

I would also like to thank my friends and family for the continues and endless support that was given to me during this process. Thank you for encouraging me and believing that I would be able to do something like this.

I would like to thank Huron, as a whole, as well as the Psychology department for providing me with the best knowledge and understanding of psychology that has allowed me to continue with psychological knowledge outside of the school hours.

Table of Contents

Introduction

Violent and aggressive behaviours have long been studied in Psychology, both of which are present in different media types that can potentially influence behaviours of individuals. *Violence* is defined as an extreme form of physical aggression that is likely to cause physical injury, such as shooting, punching, and hitting (Anderson et al., 2008). Similarly, *aggression* is defined as a behaviour with intent to harm another person whose motivation is to avoid harm (Anderson et al., 2008). Although these two terms are often used synonymously, they are conceptualized as different in the research literature. Violence is a form of physical assault, whereas aggression is conceptualized as a broad construct that includes physical, verbal, and psychological means of harm (Liu, Lewis, & Evans, 2014). Therefore, it can be argued that these terms are similar in that violence is a physical manifestation of aggression, however, aggression does not have to be exclusively physical and does not have to defined in term of violence. For example, an individual with a verbally aggressive nature does not necessarily engage in violent acts. Both violent and aggressive behaviours can be learned through observation (Huesmann, 2007). In terms of the demonstration of aggressive behaviours, several forms of violence and aggression can be present in the media through television shows, movies, music, and much more. These mediums create platforms to demonstrate both acts of violence and aggression, whether these actions are intentional or unintentional, which may influence individuals to act in certain ways that increases their own physical aggression and violence.

Violent video games are forms of media that include a large exposure to violence and aggression. Likewise, a violent video game is defined in terms of its rating. Most violent video games have a rating of "M" suggesting that there is mature content with a large amount of violence including blood and gore. Extensive research has been conducted to examine the

effects of playing of video games and the psychological effects of playing these games on individuals'. Studies suggest that adolescents spend an average of 7 hours a week playing video games (Gentile, Lynch, Linder, & Walsh, 2004). The types of video games that adolescents play range from games with no violent content such as *Mario Kart*, to games with a large amount of violent content such as *Call of Duty*. In terms of exposure to violent video games, individuals who play many hours of violent video games are being exposed to many violent acts, which may influence their behaviours in the real world through imitation. Playing violent video games may promote aggressive behaviours and provide an outlet in which violent and aggressive acts can be viewed by the players, observers, or competitors in the game. Playing violent video games has been shown to increase aggressive thoughts (Dill & Anderson, 2000), increase arousal of aggression (Barlett, Anderson, & Swing, 2009), and prime aggressive feelings (Kühn et al., 2018). With the activation of these three behaviours and responses associated with aggression, playing violent video games could potentially develop negative behaviours that could persist into everday activities.

The General Aggression Model (GAM) (Barlett, Anderson, & Swing, 2009) suggests that the causal link between any variable that increases aggression is influenced by an individual's thoughts, feeling, and physiological arousal (Barlett, Anderson, & Swing, 2009). The GAM can be used to explain the negative effects of violent video games, effects such as increased likelihood of hurting other people, failing to get along with others, and decreased ability in school or job abilities (Barlett, Anderson, & Swing, 2009). For example, playing a video game increases aggression in individuals by increasing their aggressive thoughts, aggressive feelings, and physiological arousal towards aggression. Similarly, Barlett, Anderson, & Swing (2009) suggest that violent video game exposure can shape the player's behaviours because continuous playing with these games reinforces the behaviour that hurting other people can be used to resolve conflicts (Barlett, Anderson, & Swing, 2009).

 The GAM model also suggests that playing violent video games activates three internal states; physiological arousal; aggressive feelings; and aggressive thoughts. With regard to physiological arousal, violent video games can be associated with an increase in heart rate and blood pressure and tends to produce more arousal than non-violent video games, suggesting there is a rapid increase of arousal when playing these games as a function of the game being fun, challenging, and exciting (Barlett, Anderson, & Swing, 2009). Video games can be related to an increase in physiological arousal that can increase aggressive behaviours. With heighted heart rates and blood pressure due to violent video game exposure, aggressive behaviours might be misattributed to another provoking event that might be external to the video game, therefore shaping the behaviour of these individuals (Barlett, Anderson, & Swing, 2009). With regard to aggressive feelings, Anderson and Dill (2000) suggest that each time individuals are exposed to an aggressive video game, they rehearse these aggressive scripts that teach and reinforce hostility toward enemies, as well as aggressive actions against others. Therefore, these studies suggest that these individuals are learning about aggression which could affect their aggressive feelings towards the victims in these games, which might in turn increase the probability of future aggressive behaviours. With connection to Dill and Anderson (2000), Kühn et al. (2018) suggest that aggressive thoughts can be increased by exposure to violent video games, where thoughts and feelings can be primed that later influence the perception of events, and therefore can elicit aggressive behaviours. Thereby, exposure to violent video games increases aggressive thoughts through priming. With the activation of the three internal states, increased exposure to violent video game may create a longitudinal effect on individual's behaviours. More specifically, researchers questioned whether the three internal states would be activated after having played video games for only a few minutes or over a period of time (Anderson, Gentile, & Buckley, 2007).

Overall, they found that brief exposure to violent video games predicted hostile attribution bias with both physical and verbal aggression and that prolonged exposure to violent video games will prime thoughts with aggressive content in the individual that will change their understanding of a situation (Anderson, et al., 2008). Thereby, the GAM predicts an increase in aggressive thoughts, feelings, and physiological arousal both in the short term and in the long term.

Recent video games have become more realistic in quality and are becoming addictive due to the immersive nature of the game that captures the attention of the players (Barlett, Harris, & Baldassaro, 2007). It is possible that the more realistic the game, the more likely individuals will play the games, which in turn will increase their exposure to the mature content of the games. Alongside the GAM, there are two major hypotheses that are involved in the study of video game aggression. Firstly, the competitive-only hypothesis suggests that competitive situations in video games cause later aggression. Secondly, the violent-content hypothesis suggests that violent content in video games primes aggressive thoughts in players and therefore can cause an increase in aggressive behaviour later on (Carnagey, 2006). For example, exposure to illicit violence in sports video games does in fact increase aggressive affect and can influence attitudes towards aggression (Carnagey, 2006). Overall, this suggests that the content of the video games has more of an effect on aggression than the type of game that is played. These two hypotheses are integrated into the GAM by a cyclical pattern of interactions between the person and the environment. The GAM helps to explain the violent-content hypothesis by suggesting that, through time and repetition, aggression-related knowledge structures strengthen and combine with emotional desensitization to change an individual's personality (Carnagey, 2006). Similarly, the competition-only hypothesis is supported by the GAM and suggests that competition factors in video games can increase physiological arousal and aggressive cognition (Carnagey, 2006).

Another trend that has increased in frequency beyond the playing of video games is the practice of "streaming" of video games. Playing video games involves players engaging first hand with characters in the game where they can directly manipulate the actions of the character and essentially make all the decision within the game. On the other hand, live streaming refers to simply watching others play the video games. More specifically, live streamers are defined as those individuals who broadcast themselves playing video games, eating, dancing, painting, and other activities to a public audience (Hilvert-Bruce, Neill, Sjoblom, & Hamari, 2018). Viewers of the live stream do not have the ability to manipulate the game's characters. The viewing of live-streams has become so popular that more people prefer to watch other people do these activities than to do them themselves (Hilvert-Bruce, Neill, Sjoblom, & Hamari, 2018). Streaming is another form of broadcasting entertainment, however, for many users it is more about the communication channels and interactions rather than the video content itself, due to the high levels of interaction (Sjoblom & Hamari, 2016).

Why do people stream rather than play video games? Sjoblom and Hamari (2006) examined the motivations of individuals who stream (but do not play) video games by using the Uses and Gratification (UG) theory. The UG model assists in understanding individuals' media consumption habits as well as explaining why individuals choose certain media types based on the benefits that they can give them. Therefore, the UG model states that the motivation behind using a certain medium is a particular gratification that is sought (Sjoblom & Hamari, 2016). The gratifications of watching video game streams are sought through five categories: cognitive; affective; personal integrative; social integrative; and tension release (Sjoblom & Hamari, 2006). Firstly, such watchers are trying to benefit cognitively by acquiring knowledge and information about the game. Secondly, they are motivated to watch these streams to create an affective sense of emotional, pleasant,

and aesthetic experience. Thirdly, individuals are trying to achieve personal integrative experience by enhancing credibility, confidence, and status in the game. Fourthly, there is an indication of a social variable in that viewers are trying to engage with friends and family through social interaction. Lastly, there is an element of tension release in that watching these video streams allows for an escape and a disconnect from the real world (Sjoblom & Hamari, 2016). It seems that individuals are seeking pleasure from live streaming because it offers a higher degree of interactivity as well as creating a relationship between the media creator and the consumers, as they are able to communicate with each other (Sjoblom & Hamari., 2016). Streaming also blends two mediums: the live-streaming medium; and the game itself, which allows for participatory aspects similar to interactions that are taking place in real time (Sjoblom & Hamari, 2016). However, players of video games might also be seeking gratification from the game content only, rather than the live-streaming media aspect of the game. Therefore, the UG model attempts to explain why individuals would choose to watch other people play video games rather than play the games themselves.

The UG model and the GAM are both designed to explain a causal link between variables that influence an individual's decisions that leads towards violence. The UG model suggests that motivation is coupled with specific gratification, whereas the GAM creates links between an individual's physiological arousal and their cognition. However, the UG model explains the motivation of actually choosing a media type, whereas the GAM explains the underlying effects of the specific media type that is being used.

The trend of live streaming is relatively new, and thus there is less direct evidence about the effects of watching violent video games and later aggression. However, recent research indicates that watching other people play video games through streaming leads to outcomes similar to those who merely watch media violence (Huesmann, 2007). Media Violence is loosely defined as a virtual portrayal of acts of violence by humans or human-like characters against others, that can be present in television shows, movies, and music (Huesmann, 2007). Similarly, Huesmann (2007) suggests that

exposure to violence through television shows, movies, music, and the internet does in fact increase the risk of violent behaviours in viewers in the same way that growing up in an environment that is filled with violence can increase the risk of acting violently (Huesmann, 2009). Essentially, these researchers suggest that the direct exposure, even through observation, can cause an increase in behaviour with violence. Haridakis & Rubin, (2009) found that those who are exposed to media violence showed: (a) increased imitation of behaviour; (b) increased accessibility of violent construct in one's memory; (c) increased arousal levels of violence, which in turn will increase aggression; (d) decreased ability to be sensitive and sympathetic to victims; and (e) increased acceptance of violence in real life, where overall they see these actions as something that is more socially accepted by all so they engage in the action more to fit in (Haridakis & Rubin, 2009). These motivations are directly linked to the GAM in that there are multiple cyclical pathways that influence the levels of aggression in an individual. This cyclical pattern; including a combination of both personal and situational factors can activate individuals' physiological arousal, aggressive thoughts, and aggressive feelings about aggression. The motivations behind the effects of media violence and aggression are spread out around the content of the violence itself. To extend this idea, the UG model also helps to examine the viewer's motivations and characteristics that can enhance and mitigate the effects of media violence. This model is used to address violence and aggression by suggesting a systemic route to the media effect that involves many factors such as social and psychological factors, motivation, expectations, and media content and source (Haridakis & Rubin, 2009). Within social psychology, violence is more likely to be imitated or learned if it were unpunished (Bandura, 1977), realistic (Atkin, 1983), arousing (Mustonen & Pulkkinen, 1993), and without consequences (Comstock& Strasburger, 1990). This idea suggests that if viewers are watching violent video games streams, they might be more inclined to imitate the actions of these characters because their actions are done without punishment and consequences, so that viewers learn that these actions are routine in the real world. More specifically, children who consume a large amount of media violence show a shift in their conception

of aggressive norms and are more likely see aggression as more normative and exhibit a hostile attribution bias, which in turn increase aggressive behaviours and decrease prosocial behaviours (Gentile, Coyne, & Walsh, 2011). While large amounts of media violence have shown to have an effect on aggressive behaviours, there is also empirical evidence that suggest that the long-term effect of exposure to violent video games can create similar effect on aggressive behaviours. This empirical evidence was presented by Gentile, Coyne, & Walsh (2011) which looked at the longitudinal effects of media violence, including watching violence and playing video games at different time intervals during a standard school year for children. Overall, there was a significant correlation over time between hostile attribution error, physical violence, and verbal violence and change in aggressive behaviours was a result of early exposure to media violence (Gentile, Coyne, & Walsh., 2011).

Overall, these theories and the supporting empirical findings suggest that both playing violent video games, and streaming violent video games are associated with an increase in physiological arousal, aggressive feelings, and aggressive behaviour, which might later affect their personal behaviours in real time. Likewise, streaming of video games provides an outlet to combine broadcasting media violence and violent content of video games, therefore suggesting that those individuals who watch live-streaming video of violent video games may show similar effects as those playing video games on aggressive behaviours. I predict that participants assigned to watch a violent video stream will complete more aggressive words on the Word Completion Task than those participants assigned to watch a non-violent video stream. I also predict that men will complete more aggressive words on the Word Completion Task compared to females.

Method

Participants

Participants were recruited from friends and family of the researchers as well as Huron University Students enrolled in Psychology 1100E and Psychology 1000E. Participants were obtained through the Huron University College SONA System and they received a participation credit toward their final course grade. There was a total of 50 participants (35 females and 15 males). The ages of the participants ranged between 17 and 31 years ($M = 19.82$, $SD = 2.57$).

Material and Measures

The study used online videos from YouTube to stream two types of video games. The first condition included the viewing of a violent video game streaming, more specifically *Call of Duty Black Ops 4*, that included scenes of the video game players shooting other characters in the game as well as commentary on different methods of killing the characters, such as with the use of knives. The second condition included the viewing of a non-violent video game streaming, more specifically *Mario Kart 8 Multiplayer*, that included the players racing around a race track with obstacles. These videos were chosen as contrasting types of video games that compare a more obvious form of violence, such as shooting, to a video game that has no violence. Both of these videos were chosen because they have a large number of viewers on YouTube, indicating that these videos might be popular among video game viewers. The full duration of the violent video game streaming was 16 minutes, and the duration of the non-violent video games was 42 minutes.

The *Buss and Perry Aggression Scale* was used to assess aggression as a personality trait. It included four sub-traits, physical aggression, verbal aggression, anger, and hostility (Perry & Buss, 1992). The 29- items were each measured on a 5-point Likert-type scale (ranging from 1 - extremely uncharacteristic of me to 5 - extremely characteristics of me). One of the four sub traits, **Physical Aggression** was operationalized as an activity that involves hurting or harming others. The questions included: "*I have become so mad that I have broken things*"; and "*I have threatened people I know*". A second sub trait, **Verbal Aggression**, was operationalized as an activity that involved using words to hurt or harm others or being argumentative. The questions included: "*I can't help getting into arguments when people disagree with me*"; and *"my friends say I am somewhat argumentative"*, The third sub trait, **Anger**, was operationalized as an activity that involved physiological arousal as well as emotional and affective components of aggression. The questions included: *"I have trouble controlling my temper"*; and *"sometimes I fly off the handle for no good reason"*, The final sub trait, **Hostility**, was operationalized as harbouring feelings of ill will and injustice, as well as representing the cognitive component of aggressive behaviours. The questions included: *"when people are especially nice to me, I wonder what they want"*; and *"I am sometimes eaten up with jealousy"* (Perry & Buss, 1992).

The *Word Completion Task* was used within this present study to measure the accessibility of aggressive thoughts within the participants. This task has been used in the past to study the effect of a brief exposure to violent video games (Anderson et al., 2004). Therefore, the Word Completion Task was utilized to test the short-term effect of exposure to violent video games to examine if there would be an immediate activation of aggressive cognitions. Thereby, this task served to measure the dependent variable, as well as measure implicit memory and information processing. Participants were presented with a total of 18 partially-completed words, nine of which were easy, but included three violent partial words, three non-violent partial words, and three neutral partial words. Examples of violent partial words were: *"sho_t" and "ki _ _"*. The other nine partially-completed words were

more difficult and included three violent partial words, three non-violent partial words, and three neutral partial words. Examples of violent partial words were "*mu_ _er" and "att_c_"*. These partially-completed words are considered more difficult because they require more thought and priming. The words completed were scored based on the number of aggressive, non-aggressive, and neutral partial words completed.

Procedure

Upon choosing to participate in this present study, participants were asked to sign a consent form agreeing to participate. Participants were tested individually. Participants were randomly assigned to watch 5 minutes of one of the two video game streams (violent or not violent). After viewing the streaming videos, participants were asked to fill out demographic information that included their gender, age and the number of hours they typically spend watching video game streams. They were then asked to complete the Buss and Perry Aggression scale on paper. Lastly, participants were asked to complete the Word Completion Task on paper, that included the list of incomplete words and asked to fill in the blanks to make a complete word. This present study took approximately 15 to 20 minutes to complete for each participant. There were 25 participants in each condition.

Results

A two-way between subjects Analysis of Variance (ANOVA) was used with type of video game live streaming and gender as the fixed predictor variables and trait aggression and age as covariates in the analysis. The dependent variable was the percentage of aggressive words completed on the Word Completion Task, which was calculated by dividing the number of aggressive words by the total number of words completed. Results indicated that there was a statistically significant interaction between streaming condition and gender, $F(1, 44) = 6.64$, $p = .013$. More specifically, Figure 1 shows that when participants were asked to watch the violent video game streaming, females in the violent streaming condition showed a significantly lower percentage of aggressive words ($M = 30.68$, $SD = 4.19$) when compared to males in the violent streaming condition ($M = 41.68$, $SD = 5.59$) whereas females in the non-violent stream showed a significantly higher percentage of aggressive words ($M = 31.39$, $SD = 3.91$) when compared to males ($M = 13.67$, $SD = 7.29$). Two independent sample t-tests were conducted to examine if there were gender differences with aggression while holding streaming conditions constant. Results indicated that within violent video games stream, males ($M = 40.71$, $SD = 8.31$) completed significantly more aggressive words compared to females ($M = 30.90$, $SD = 18.03$), $t(23) = -1.53$, $p = .002$. However, within the non-violent video game stream, there was no significant difference between males ($M = 20.37$, $SD = 13.46$) and females ($M = 29.53$, $SD = 21.36$), $t(23) = .98$, $p = .50$.
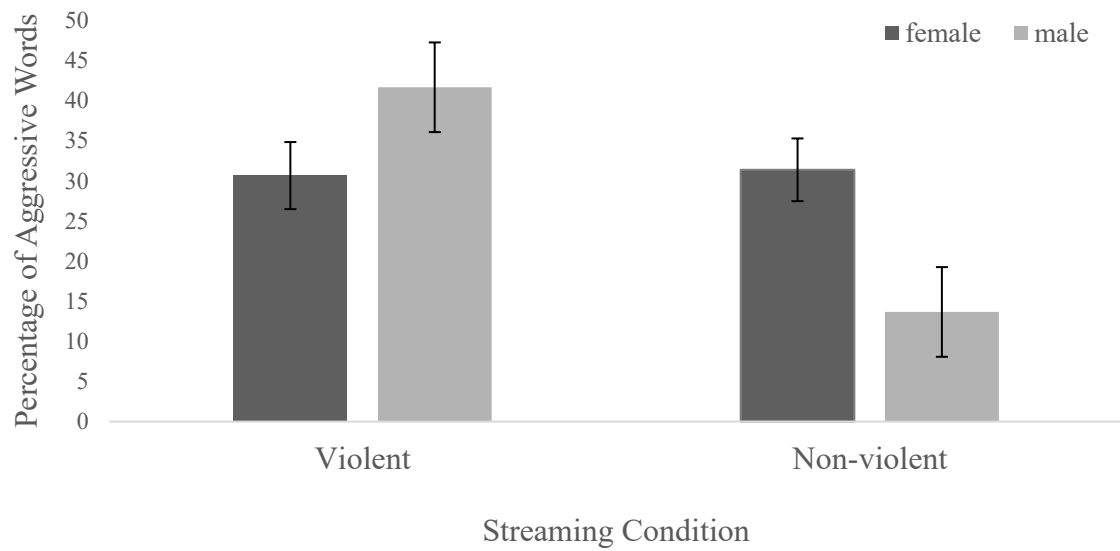
Figure 1. *Mean percentage of aggressive words completed by males and females in Violent and Non-Violent Video games conditions. Error bars represent the standard error.*

Results also showed a significant main effect of streaming condition on the percentage of aggressive words completed F (1, 44) = 6.51, p = .014. More specifically, those participants who were shown the violent video game streaming (M = 36.18, SD = 3.49) completed a higher percentage of aggressive words than those individuals who were shown the non-violent video game streaming (M = 22.53, SD = 4.02).

To understand the popularity of video game streaming among different genders, participants were asked how many hours per week they watch video game streaming. An independent Samples t-test was used to test if there was a significant difference between gender and the number of hours spent watching live streaming videos. Results indicated that males (M = 1.83, SD = 1.91) watched significantly more hours watching live stream videos than women (M = .41, SD = 1.06), t (48) = -3.36, p < .05, d = 4.63.

Discussion

This present study was designed to examine the effect of viewing live streaming of violent video games on levels of aggressive cognitions in individuals. Playing video games has been shown to be correlated with expression of aggressive behaviour (Barlett, Anderson, & Swing, 2009), as well as aggressive thoughts (Dill & Anderson, 2000) and aggressive feelings (Kuhn et al, 2018). The purpose of the present research was to examine if those participants who were assigned to watch the violent video game streaming would complete a higher percentage of aggressive words on the Word Completion Task. With gender as a fixed variable, the question was answered in the affirmative, that when participants were asked to watch the violent video game streaming, males completed a higher percentage of aggressive words.

With the significant interaction between gender and the video games streaming type on the percentage of aggressive words completed on the Word Competition Task, there was only a significant difference between genders within the violent video game streaming condition.

More specifically, when participants were asked to watch the violent video game streaming, males completed a significantly higher percentage of aggressive words compared to females. Comparatively, when participants were asked to watch the non-violent video game streaming, females completed a significantly higher percentage of aggressive words compared to males.

Males tend to be more aggressive than females. More specifically, Buss and Perry (1992) suggest that males have higher scores on measures of physical aggression, verbal aggression, and hostility, but not anger when compared with females. Furthermore, males, more than females tend to consider physical aggression to be an appropriate response to certain situations (Bartholow, 2002). After exposure to violent video game streaming, males completed a higher percentage of aggressive words compared with females. This could be explained by the idea that males are generally more aggressive; therefore, they might be more sensitive to aggressive cues in the video games (Bartholow, 2002). The significance of the interaction could also be explained by the choice of the video game streaming. In the violent streaming condition, Call of Duty was chosen because it is a popular game among many adolescents, mostly by males. However, in this streaming, all of the characters were human-like characters that were also male. In support of this, Farrar, Krcmar, and Mcgloin (2013) found that participants who played a first-person shooting game, while battling against human-like characters, had higher scores of aggressive thoughts and words than those who battled against non-human like characters (Farrar, Krcmar, & Mcgloin, 2013). In the Call of Duty game, the streamer and the characters in the game were human-like characters which might allow the male participants in this present study to identify with the characters, as well as be more influenced by the aggressive behaviours. On the other hand, females tend to be less physically aggressive and more verbally aggressive (Barthalow, 2002), and somewhat hostile (Buss & Perry, 1992). The results of the present study indicate that in the non-violent video game streaming, females completed a

significantly higher percentage of aggressive words compared with males. This could be explained through the type of game. Mario Kart is not a violent video game but it is still a very competitive game. Research shows that the competitive situations in video games can cause a significant increase in hostility (Shafer, 2012). More specifically, Carnagey (2006) suggests that the competitive situations within a game causes later aggression. More specifically, compeition between players can increase physiological arousal and aggressive cognitions (Carnagey, 2006). Therefore, this could explain why females completed a higher percentage of aggressive words. Similarly, male participants might not complete a higher percentage of aggressive words because there were not enough aggressive-related cues in the Mario Kart video game, more specifically physical aggression to activate their aggressive-related behaviours. While comparing the streaming conditions and gender, the biggest differences lies within the difference in the male participant's responses based on the video game streams condition. More specifically, figure 1 shows that there was a significant decrease in the percentage of aggressive words completed by males based on the streaming condition. However, there was no major difference in the percentage of aggressive words given by females based on the streaming condition that they were in. This helps to show that males are more affected by violent video game streaming compared with females.

As competitive situations result in an increase in aggressive-related behaviours, one limitation of the present study was the type of video game streaming shown as well as the interactive nature of the video game streaming. During the live streaming of both video games presented in the present study, there was commentary on the game by the live streamers; however, their levels of competitiveness were different. In the violent video game streaming, Call of Duty, there was more interactive conversation among the muliple players in the game. The players in the live stream included both the main streamer and other human opponents playing the same game. These players

discussed the methods by which they could eliminate the other characters, for exmaple, by using knives to stab the other players. In the non-violent video game streaming, Mario Kart, there was a single player racing against computerized opponents. This streaming included the singular streamer discussing methods with the audience of the video. Thereby, one streaming video had a more interactive nature with other players and the other streaming video involved a single player. During the live-streams of these video games, participants might have been more influenced by the conversations going on among the players. For future studies, greater control should be placed on the interactive nature of the video game streaming, more specifically whether it is a multiplayer or a one-player game.

When studying aggression, there are multiple pathways and factors that should be considered when examining the phenomenon. More specficailly, the GAM suggests that there are two inputs into explaining aggression: situational and personal (Barlett, Anderson, & Swing, 2009). This present study used the Word Completion Task to measure of brief exposure to violent video games on a variety of aggressive-related variables (Anderson, et al., 2004). However, the Word Completion Task does not account for other personality factors that might play a role in response to aggression. More specifically, factors such as temperament, emotionality, implusivity, socability, and compeitiveness (Buss & Perry, 1992) might play a role in explaining the types of words that were completed on the Word Completion Task. Likewise, the Word Completion Task does not take into account the situational factors along with the personality factors of aggression. Barlett, Harris, & Baldassaro (2007) suggest that the activation of the three internal states; aggressive feelings, aggressive thoughts and physiological arousal are what predict decision making that can lead to more aggressive and impulsive actions (Barlett, Harris, & Bladassaro, 2007). For example, an individual might respond with aggression in one situation and not be aggressive in another situation depending on the environment that they are in. Therefore, one limitation of this present study was the exclusion of

situational factors within the measure of aggression. For future studies a more comprehensive measure should be used in order to assess aggressive tendencies in individuals, as well as to control both situational and personal factors. In order to do this, a combination of both a word completion task and a scenario survery, that includes different situations in which there is an opportunity for both an aggressive and non-aggressive response, could be done in order to have a more reliable measure of aggression that includes personal and situational factors.

The GAM predicts that in a short period of time, such as within a few minutes, violent media exposure can affect arousal, aggressive thoughts, and aggressive feelings, which in turn would infleunce aggressive behaviours (Gentile, Coyne, & Walsh., 2011). The effects of short-term exposure to violent media is routed around the cognitive route, in that, when individuals are exposed to violence, it activtates and strengthens their scripts that makes their aggressive behaviours more likely in an immediate situation (Gentile, Coyne, & Walsh., 2011). Likewise, in this present study participants were asked to watch a video game streaming for only 5 minutes and yet there was a significant effect on levels of aggression as measured by the word completion task. The amount of time that each individual was asked to watch video game streaming may have activated aggressive-related behaviours and knowledge in this present study, however, there may be long-lasting effects of exposure to violent video games that might show a more significant effect. The GAM suggest that the long term exposure to media violence throught repeated episodes of viewing violence could results in the development, over-learing, and reinforcement of aggressive related knowledge (Gentile, Coyne, & Walsh, 2011). More Specifically, researchers continuted their studes of aggression by testing aggression over time intervals. Overall, they found that the frequency of aggression based on violent video game exposure briefly after watching (Time 1) predicted the frequency of aggression approximately 5 months later (Time 2) (Barlett, Anderson, & Swing, 2009). This suggests there may be a lasting effect of long-term exposure to media violence. In order to exmaine the lasting effect of

the long-term exposure to media violence, in the future, participants should be asked to watch a video game streaming for a longer period of time or over a series of time intervals. This will help to examine if there is a long-term effect of exposure to violent video game exposure.

Playing and streaming of video games might be different activities, but they still yeild similar results in terms of the effects on aggressive-related bahaviorus. The results of this present study illustrated that exposure to violent video games through streaming did show a significant effect on aggressive-related behaviours similar to the results seen in studies in which participants actually play violent video games. Therefore, there was a significant interaction between the type of streaming and gender, where in the violent video game streaming males completed a higher percentage of aggressive words on the Word Completion Task. Males tend to be more aggressive and generally enjoy playing and streaming violent video game which could make them a vulnerable demographic to the negative psychological effects of violent video games. Violent video game exposure can show significant increases in both violence and aggression which can lead to the development, learning, and reinforceing of aggressive related behaviours over a series of time. When examining the effect of exposure to video game violence, there is no singular factor, but a series of factors with equal importance, that can be used to explain violence and aggression. These factors include: the content of the games and the compeitive nature of the game. While this present study showed statistical significant after participants watched streaming for a short period of time, there would be higher levels of aggression in individuals due to long-term exposure to violent video games.

References

Anderson, C. A., Sakamoto, A., Gentile, D. A., Ihori, N., Shibuya, A., Yukawa, S., . . . Kobayshi, K. (2008, November). Longitudinal Effects of Violent Video Games on Aggression in Japan and the United States. *Pediatrics, 122*.

Anderson, C., Nicholas, C., Flanagan, M., Benjamin Jr, A., Eubanks, J., & Valentine, J. (2004). Advances in Environemntal Social Psychology: Violent Video Games: Specific Effects of Violent Content on Aggressive Thoughts and Behavior. *Elsevier Science and Technology, 199-250.*

Barlett, C. P., Anderson, C. A., & Swing, E. L. (2009). Video Game Effects—Confirmed, Suspected, and Speculative. *A Review of Evidence, 40*, 377-403.

Barlett, C. P., Harris, R. J., & Baldassaro, R. (2007). Longer You Play, the More Hostile You Feel: Examination of First Person Shooter Video Games and Aggression During Video Game Play. *Aggressive Behaviour, 33*, 1-12.

Bartholow, Bruce D. (2002). Effects of Violent Video Games on Aggressive Behaviors: Potential Sex Differences. *Journal of Experimental Social Psychology.*

Carnagey, N. L. (2006). Is it competitiveness or violent content?: the effects of violent sports video games on aggression. *Retrospective Theses and Dissertation*.

Dill, K. E., & Anderson, C. A. (2000). Video Games and Aggressive Thoughts, Feelings, and Behavior in the Laboratory and in Life. *Journal of Personality and Social Psychology, 78*, 772-790.

Farrar, K. M., Krcmar, M., & Mcgloin, R. P. (2013). The Perception of Human Appearnce in Video Games: Toward an Understanding of the Effects of Player Perceptions of Game Features. *Mass Communication and Society, 16*, 299-324.

Fischer, P., Kastenmuller, A., & Greitemeyer, T. (2010). Media violence and the self: The impact of personalized gaming characters in aggressive video games on aggressive behavior. *Journal of Experimental Social Psychology*, 192-195.

Gentile, D. A., Coyne, S., & Walsh, D. A. (2011). Media Violence, Physical Aggression, and Relational Aggression in School Age Children: A Short-Term Longitudinal Study. *Aggressive Behaviour, 37*, 193-206.

Gentile, D. A., Lynch, P. J., Linder, J. R., & Walsh, D. A. (2004, Feb). The effects of violent video game habits on adolescent hostility, aggressive behaviors, and school performance. *Elsevier. 27, 5 – 22.*

Haridakis, P. M., & Rubin, A. M. (2009, November). Motivation for Watching Television Violence and Viewer Aggression. *Mass Communication and Society*, 29-56.

Hilvert-Bruce, Z., Neill, J. T., Sjoblom, M., & Hamari, J. (2018, Feb 14). ocial motivations of live-streaming viewer engagement on Twitch. *Computers in Human Behaviour*, 58-67.

Huesmann, L. R. (2009). The Impact of Electronic Media Violence: Scientific Theory and Research. *J Adolesc Health. 41.* doi: 10.1016/j.jadohealth.2007.09.005

Kühn, S., Kugler, D., Schmalen, K., Weichenberger, M., Witt, C., & Gallinat, J. (2018). Does playing violent video games cause aggression? A longitudinal intervention study. *Molecular Psychiatry*, 1220-1234.

Liu, J., Lewis, G., & Evans, L. (2014). Understanding Aggressive Behavior Across the Life Span. *J Psychiatric Mental Health Nursing.*

Perry, M., & Buss, A. H. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 66*, 452-459.

Safer, D.M. (2012). Causes of State Hostility and Enjoyment in Player Versus Player and Player Versus Environment Video Games. *Journal of Communication, 64, 719 – 737.*

Sjoblom, M., & Hamari, J. (2016,). Why do people watch others play video games? An empirical

study onthe motivations of Twitch users. *Elsevier*, 1-12.

Curriculum Vitae

Name	Kimberly Clarke
Place of Birth	Kingston, Jamaica,
Secondary School Diploma:	Senior Matriculation, Appleby College, Oakville, Ontario, Canada