ASSESSING THE EFFECTS OF OBSERVING NON-PERFORMANCE-BASED
AGGRESSION DURING ONLINE VIOLENT VIDEO GAME PLAY ON AGGRESSIVE
BEHAVIOR

Elizabeth M. Kryszak

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Committee:

Eric Dubow, Advisor

Jorge Chavez
Graduate Faculty Representative

Carolyn Tompsett

Anne Gordon
In this study, I sought to extend the body of research linking violent video games to increases in aggression by further examining the effects of experiencing verbal non-performance-based aggression (NPBA) while playing an online multiplayer video game. The study also investigated whether trait aggression, trait empathy, and social dominance orientation moderated the relation between playing a violent game while experiencing verbal NPBA and aggressive outcomes. The study included 126 participants randomly assigned to four experimental groups: The first group played a violent game against a confederate who engaged in verbal NPBA, the second played a nonviolent game against a confederate who engaged in verbal NPBA, the third played a violent video game against a confederate who engaged in neutral comments, and the fourth played a nonviolent game against a confederate who engaged in neutral comments. After playing the video game, participants completed measures of their aggressive cognitions, affect, and behavior. Participants’ verbal responses during the video game play were also recorded and coded to obtain a measure of their use of verbal NPBA during the game. Participants completed online measures of trait aggression, trait empathy, social dominance orientation, and demographic information before participating in the experiment. A series of ANOVAs were completed to examine between group differences for the four aggressive outcomes and whether these were moderated by personality variables. Contrary to study hypotheses, no significant differences between groups were found on aggressive cognitions, affect and behavior. Significant group differences were found for participant use of verbal NPBA, such that those in the group that played the nonviolent game against the confederate who engaged in verbal NPBA made
significantly more NPBA statements themselves compared to the other experimental groups.

Moderation analyses revealed that the relation between playing a violent game and increases in aggressive cognitions was only significant for those who were high in trait aggression. Trait aggression was also found to moderate the relation between video game condition and aggressive affect, although contrary to expectations, only those who played the nonviolent game and were highest in trait aggression had significantly higher increases in aggressive affect. No moderation effects were found for trait empathy or social dominance orientation. Possible limitations of the study design were discussed including difficulty creating a realistic interaction between the participant and confederate while maintaining experimental control, problems with using only those with a previous history of exposure to violent video games and NPBA, and difficulties finding comparable violent and nonviolent games. The possible effects of these limitations on the current studies results were discussed, along with directions for future research.
To my mom and dad for their unwavering support over the past 30 years and their unflappable belief that I could be whatever I wanted to be. Also, to Michael Weigman, whose love and support helped carry me through to the completion of this project.
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INTRODUCTION

An overwhelming majority of research focused on violent video games has found that playing these games leads to small but significant increases in aggressive behavior, affect, and cognition, both in the short-term and long-term (Anderson & Carnagey, 2009; Anderson & Dill 2000; Bartholow, Bushman, & Sestir, 2006; Carnagey & Anderson, 2005; Cicchirillo & Chory-Assad, 2005; Polman, de Castro, & van Aken, 2008; Moller & Krahe, 2009; Shibuya, Sakamoto, Ihori, & Yukawa, 2008; Williams & Skoric, 2005). The model most often used to explain the relation between playing violent video games and aggression is Anderson and Bushman’s (2002) General Aggression Model (GAM). This model illustrates how multiple factors, including violent video game play, can have both short-term and long-term effects on aggressive behavior. The model posits that by activating aggressive cognitions, affect, and physiological arousal, playing violent video games can create short-term increases in aggression, and if played regularly, can increase aggressive attitudes and beliefs, desensitization to violence, and aggressive personality traits, which can then lead to long-term increases in aggressive behavior. Variables such as gender (Arriaga, Esteves, Carneiro, & Monteiro, 2006), personality traits (Peng, Liu & Mou, 2008), and video game characteristics (Shibuya et al., 2008) have been shown to moderate the relation between playing violent video games and aggression.

One particular video game play characteristic that is likely to increase the relation between exposure to violent video games and aggression is playing a game with other people, which creates a sense of competition not felt towards computer-generated opponents (Williams & Clippinger, 2002) and may provide players with an additional model of aggressive behavior (Schmierbach, 2010). Multiplayer online video games allow individuals to observe and engage in performance-based aggressive behavior, such as hurting and killing other players, for in-game
reward. These games also provide an environment for players to observe, experience, and engage in non-performance-based aggressive behavior such as making fun of other players’ abilities, making mocking gestures after killing another player, and excluding another from the team or group. Following the GAM and observational learning models, it would be expected that players who observe others engaging in non-performance-based aggression (NPBA) in multiplayer online games will exhibit higher levels of aggression in other settings compared to players who only observe performance-based aggression. So far the single experimental study completed in this area focused on pseudo-physical NPBA (i.e., killing another player over and over) and found that players who experienced this form of NPBA, engaged in more NPBA themselves and had higher levels of aggressive affect after playing the game (Ross & Weaver, 2012). No experimental studies have been completed so far that examine the effect of experiencing verbal NPBA on aggressive outcomes after playing the game, even though this is the most common type of NPBA observed by players (Kryszak, 2011).

In the following pages, I will describe the current literature on the relation between playing violent video games and aggression. I will provide a short overview of characteristics of those who play video games and the level of aggression showcased in these popular games. I will then describe the evidence illustrating the significant relation between playing violent video games and aggressive behavior. In order to explain this relation, I will outline the GAM and the current body of evidence of both short-term and long-term connections between violent video games and aggression-related variables. Possible moderators of this relation will also be discussed including gender, personality, and video game characteristics. Observing another player engaging in NPBA will be highlighted as a particular video game characteristic that may moderate the relation between playing violent video games and aggression. This will lead to a
discussion of how playing violent video games online against others provides a unique environment that may foster increases in aggression above and beyond just playing the violent game itself, particularly by encouraging NPBA. How NPBA is theorized to fit into the GAM model will be discussed, and the small body of research examining NPBA will be reviewed.

After reviewing these issues, I will propose the current research project which will examine the effects of observing verbal NPBA while playing a violent video game on aggressive affect, cognitions, and behavior immediately after playing the game. The study is an experimental design with four groups. Participants will either play a violent or nonviolent game and will either play against a confederate who engages in verbal NPBA or neutral interactions, creating four possible conditions. After playing the game, all participants will complete measures of their aggressive affect, cognitions, and behavior. Participants’ vocalizations during the session will also be recorded and coded to measure verbal NPBA exhibited by participants. I hypothesize that those in the group that experiences verbal NPBA while playing the violent game will have the highest levels of aggressive affect, cognitions, and behavior during and after playing the game, followed by the group that experiences verbal NPBA while playing a nonviolent game, followed by the group that experiences neutral interactions while playing the violent game. Finally, I expect the group who experiences neutral interactions while playing the nonviolent game will have the lowest level of aggressive affect, cognition and behavior during and after playing the game. I also propose that levels of trait aggression, trait empathy, and social dominance orientation will moderate these relationships, such that there will be a stronger relation between experiencing verbal NPBA while playing violent video games and higher aggressive affect, cognition, and behavior for those who are already high in trait aggression and social dominance orientation and low in trait empathy.
Overview of Video Game Usage

With over 60% of Americans playing some sort of video game on a regular basis, video games are now an integral part of our entertainment culture (Williams & Skoric, 2005). Once played primarily by children and teenagers, video games are now played across the lifespan with the average player being around 33 years old (Gentile & Gentile, 2008). Although video games are being used as a regular source of entertainment both by children and adults, the average time spent playing video games increases throughout childhood into adolescence, peaks in late adolescence, and then slowly decreases and finally levels out across the rest of the lifespan (Anderson & Dill, 2000; Gentile & Walsh, 2002). Findings regarding university students vary, with studies showing that individuals aged 18 to 25 years play on average from 2 (Anderson & Dill, 2000) to 5 hours per week (Chory & Goodboy, 2011).

Video games fall into multiple genres based on the type of game and certain context variables. Some genres are typically nonviolent or have little aggressive content, such as games which are puzzle-based or traditional sports games in which, although aggression is part of the game, too much aggression will lead to penalties. Currently though, most popular genres of video games tend to be combat-based and include a high level of aggression or violence. Although games such as these vary greatly in terms of the level of violence they contain, the majority of popular game titles now contain at least some level of violence. A 2003 analysis showed that 90% of games rated “Teen” or “Mature” and 57% of games rated “Everyone” contained violence (Smith, Lachlan, & Tamborini, 2003). Another content analysis showed that 85% of all games included some violence, while over half contained serious violence (Carnagey, Anderson, & Bushman, 2007). Studies also show that both children and adolescents prefer at least a moderate amount of violence in the games they play (Gentile, Lynch, Linder, & Walsh,
These high rates of violence in video games have led researchers to investigate whether exposure to video game violence leads to changes in aggressive behavior in other (i.e., non-game) contexts.

**Association between Playing Violent Video Games and Aggressive Behavior**

Like with other forms of violent media, there is concern that playing video games that contain violence will lead to an increase in aggressive behavior in other settings. Over the years, numerous studies have shown a significant association in children, adolescents, and young adults between playing violent video games and increases in aggressive behavior. Multiple meta-analyses have been conducted to aggregate the findings of the association between video game violence exposure and aggressive behavior. The majority of these analyses resulted in small but significant effect sizes ranging from .15 to .26, indicating that exposure to violent video games does relate to aggressive behavior (Anderson, 2004; Anderson & Bushman, 2001; Sherry, 2001). The most recent meta-analysis found small effect sizes of .21 (\( K \) (the total number of effect sizes contributing to the analysis) = 27) for experimental studies, .26 (\( K = 40 \)) for cross-sectional analyses, and .20 (\( K = 12 \)) for longitudinal studies for the relation between violent video game exposure and aggressive behavior, suggesting both short-term and long-term effects on aggressive behavior (Anderson et al., 2010).

It should be noted that two other meta-analyses did not find significant effect sizes for the relation between exposure to violent video games and aggression. The authors of these studies stated that the association has been overestimated because of publication bias and measurement error (Ferguson, 2007; Ferguson & Kilburn, 2009). Anderson et al. (2010) presented a rebuttal to these arguments providing evidence that these claims are unfounded. More specifically, Anderson et al. argued that Ferguson incorrectly used the “trim and fill” technique to provide a
“corrected” effect size when it is merely a sensitivity analysis to assess the impact of possibly missing studies on the effect size. The authors posed that because of the controversy surrounding this topic it is likely that, if there are studies missing, they are just as likely to show effects than not. The authors also pointed out that Ferguson’s inclusion criteria for studies were unnecessarily stringent as he excluded any study that did not use a direct measure of aggressive behavior. Therefore, he excluded studies that used a CRT task or similar analogous measure of aggressive behavior even though these methods have been shown to correlate well with aggression.

Despite these few findings to the contrary, the question of whether playing violent video games increases aggression appears to have been answered in the affirmative by consistent and stable findings across multiple studies and research designs. This has then led to efforts to understand the mechanisms behind how playing violent video games may contribute to an increase in aggression.

**Overview of the General Aggression Model**

The General Aggression Model (GAM) was developed to provide a more comprehensive explanation of the causes of aggressive behavior (Anderson & Bushman, 2002), particularly as an outcome of exposure to violent media. The GAM seeks to explain both short-term and long-term increases in aggressive behavior. Although the model is focused on a single present incidence of aggression, it takes into account how personal factors, such as past experiences and personality, will interact with factors of the specific situation to determine whether the individual will act aggressively.

The GAM explains how the decision on whether to behave aggressively in a particular social interaction is made in three major steps: person and situation inputs; cognitive, affective, and arousal routes through which the inputs have their effect; and outcomes based on underlying
evaluation and decision-making processes, which then influence person inputs and affect subsequent behavior.

Person and situation inputs encompass all biological, environmental, psychological, and social factors that can influence behavior in a specific situation, including aggressive behavior. Person inputs refer to the relatively stable characteristics a particular individual brings to the situation, such as personality traits, attitudes and beliefs, and genetics. Specific person inputs are theorized to be more likely to prepare a person to behave aggressively. These include personality traits such as hostile attribution biases, an unstable but high level of self confidence, being male, having certain beliefs such as high self-efficacy to carry out aggression and the belief that aggression will lead to desired outcomes, attitudes that aggression is an acceptable behavior, valuing aggression as an acceptable way to deal with certain situations, long-term goals such as wanting to be feared and respected, and scripts that include aggression as a typical way of dealing with certain situations. Situational inputs include important features of the current social situation that may influence how a person reacts. Although person inputs remain relatively stable across situations, situational inputs obviously vary. Again, specific situational factors will increase the likelihood that a person will behave aggressively. These include aggressive cues, provocation, frustration, pain or discomfort, drugs like alcohol and caffeine, and the presence of incentives that could be gained through the use of aggression.

These person and situation inputs are thought to increase the likelihood that a person will become aggressive in the current situation through three major routes: by increasing aggressive cognitions, negative affect, and physiological arousal. Increases in aggressive cognitions can lead to priming of aggressive thoughts or an increased likelihood that social cues will be perceived as hostile. Increases in negative affect and arousal will increase the likelihood that a person will not
thoroughly think through behavioral options but will more quickly or impulsively choose to act in an aggressive manner. These three variables affect the decision-making process an individual will engage in as well as the individual’s actual behavior. The outcome of the behavior will then be evaluated. Repeated activation of aggressive cognitions and affect, as well as the successful use of aggression to achieve desired goals, may lead to more permanent changes in a number of person inputs including beliefs and attitudes about aggression, aggressive perceptual schemata, aggressive expectation schemata, aggressive behavior scripts, and desensitization to aggression (Bushman & Anderson, 2002). These changes would then lead to an overall increase in aggressive personality, which would play a direct role as a person input and could lead to choosing situations that encourage aggressive behavior, such as becoming involved with a more deviant peer group or choosing situations where aggression could be more likely.

Using the framework of the GAM, violent video games would be considered a situational factor, acting as an aggressive cue that can prime aggressive thoughts, emotions, and arousal in the short-term, which could lead to immediate increases in aggressive behavior (Bushman & Anderson, 2002). Theoretically, by repeatedly activating aggressive scripts and rewarding aggressive behavior, regular long-term playing of violent video games can also lead to long-lasting increases in aggressive behavior by causing increases in aggressive attitudes and beliefs, desensitization to violence and decreased empathy, and increases in aggressive personality traits such as trait anger and hostility. Research has been done to test these possible short-term and long-term increases in aggressive variables and has typically found statistically significant connections between playing violent video games and increases in aggression-related variables.
Short-term Effects of Playing Violent Video Games on Cognitions, Affect, and Arousal

Effects on aggressive cognitions. A recent meta-analysis found a small effect size of .22 ($K = 24$) for experimental studies examining the short-term effects of playing violent video games on aggressive cognition (Anderson et al., 2010). Experimental studies have shown that playing video games for a brief time can create a short-term increase in hostile attribution biases and automatic aggressive self concept (Bushman & Anderson, 2002; Bluemke, Friedrich, & Zumbach, 2010; Giumetti & Markey, 2007; Uhlmann & Swanson, 2004). Experimental studies have also found that those who played violent video games had easier access to aggressive thoughts, as evidenced by their quicker reaction times when identifying aggressive words, when compared to those who played a nonviolent video game (Anderson & Carnagey, 2009; Anderson & Dill, 2000; Carnagey & Anderson, 2005) although other studies have found no significant effect using a similar task (Ivory & Kalyanaraman, 2007). Further research has found that those who reported higher levels of exposure to violent video games had higher levels of hostile attributions which led to higher levels of aggressive responding on a CRT task, providing support for the GAM model that playing violent video games leads to aggressive thoughts which can then lead to aggressive behavior (Bartholow et al., 2005; Hasan, Bègue, & Bushman, 2012).

Effects on aggressive affect. Research also suggests that playing violent video games may lead to increases in aggressive affect, although a recent meta-analysis found a smaller effect size for the effects of playing violent video games on aggressive affect ($r+ = .18$, $K = 37$) than on aggressive cognitions (Anderson et al., 2010). Using a scale measuring state hostility, those who played violent video games had significantly higher levels of hostility shortly after playing compared to those who played nonviolent games (Arriga et al., 2006; Ivory & Kalyanaraman, 2007; Panee & Ballard, 2002; Saleem, Anderson, & Gentile, 2012). Even when controlling for
trait hostility and prior video game exposure, playing a violent video game increased state hostility in university students (Carnagey & Anderson, 2005). Anderson and Carnegey (2009) found that college students who played a violent sports game had higher levels of self-reported aggravation than those who played a nonviolent game.

However, other studies have found no effects of violent video game play on aggressive affect. One study found no change in adolescents’ state anger after playing a violent video game (Ballard, Hamby, Panee, & Nivens, 2006). Another study found no change in self-reported aggressiveness, although this result may be due to the use of measures that tapped trait instead of state aggressiveness and were therefore insensitive to short-term increases in aggressive affect (Uhlmann & Swanson, 2004).

**Effects on arousal.** A third way violent video games are thought to affect short-term increases in aggressive behavior is through increasing physiological arousal, which can increase the likelihood of impulsive decision making and aggressive behavior. Arousal has been measured across studies in a number of ways, with the most popular being self report and physiological measures (e.g., skin conductance, heart rate, and blood pressure). Newer video games with better graphics were found to have a significantly larger effect on arousal than older games, suggesting that as game technology continues to advance, games increase in their potential to physiologically arouse players (Ivory & Kalyanaraman, 2007). Interestingly, though, the same study found that the level of violence in a game did not affect physiological arousal, suggesting that all games produce an increase in arousal. These results parallel those found using self reports of arousal, with participants playing newer games reporting a significantly higher level of arousal than those playing older games, but with no significant findings for level of game violence (Ivory & Kalyanaraman, 2007). Other studies have also found that video game
play, regardless of whether the game is violent or nonviolent, increases heart rate (Anderson & Carnagey, 2009; Ballard et al., 2006; Bluemke et al., 2010; Carnagey & Anderson, 2005), blood pressure (Anderson & Carnagey, 2009; Ballard et al., 2006; Carnagey & Anderson, 2005), and skin conductance levels (Arriaga et al., 2006; Bluemke et al., 2010). These results suggest that, although playing a video game in general increases arousal from baseline levels, violent content of the game may not play a role.

Whereas several studies examining violent versus nonviolent games have shown no differences in arousal, studies examining differences in other game characteristics such as using a controller resembling a gun and exposure to higher levels of blood, have shown that these characteristics can cause higher arousal (Barlett, Harris, & Baldassaro, 2007; Barlett, Harris, & Bruey, 2008). Also a recent meta-analysis found a small effect size of .18 for the effects of violent video game exposure on arousal (Anderson et al., 2010).

Results from other studies, however, suggest that playing violent video games may actually lead to a decrease in arousal after playing the game because violent video games lead to desensitization towards aggressive and violent behaviors. Playing violent video games has been found to cause cardiovascular desensitization (Ballard et al., 2006; Carnagey et al., 2007), lower galvanic skin responses (Carnagey, et al., 2007) and lower P300 amplitudes (Bartholow et al., 2006). A recent study examining the P3 component of the event-related brain potential (ERP) before and after playing video games found that lower P3 excitation while viewing violent images mediated the connection between playing violent games and later aggressive responding on a CRT task for those with low prior exposure to video games (Engelhardt, Bartholow, Kerr, & Bushman, 2011). This suggests that video games may actually lead to higher aggressive behaviors because they decrease arousal towards aggression. Although arousal does seem to vary
somewhat based on violent characteristics of violent games, because this finding is not consistent and appears to vary more based on just playing a video game, I will not focus on arousal as an outcome in the current study.

*Effects on aggressive behavior.* Experimental designs show the immediate causal effects of playing violent video games on short-term increases in aggressive behavior. A study assessing aggressive behavior in children aged 10 to 13 years found that children who played a violent video game were rated as more aggressive by peers than those who played a nonviolent game and those who just watched the same violent game being played, suggesting that actively controlling the character engaging in violent actions has a larger effect on aggression than passively watching the violence or playing a nonviolent game (Polman et al., 2008).

Several studies used a variation of the Competitive Reaction-Time (CRT) task as an analogous measure of aggressive behavior. In this experimental paradigm, participants are told they are competing against an unseen opponent to see who can press a button faster. They are also told that before each trial they can vary a noise blast that their opponent will receive if the opponent loses. In reality, there is no opponent and the participant will win and lose a predetermined number of trials. The average level of noise blast the participant sets can be used as a measure of his or her aggressive behavior (for an overview, see Anderson et al., 2010). Several researchers have found a significant connection between playing violent video games and increases in aggressive responding on the CRT task even when controlling for past video game exposure and trait aggressiveness (Anderson & Carnagey, 2009; Anderson & Dill, 2000; Bartholow et al., 2006, Carnagey & Anderson, 2005; Hasan, Bègue, Scharkow, & Bushman, 2012). Bartholow et al. (2005), however, found that this relation was moderated by past violent video game exposure, such that those who played more violent video games in the past showed
the same amount of aggression on the CRT task regardless of whether they played a violent or nonviolent game.

*Long-term Effects of Violent Video Game Exposure*

*Long-term changes in aggressive personality and behavior.* Correlational studies show that repeated and long-term playing of violent video games is linked to higher self-reported physically aggressive behavior among undergraduate students even when controlling for aggressive personality traits, other types of video game play, and gender (Anderson & Dill, 2000; Bartholow et al., 2005; Richmond & Wilson, 2008). For preteen youth, higher levels of playing violent video games was significantly positively related to both direct and indirect aggression (Gentile et al., 2004; Wallenius, Punamki, & Rimpel, 2007). Playing violent video games was also shown to relate to violent delinquency in a sample of institutionalized adolescents, even after controlling for the effects of screen time, years playing video games, age, sex, race, delinquency history, and psychopathic personality traits (DeLisi, Vaughn, Gentile, Anderson, & Shook, 2013).

The few longitudinal studies that have been completed link earlier violent video game play to later aggression-related variables. When controlling for time one aggressive behavior and attitudes towards aggression, it was found that violent video game play of preadolescent children was related to higher levels of hostility in boys one year later, but not to higher levels of aggressive behavior (Shibuya et al., 2008). No significant relation was found for girls. The authors did find, however, that when they investigated specific context variables of violent video games played at time one, many of these were related to later aggression in both boys and girls (i.e., attractiveness of perpetrator, type of violence, and pain or harm experienced by the victim), suggesting that not all video games that are considered “violent” have the same effect on
aggressive behavior. When controlling for sex, age, parent-child communication, and self-reported aggression at time one, another study found that time one violent video game play was related to self-reported aggression for 10- to 13-year old children two years later (Wallenius et al., 2007). A third study found that violent video game play in early adolescents predicted self-reported physical aggression six months later (Moller & Krahe, 2009). Finally, a fourth study found that violent video game play predicted increases in aggression in adolescents over a three-year period when controlling for previous levels of aggression. No change was found for those who played only nonviolent games (Willoughby, Adachi, & Good, 2012).

Many critics of the link between playing violent video games and aggression have often used the argument that effects found are merely the spurious result of individuals with more aggressive personalities selecting to play violent video games (Bartholow, Sestir, & Davis, 2005). However, studies that have controlled for personality traits related to aggression continue to show significant connections between playing violent video games and other indices of aggression (Anderson & Dill, 2000; Bartholow et al., 2005). Although it is likely that some people who play violent video games have developed aggressive personality traits due to other factors besides playing the games themselves, the GAM posits that one avenue through which playing violent video games can lead to a long-term increase in aggression is by repeatedly triggering aggressive cognitions which can lead to an increasingly aggressive personality (Bushman & Anderson, 2002). Evidence for this relation was provided by one longitudinal study, which found that, while violent video game play at time one predicted physical aggression at time two, physical aggression at time one did not predict violent video game exposure at time two (Moller & Krahe, 2009). These results suggest that, at least in adolescents, playing violent
video games has a significant effect on future aggressive behavior, while aggressive behavior has little effect on future violent video game play.

*Desensitization/decreased empathy.* It has been theorized that repeated exposure to violence and aggression may also lead to long-term desensitization to related stimuli (Ballard et al., 2006). Although the meaning of “desensitization” can vary, for this context the most appropriate definition is “a reduction in emotion-related physiological reactivity to real violence” (Carnagey et al., 2007). Repeated exposure to violent video games over time may create long-term decreases in physiological, emotional, and behavioral responses that typically are related to emotions such as fear, horror, and disgust (Bartholow et al., 2006; Funk, Buchman, Jenks, & Bechtoldt, 2003). Decreases in these emotions can lead to an increased tolerance and acceptance of violent behavior as normal and a decrease in empathic responding, which in turn can lead to more aggressive behavior (Ballard et al., 2006; Bartholow et al., 2006).

A recent meta-analysis found a small effect size of -.19 ($K = 14$) for the long-term effects of violent video game play on empathy, suggesting that over time, playing violent video games may result in a decrease in empathy, which suggests that players may experience an increase in their cognitive desensitization to the impact of violence on others (Anderson et al., 2010). Funk et al. (2003) found that children with higher past video game exposure had lower levels of empathy and higher levels of aggressive cognitions, suggesting that repeated exposure to video games may decrease empathy for victims of aggression which could lead to higher acceptance of aggressive behavior. It should also noted that the U.S. military now uses video games for a variety of training procedures, including desensitizing soldiers to the violence they may experience on the battlefield (Carnagey et al., 2007; Funk et al., 2003).
Changes in attitudes, beliefs, and values. Another way repeated playing of violent video games is thought to influence long-term increases in aggressive behavior is by changing person inputs such as beliefs, attitudes, and values related to aggression. Because violent video games provide rewards to individuals for repeatedly practicing aggression to successfully solve interpersonal conflicts across a variety of contexts, this may lead to individuals having higher self efficacy to use aggression and to the belief that aggression is likely to lead to positive outcomes (Gentile & Gentile, 2008). Repeatedly engaging in aggression in video games may also increase the individual’s belief that aggression is an acceptable way to deal with interpersonal conflicts and may increase the use and generalizability of aggressive scripts.

Anderson et al. (2010)’s meta-analysis reported a small effect size of .12 ($K = 8$) for the effect of regular violent video game exposure on aggressive cognition and .08 ($K = 5$) for effect on aggressive affect when examining longitudinal data, suggesting that exposure to violent video games does have modest but significant long-term effects on aggressive thoughts and emotions. A study by Gentile and Gentile (2008) found that children and adolescents who played multiple violent video games and those who had high levels of distributed practice of playing violent games at time one had higher hostile attribution biases than children who played only one or a few. Hostile attribution bias then mediated the pathway between multiple violent video game play and aggressive behavior, suggesting that exposure to aggressive play across multiple contexts may increase aggression by first increasing aggressive cognitions.

Moderators of the Effects of Playing Violent Video Games

The research provided thus far suggests a significant link between playing violent video games and increases in aggression. Obviously, playing violent video games is only one of many factors that determines the likelihood of aggressive behaviors and violent video games are
unlikely to affect all players in the same way. As the GAM model proposes, playing violent video games is one out of several inputs that influence aggressive affect, cognition, and arousal, which in turn affect decision making and ultimately whether an individual behaves aggressively in a particular conflictual social situation. Several studies have examined whether variables such as gender, personality traits, and game play characteristics moderate the relation between playing violent video games and aggression.

**Gender.** Because females consume less violent media and are, in general, less physically aggressive than males, claims have been made that violent media in general, and violent video games in particular, have less of an effect on females than on males (Anderson & Murphy, 2003). Research has shown consistently that males are more physically and verbally aggressive than females (Crick & Grotpeter, 1995, 1996; Musher-Eizenman et al., 2004), and research has also shown that males are more likely than females to play video games in general, as well as to play more violent games in particular (Anderson & Dill, 2000; Arriga et al., 2006; Krahe & Moller, 2004; Terlecki et al., 2011). It has been found that males also prefer a higher level of violence in the games they played compared to females (Gentile et al., 2004; Shibuya et al., 2008). Because males more often play aggressive games and, therefore, have greater opportunity to be affected by the aggression they observe and engage in, only males will be focused on in the current study.

**Personality traits.** Although it is difficult to determine whether playing violent video games makes a contribution to developing an aggressive personality or whether aggressive personalities are more attracted to violent video games, evidence is compiling illustrating that existing personality traits may compound with exposure to violent video games to create larger increases in aggression. Personality traits related to aggression were found to moderate the
connection between playing a violent video game and short-term increases in aggressive cognitions (Anderson & Carnagey, 2009; Giumetti & Markey, 2007), aggressive affect (Arriaga et al., 2006; Markey & Markey, 2010), and aggressive behavior (Bartholow et al., 2005; Cicchirillo & Chory-Assad, 2005; Gentile et al., 2004; Peng et al., 2007). Correlational data show that those higher in trait aggression, lower in trait empathy, and who more often played violent video games had the highest level of aggressive behavior (Anderson & Dill, 2000; Bartholow et al., 2005). A recent experimental study found that the connection between playing a violent video game and increases in aggressive behavior were only significant for those with a high level of trait aggression (Engelhardt, Bartholow, & Saults, 2011). Based on these findings, aggressive and empathic personality traits will be examined as possible moderators in the current hypothesis.

Another personality trait that has not yet been explored in the literature, but which may also moderate the relation between video games and aggression, is social dominance orientation. Social dominance orientation refers to the belief that one’s own group is superior to other groups and therefore it is acceptable to treat groups unequally (Pratto, Sidanius, Stallworth, & Malle, 1994). This trait may be particularly pertinent when examining the effect of multiplayer games where players are in competition with each other. High social dominance orientation may serve as a person input that could make it easier for a person to act aggressively towards others that he or she views as part of an inferior group. Playing a multiplayer game that pits one team against another team may serve as a situation input that would be more likely to activate social dominance beliefs that one team is better and therefore deserves to destroy the other team. As a result, those who are higher in social dominance orientation may experience a larger increase in aggression after playing a multiplayer violent game than those who are lower in social
dominance orientation. Therefore social dominance orientation will also be included as a moderator in the current study.

*Game play characteristics.* So far, violent video games have been discussed as a homogeneous variable. But, violent games vary on a number of characteristics that may affect subsequent aggression, including theme of the story and related violence (e.g., aggression is justified vs. unjustified), point of view of the player (e.g., first person vs. third person), main character characteristics (e.g., gender, attractiveness, personality), graphicness of the violence (e.g., amount of blood, type of weapon, sophistication of graphics), and many others (see Shibuya et al., 2008 for a review). For example, Shibuya et al. (2008) found that, for boys, an attractive perpetrator, justified violence, unjustified violence, reality of the violence, and presence of pain in victims predicted later hostility, anger, and aggressive behavior. For girls, justified violence and hostile humor predicted later anti-violent norms, but no variables predicted higher levels of aggressive behavior. Evidence also suggests that video games that have more realistic violent interactions such as higher level of blood, playing a game involving fist fighting versus using a gun, or involving a controller shaped like an actual gun may lead to more aggression (Bartlett et al., 2007, 2008; Eastin & Griffiths, 2006; McGloin, Farrar, & Krcmar, 2013).

In addition to the aggressive cues provided by playing the violent video game itself, playing against other people may heighten effects on aggression. Individuals are likely to feel a sense of competition when playing against another player that they do not feel when playing a computer opponent (Williams & Clippinger, 2002). Goals can change when playing a game against another player versus playing against a computer. Individuals may feel a heightened desire to “look good” in front of other players or to beat a particular player to prove they are
better. This sense of competition combined with losing to another player can lead to a heightened feeling of frustration (Williams & Clippinger, 2002). As already discussed, frustration is a possible input in the GAM model that can lead to increases in aggressive cognitions and affect, which can then lead to increases in aggressive behavior. Some research on competition in video games has shown that frustration increases when playing against other players, rather than against a computer-generated opponent (Eastin & Griffiths, 2006). Other research, however, contradicts this model. When university students played a nonviolent game against a computer, their aggressive affect was higher than when they played against another player (Williams & Clippinger, 2002). It should be noted that the participants in William and Clippinger’s study played the game in the same room together and that the game contained no violence or aggression. It may be that these participants played the game less aggressively because of a fear of retaliation from the player in the same room or because of the nature of the game. The effects may have been different if opponents were in different rooms.

Based on a social learning model, playing against another person may also provide an avenue for greater aggression by providing a more aggressive model or by eliciting more aggressive action than the computer-generated opponent would (Schmierbach, 2010). A study of participants playing a violent video game either solo or competitively or cooperatively with another player found that those in the competitive condition experienced higher levels of aggressive cognitions (Schmierbach, 2010). The authors found that these results were partially mediated by level of violent strategizing, in that those playing competitively against another player used the highest level of violent strategizing. Overall, it appears that playing video games against another human player is a particular violent video game play feature that may impact aggression levels.
Overview of Multiplayer Online Games

In recent years there has been an increase in games that include a multiplayer online feature that allows players to interact not only with computer-controlled opponents, but with other players, present and in other locations (Schmierbach, 2010). One type of online platform that has become increasingly popular involves players logging in and out of a virtual environment that is always “on” even when they are not playing. Players can usually communicate with each other through typed messages or by speaking to each other through headsets, allowing players to interact personally with other people in remote locations.

Currently, the most popular of these games fall into two major categories based on the major goals of the game. The first type, the Massive Multiplayer Online Role-Playing Game (MMORPG), is based primarily on combat and conflict, but the conflict is typically directed towards computer-generated enemies and almost never between online players (e.g., World of Warcraft; Williams & Skoric, 2005). In fact in order to be successful in these games, players must often form teams and work cooperatively to fight and defeat enemies. Applying the GAM model, these prosocial aspects of these games may dampen the effect of the repeated violent action on players’ affect and cognitions. A longitudinal study examining this type of game enlisted participants to play a specific MMORPG for one month and then compared them to a group that did not play the game, on number of arguments they had with friends and significant others (Williams & Skoric, 2005). The authors did not find significant results, suggesting that although these games contain a large amount of violent play, perhaps they also foster cooperation among players, which may lead to less of an increase in aggression. It should be noted that this study did not control for other violent video game play of either group, and the measure of aggressive behavior was extremely limited and subjective (i.e., a 2-item measure that
asked participants whether they had a serious argument with a friend and with their significant other within the last month).

Another popular genre of online games is first-person shooter (FPS) games, which pit players in a war-like “fight to the death” against other online players, where players are either on teams or solo and the goal is to kill all enemy players. Although players are often on a team so some cooperative play is encouraged, the primary goal is typically to kill as many players from the opposite team as possible. Jansz and Tanis (2007) surveyed over 750 people who played online FPS games and found that 99% of the sample was male and the mean age was 18-years-old (SD = 3.9; range 12 -50 years old). The authors also found that respondents played an average of 2.6 hours online a day (M=156.56 min, SD=58.32). This suggests that these are popular games played across the lifespan with those either in high school or just past high school age playing most often and that those who play them spend a relatively large portion of time doing so.

**Overview of Non-Performance-Based Aggression (NPBA)**

The multiplayer online setting of FPS games allows players to not only repeatedly observe and engage in game performance-based aggressive behaviors, such as killing other opponents to gain points and win the game, but also to observe and engage in non-performance-based aggressive behaviors above and beyond those related to “achievement” in the game. For example, players can engage in verbally aggressive acts such as swearing at other players, verbally threatening them with either in-game or out-of-game harm, and making fun of their abilities. Players also can engage in pseudo-physically aggressive acts which are not related to game play such as killing another player for fun, killing the same player over and over to “teach them a lesson” or harass them, and making mocking gestures after killing another player (e.g.,
“rapeage” is slang for a behavior commonly done in games such as “Call of Duty” and “Halo” where, after a player kills another player, he will make his character repeatedly bend down and stand up so it looks as if the character is raping the corpse of the other player’s character.

Finally, players have the opportunity to engage in relationally aggressive acts such as excluding another from their team or group and convincing other players to gang up on another person to kill him or not help him.

Relating non-performance-based aggression (NPBA) back to the GAM model, observing NPBA while playing a violent multiplayer online video game is likely to provide additional situation inputs that may lead to an increase in aggression. Observing NPBA is likely to cause the same type of short-term increases in aggressive cognitions and affect as would just observing the violence and aggression that are part of the violent game. It is also likely that experiencing these behaviors from other players may increase frustration, leading to more aggressive affect and cognitions in the short-term. This may in turn lead to a greater chance of players engaging in aggressive behavior, including an increased likelihood that they will engage in NPBA themselves. It is also likely that watching other players engage in NPBA may provide a social learning model for new additions to one’s own repertoire of aggressive scripts. Watching other people engage in aggression rather that just watching computer-operated characters may also be a more salient model of aggression, that may lead to players engaging in more aggressive behavior, including NPBA, both in the short-term and long-term.

The difference in motivations for engaging in performance-based aggression and NPBA may also be important when judging how observing an aggressive model may affect person input variables such as players’ non-game aggressive scripts. Performance-based aggression is used to achieve some goal in the game (e.g., score points, beat monsters, and receive items). Players may
not easily perceive these goals, and the aggressive scripts they use to achieve them in-game, as applicable to goals and scripts in their real-world environment. It appears, on the other hand, that NPBA is used when the player’s goal is to harm another player in order to achieve outcomes such as getting revenge on, irritating, or angering the other player, or in an attempt to resolve or win a personal conflict. These goals appear far more applicable to goals a person may have in the real-world environment in certain social situations. Therefore, repeatedly observing others engaging in NPBA to successfully achieve these goals may strengthen the player’s scripts for using aggression and beliefs that aggression is an acceptable way to achieve desired outcomes. Finally, observing and engaging in NPBA repeatedly is likely to have similar long-term cognitive effects as observing or engaging in performance-based aggression. More specifically, players will learn to have more accepting attitudes towards aggression, see it as a viable way to handle conflict, experience greater moral disengagement and desensitization towards aggression, and perhaps develop more aggressive personalities. This will lead to lasting changes in person inputs that will cause long-term increases in aggression.

Only a few studies examining the effects of NPBA have been completed so far. An unpublished study examining these behaviors found that verbal NPBA was observed more frequently than pseudo-physical and relational NPBA. It was also found that observing NPBA moderated the relation between playing violent video games and aggression (Kryszak, 2011). More specifically, it was found that a history of higher levels of violent video game play was associated with trait aggression only for those who also had a history of observing higher levels of NPBA. An experimental study looking at the effects of experiencing NPBA (referred to as “Griefing” in this study) was also recently completed (Ross & Weaver, 2012). This study examined the effects of being killed multiple times during a round by the same player on
participants’ subsequent game play and changes in their aggressive affect. Results indicated that experiencing this pseudo-physical NPBA increased the likelihood that participants would engage in the same type of NPBA themselves and also increased their levels of aggressive affect. Because the study did not provide a way for participants to verbally communicate with the confederate, verbal NPBA was not examined. While this research provides preliminary evidence that NPBA affects aggression above and beyond just playing a violent video game, further experimental research must be done to examine whether experiencing verbal NPBA causes increases in aggressive thoughts, affect, and behavior above and beyond just playing violent video games with another player.

Current Study and Hypotheses

The major goal of the current study is to determine whether observing verbal NPBA while playing a violent video game causes an immediate increase in aggressive cognitions, affect, and behavior. Male participants will play a video game in one of four conditions: playing a violent game against a confederate who will engage in verbal NPBA, playing a violent game against a confederate who engages in neutral interactions, playing a nonviolent game against a confederate who will engage in verbal NPBA, and playing a nonviolent game against a confederate who engages in neutral interactions. After playing the game, participants will complete measures of their aggressive cognitions, affect, and behavior. Participant vocalizations will also be coded to determine the amount of verbal NPBA used by participants. Baseline levels of aggressive personality, trait empathy, social dominance, and previous history of playing violent video games will be collected beforehand through an online survey.
Based on the GAM and previous research assessing the association between playing online violent video games and immediate changes in aggression after playing these games, I have four main hypotheses.

1) I hypothesize that the between-groups results of a word completion task that measures aggressive cognition will be as follows: those who experience verbal NPBA while playing a violent video game will have the highest level of aggression cognitions after playing the game; followed by those who experience verbal NPBA while playing a nonviolent video game, then by those who experience neutral statements while playing a violent video game; and those who experience neutral statements while playing a nonviolent video game will have the lowest level of aggressive cognitions. My rationale for hypothesizing that the group who experienced the verbal NPBA while playing the nonviolent game would exhibit a higher level of aggression after the game than the group who experienced neutral statements while playing the violent game was that I conceptualize the verbal NPBA as a more realistic model of aggression likely to be used in other settings and a more personally insulting form of aggression than the in-game violence. Players are unlikely to be faced with having to respond to an alien invasion in their lives, but they will likely be faced with someone insulting them at some point, making experiencing verbal NPBA a more salient situational input than the violence experienced while playing the video game. Also, the violence in the game is directed at the participants’ avatar, whereas the verbal NPBA statements are directed at the actual participants likely making them more personal.

2) I expect similar between-group results for a self-report measure of aggressive affect completed after the game is played. Those who experience verbal NPBA while playing a violent video game will have the highest level of aggressive affect, followed by those who experience verbal NPBA while playing a nonviolent video game, followed by those who experience neutral
statements while playing a violent video game; finally those who experience neutral statements while playing a nonviolent video game should exhibit the lowest level of aggressive affect.

3) I again hypothesize similar between-group results for average noise blasts given on a Competitive Reaction Time (CRT) task after playing the game: Those who experience verbal NPBA while playing a violent video game will give the highest level of noise blasts, followed by those who experience verbal NPBA while playing a nonviolent video game, followed by those who experience neutral statements while playing a violent video game; finally those who experience neutral statements while playing a nonviolent video game should give the lowest level of noise blasts.

4) Finally, I hypothesize similar between-group results will be obtained for the amount of verbal NPBA participants exhibit during video game play. I expect that those who experience verbal NPBA while playing a violent game will exhibit the highest level of verbal NPBA, followed by those who experience verbal NPBA while playing a nonviolent game, followed by those who play the violent game while experiencing neutral statements from the confederate, and lastly by those who experience neutral statements while playing the nonviolent game.

I will also examine whether trait aggression, trait empathy, and social dominance moderate the relation between my four conditions and the aggression outcome variables. Specifically, I hypothesize:

5) The relation between experiencing verbal NPBA and/or playing a violent video game and participants’ aggressive cognition, affect, and behavior after playing the game, as well as their level of verbal NPBA during game play, will be stronger for those higher in trait aggression;
6) The relation between experiencing verbal NPBA and playing a violent video game and participants’ aggressive cognition, affect, and behavior after playing the game, as well as their level of verbal NPBA during game play, will be stronger for those lower in trait empathy;

7) The relation between experiencing verbal NPBA and playing a violent video game and participants’ aggressive cognition, affect, and behavior after playing the game, as well as their level of verbal NPBA during game play, will be stronger for those higher in social dominance.
METHOD

Participants and Procedures

One hundred and twenty-six participants were recruited from undergraduate psychology classes at Bowling Green State University. The number of participants was chosen based on a power analysis computed using the G*Power 3 interface (Faul, Erdfelder, Lang, & Buchner, 2007) employing an effect size of .4 based on previous experimental studies examining the relation between violent video games and aggression. The specific studies examined used the same measures that were used the current study to measure aggressive affect, cognition, and behavior and found effect sizes ranging from .3 to .5 (Anderson & Carnagey, 2009; Anderson & Dill, 2000; Bartholow, Bushman, & Sestir, 2006; Carnagey & Anderson, 2005). Because previous research (e.g., Arriga et al., 2006; Krahe & Moller, 2004) has shown that males are more likely to play violent video games than females, only male participants were recruited. Participants had to be at least 18-years-old and have played games online in a format where they could communicate with others in the past year.

Twelve (11.1%) of the 126 participants could not remember their ID numbers when they came for the second part of the study so background information is unavailable for them. The remaining participants’ ages ranged from 18 years old to 39 years old, although all but two of the participants (97%) were between the ages of 18 and 22 years old. The two participants above age 22 (i.e., ages 36 and 39 years old) were removed as outliers from all other analyses, leading to a primary group of 124 participants. Of the remaining 112 participants, the majority were in their first year of undergraduate study (56%), with another 30% in their second year, 9% in their third year, and 5% in their fourth year. GPA was distributed among students as follows: 13% between a 1.0 and 2.0, 41% between a 2.0 and 3.0, and 46% between 3.0 and 4.0. Forty-six percent of the
sample indicated that they had a part time job and 54% stated that they did not currently have a job. Examining relationship status, 37% were single, 17% had ended a committed relationship within the last year, 41% were currently in a committed relationship, and 5% were engaged. See Table 1 for the full demographic characteristics of the participants.

Participants were randomly assigned to one of four groups: the first condition involved participants playing a violent video game with a confederate who engaged in verbal NPBA; the second condition involved them playing a violent video game with a confederate who made neutral statements; the third condition had participants play a nonviolent game with a confederate who engaged in verbal NPBA; and the final condition had participants playing the nonviolent game against a confederate who made neutral statements. The confederates were two male undergraduate research assistants with experience playing video games on an Xbox gaming console. The first confederate participated in 75 trials (60%) while the other confederate participated in 51 trials (40%). Conditions were relatively equally distributed between trials so that each condition accounted for about 25% of each confederate’s trials. Confederates worked with this investigator to develop a list of NPBA statements and neutral statements to be used in the study based on their extensive observation while playing online multiplayer games. These statements fit HSRB stipulations (e.g., no swearing, racial slurs, or direct threats). Originally, ten NPBA statements and ten neutral statements were created to be used as a script for each trial (see Appendix A for list of statements). The statements were designed to be used with both types of games (violent and nonviolent), and the plan was to have confederates say a statement about once per minute in the order listed on the script. During pilot testing however, this script often sounded unnatural and it was difficult to fit the statements in with what was going on with the game at that moment. As a result 6 of the 10 participants became suspicious and figured out they
were playing against a confederate before debriefing. Thus, a more flexible script was designed in which confederates made ten neutral or NPBA statements once per minute based on the script but not using the exact wording. Participants could also say the statements in an order that seemed most natural. This procedure resulted in only 13 out of 126 participants figuring out they were playing against a confederate before the debriefing. It should be noted that all analyses were computed with these 13 participants first included and then with the participants removed. An identical pattern of significant and non-significant results was found, so the decision was made to include the 13 participants to add to the overall power of the study.

An Xbox video game console was used to play the video games, as it had features that allowed the participant and confederate to play against each other in separate rooms and allowed them to communicate in real time through the use of a headset. The systems were connected using an Ethernet cord that allowed a system link to be created so that players could play against each other in a closed online environment not connected to the internet. The violent video game used was Gears of War 4. This is a first person shooter game that allows players to use a variety of creative weapons (e.g., chainsaw, shotgun, rocket launcher) to attack and kill enemies from both far and close range. All hits result in a liberal amount of blood loss, and once an enemy is knocked down there is an option of completing a gory finishing move that results in more points (e.g., stomping in the enemy’s skull). Due to the way the system link is set up for this game, the participant and confederate had to be on the same team to be able to communicate by headset. Therefore to create competition, the participant was told that they would be on the same team as the confederate, but competing to see who could get the most kills. Participants were then on a four person team with the confederate and two computer-generated teammates facing a team of four computer-generated opponents. One ten minute match was played. During this match the
confederate checked the score regularly, trying to keep within 1-3 kills of the participant and then winning in the end.

The nonviolent game chosen was Dirt 3, a formula one racing game. The game was set to a staggered start so that one player would start racing his car and then a few seconds later the next player started. Wins were based on total time taken to complete the race course rather than who crossed the finish line first. Collisions were turned off so that players could not crash into each other. These two settings made it so the participant could not engage in any aggressive play with the confederate (i.e., crashing cars into each other), minimizing in-game violence to players accidentally crashing their own cars into trees or other obstacles along the sides of the course. When players did crash, the car became damaged but no injury to the driver could be seen. Participants engaged in three races against the confederate, each averaging 3 minutes in length. The confederate was instructed to win the first and last race and lose the second race.

To recruit participants, a summary of the study was posted on the Psychology Department’s online scheduling system. Eligible students signed up for the study using this system. A cover story, that the experiment was to determine the effects of playing video games on reaction time, was used to avoid demand-characteristic biases (see Appendix B for the entire script). Participants completed background questionnaires online (i.e., demographics, trait aggression, empathy, social dominance, video game play history) and at the end of the survey created an ID number for themselves. After they were assigned credit for completing the online surveys, they were able to sign up for the second part of the study where they came to the lab in the Psychology Building at their assigned time. When they arrived, they completed an informed consent process that outlined the study and explained possible risks and benefits (see Appendix C for full consent forms). They also gave their ID number so that the data from the online
surveys could be connected to the data in the session while protecting their confidentiality. Participants were told that the participant they would play against was in a different room and that they would not meet the participant in order to simulate a typical online gaming experience where opponents typically do not meet face-to-face. They were also told that another group of participants was being run at the same time, so that when they got to the reaction time game (i.e., CRT task), one participant from their group would switch rooms with a participant from the other group. This was to avoid participants being biased on the CRT by thinking they were playing against the confederate again. Participants then practiced the game they were going to be playing for about 5 minutes. Once practice was completed, participants played the video game against the confederate for about 10 minutes.

For trials in the NPBA conditions, the confederate engaged in ten NPBA statements (e.g. “you suck at this game! I am way better than you,” “You’re pathetic,” “My sister is better than you”), making about one statement per minute. In the neutral conditions, the confederate made ten neutral comments throughout the game (e.g. “I haven’t played a game like this in awhile,” “Now I am getting it,” “They must be coming from that direction”) also at the rate of one statement per minute. If participants asked a question or attempted to engage the confederate in extended conversation, confederates were instructed to respond but to keep answers short and to not encourage more conversation. The confederates started every session in all four conditions by asking if the participant had ever played the game, if the participant did not ask this question first. This was done to briefly break the ice between the two players so further statements did not seem to come out of nowhere, which had been a critique during pilot testing.

Once the 10 minutes of game play were over, participants completed measures of their aggressive affect, cognition, and behavior. The order of these measures was rotated to avoid
order effects. The word completion task to assess aggressive cognition was presented as a test of participants’ solo reaction time to see how many words they could complete in three minutes. The CRT was presented as a competitive reaction time task to see who could press a button faster. Finally, participants completed a short suspicion measure in which they were instructed to put in their own words what the point of the study was. After the entire experiment was completed, participants were debriefed as to the true goal of the experiment, which was to assess the relation between experiencing NPBA and type of game on their aggressive behavior (see Appendix C for debriefing script). Participants received research credit or extra credit in their psychology class for their participation. The entire procedure took about one hour to complete.

**Measures of Control Variables**

*Time spent playing video games.* This measure was used to assess and control for prior history of general video game play (see Appendix E). Participants were asked to indicate how many hours of off-line video games they typically played each day of the week. Participants were also asked how many hours they typically play video games each day of the week online in a situation where they could communicate with other players. The mean of the seven values was taken separately for online and offline play to determine the average number of hours participants played video games per day both online and offline.

*Exposure to violent video games.* This measure was used to assess and control for previous frequency of playing violent video games (Anderson & Dill, 2000). Participants were asked to list their five favorite games. After each game, they indicated how often they played each game and how violent the content and graphics of the game were. The 7-point scale of how often they play each game was anchored with 1 = rarely, 4 = occasionally, and 7 = often. The questions assessing violence of graphics and content were anchored with 1 = little or no violent...
graphics or content and 7=extremely violent graphics or content. A violence exposure score was computed by averaging the violent graphic and content rating for each game and multiplying by how often each game is played. These five values were then averaged to create an overall index of video game violence exposure. Past reliability for this measure was .86 (Anderson & Dill, 2000). See Appendix F for the full measure.

Demographics. This measure sought basic demographic information including age, year in college, GPA, employment status, and parental education. These variables were used to assess demographic differences in major study variables to determine if these variables needed to be controlled in subsequent analyses. The full measure is presented in Appendix G.

Because participants were randomly assigned to the four experimental conditions, it was expected that there would be no significant differences across conditions in the control variables, but by administering these measures, it could be determined whether random assignment was effective. These measures were also used to describe various characteristics of the sample.

Measures of Potential Moderating Variables

Aggressive personality. The Aggression Questionnaire (AQ; Buss & Perry, 1992) was used to measure trait aggressiveness with four subscales, each measuring a subtrait of aggression in order to assess whether trait aggression is a moderator between the different experimental conditions and aggressive cognition, affect, and behavior. Physical Aggression is measured with nine items such as “If somebody hits me, I hit them back.” Verbal Aggression is assessed using five items, including, “My friends say I am somewhat argumentative.” Anger is measured with seven items, such as “I have trouble controlling my temper.” Hostility is assessed by eight items, including “At times I feel I have gotten a raw deal out of life.” Each item is rated on a 5-point
scale from 1 = “not characteristic of me” to 5 = “extremely characteristic of me”. See Appendix H for the complete list of items.

Two items on the scale are reverse coded and items are then summed so that scores can range from 29 to 145 with higher scores indicating higher aggressive personality. This scale was found to have an alpha of .89 and a nine week retest reliability of .80 (Buss & Perry, 1992). Past alphas were as follows: Physical Aggression, .85; Verbal Aggression, .72; Anger, .83; Hostility, .77; and overall, .89. Nine week retest reliabilities for these subscales were as follows: Physical Aggression, .80; Verbal Aggression, .76; Anger, .72; Hostility, .72; and overall, .80. This scale was also shown to have good validity, with total scores being significantly correlated with measures of impulsiveness, assertiveness, competitiveness, and emotionality. All four subscales as well as the total ASQ scores were also significantly correlated with peer nominations of aggression. Current alphas were as follows: Physical Aggression, .87; Verbal Aggression, .70; Anger, .82; Hostility, .81; and overall, .92.

**Trait empathy.** Trait empathy was measured by a subscale from the Interpersonal Reactivity Index (IRI; Davis, 1983) in order to assess whether empathy is a moderating variable of condition effects. This measure asks participants to rate 28 items on a 5-point scale ranging from 1= *Does NOT Describe me well* to 5 = *Describes me VERY well*. The measure is composed of four 7-item subscales measuring four factors of empathy: Perspective Taking, Empathic Concern, Fantasy, and Personal Stress. The Empathic Concern subscale was used for this study because it appears to best capture the concept of empathic personality that is theorized to moderate the relation between playing video games and aggression. The Empathic Concern subscale assesses the tendency to experience feelings of warmth, compassion, and concern for
other people (e.g., “I often have tender, concerned feelings for people less fortunate than me”). See Appendix I for the items comprising this subscale.

Three items on the Empathic Concern subscale were reversed scored and then the items were averaged. This scale has shown good internal reliability in the past (alphas ranged from .71 to .81; Bartholow et al., 2005; Davis, 1983) and was shown to be positively correlated with social competence, self-esteem, emotionality, and sensitivity to others (Davis, 1983) and negatively correlated with violent video game exposure and trait aggression (Bartholow et al., 2005). The alpha for the current study was .70.

**Social Dominance Orientation.** To be able to assess whether social dominance was a moderator between experimental conditions and aggressive outcomes, the Social Dominance Orientation scale was administered (Pratto et al., 1994). This measure asks participants to rate 16 items on a scale from 1=Strongly Agree to 7=Strongly Disagree. Eight of the items are then reversed scored and an average of all items is taken to obtain a score of participants’ beliefs that some groups are inherently better than others and therefore unequal treatment of groups is expectable. See Appendix J for the full measure. Scores can range from 1 to 7 with higher scores indicating a stronger social dominance orientation. Past research indicated an internal consistency of .83 and test retest reliability of .81 (Pratto et al., 1994). This study also demonstrated that the scale was negatively correlated with empathy, tolerance, altruism, and communality. The alpha for the current study was .92.

**Measures of Outcome Variables**

**Measure of aggressive cognitions.** The Word Completion Task developed by Anderson, Carnagey, and Eubanks (2003) was used to measure aggressive cognitions after participants played the video game. The task involves a list of 98 words with letters missing. Participants are
asked to complete as many of the words as they can in 3 minutes. Based on analyses done by the authors, most of the words can be completed in several different ways (e.g., “h_t” can become hit or hat) and 50 of the words can yield answers that are clearly aggression-related (e.g., kill, choke, attack). Participants’ answers were coded on a system created by the measure’s authors as “neutral,” “ambiguous,” “aggressive,” and “non-word.” The number of aggressive words completed was divided by the total number of words completed to create a measure of aggressive cognitions. Past studies that used this measure found that it significantly related to different aspects of violent video game play (Anderson, et al., 2004; Eastin, 2006). See Appendix K for the full measure.

Measure of aggressive affect. The State Hostility scale (Anderson, Deuser, & DeNeve, 1995) was used to measure aggressive affect after playing the violent video game. This is a 35-item measure that asks participants to rate how much they agree or disagree with each statement about their current affect on a 5-point scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Each statement begins with the stem, “I feel…” and 24 of the statements ask about emotions relating to angry and hostile feelings (e.g., irritated, furious, unsociable) while an additional 11 ask about prosocial feelings (e.g., friendly, understanding, amiable). After the 11 prosocial items are reverse-scored, a mean score is taken of all 35-items to reflect a measure of state hostility, with higher scores indicating higher levels of hostile affect. Anderson et al. (1995) found that participants’ levels of hostility measured by the SHS rose as the temperature of the room rose. The measure has been used in several experimental studies measuring the effect of violent video game play on short-term increases in aggression and has been found to have adequate internal consistency (α = .84 to .95 ; Anderson & Carnagey, 2009; Barlett et al., 2008;
Carnagey & Anderson, 2005; Ivory & Kalyanaraman, 2007; Ross & Weaver, 2012). The alpha for the current study was .95. See Appendix L for the full measure.

**Competitive Reaction Time (CRT) task** (Taylor, 1967). Participants’ aggressive behavior was measured using a Competitive Reaction Time (CRT) task that has been widely used in experimental research to assess immediate changes in aggressive behavior (Anderson & Carnagey, 2009; Anderson & Dill, 2000; Bartholow et al., 2006, Carnagey & Anderson, 2005). Participants were told the following at the beginning of the experiment: “Since video games allow you to learn a bit about what another person's reaction time is like, we will have you play the reaction time game against someone new who is participating in this same experiment in another set of rooms. This will avoid any possible effects on your motivation to play the game or your reaction time that might come from knowing what the other player’s reaction time was like from playing him in the game before.” After the video game and before playing the CRT, participants were told the following, “You will now play a game against a new opponent to see who can respond most quickly by clicking the mouse when this box turns green. Before each trial you will be able to set a noise blast on a scale from 1 (65 decibels) to 10 (105 decibels). Following each trial the losing participant will receive the noise blast set by the other person.” The participants then listened to a sample of what a noise blast of 1, 5, and 10 sounded like before the game started. This investigator then left the room, to avoid any observation effects. The participant sat at a monitor with headphones on while playing 25 trials of the CRT. The game was programmed so that the participant lost “12” trials and won “13” trials in a random pattern, with trial 1 always being a loss with a noise blast intensity of five and trial 25 being a win. After each trial “YOU WON!” or “YOU LOST!” flashed on the screen. The “YOU LOST!” message was accompanied by a random noise blast between 2 and 10. Participants also
lost any trial where they took longer than 750 ms to respond, as a suspicion safeguard.

Following each trial, regardless if the participant won or lost, the level of the noise blast set by the “opponent” flashed on the screen. The computer automatically recorded the noise blasts set by the participants to be used as a measure of aggressive behavior.

Aggressive behavior was calculated in three ways in accordance with previous studies using this measure. High Intensity Aggression was calculated by summing the number of high intensity noise blasts (intensities from 8 to 10). Therefore scores could range from 0 to 25, with higher scores meaning higher levels of aggression. This measure is used because high noise blasts are a clearer measure of aggressive behavior than moderate noise blasts. The difficulty is that results are typically skewed near the low end of the scale. Average Intensity Aggression is measured by taking the average of noise blasts for all 25 trials. The main advantage of this measure is that the distribution of scores tends to be more normal. Therefore scores can range from 1 to 10, with higher scores meaning higher levels of aggression. One problem with both of these scores is that they do not take into account aggression that may be caused by being provoked by the CRT “opponent” which is likely to cause increases in frustration and arousal. Therefore, a third way of measuring aggressive behavior is to only examine the first noise blast participants set as this will not be confounded by exposure to the noise blasts set by the computer-generated “opponent”. As expected, these measures are typically highly correlated. Several studies have shown that those who play aggressive video games give more high intensity blasts and have a higher average level of noise blasts directly after playing than those who do not (Anderson & Carnagey, 2009; Anderson & Dill, 2000; Bartholow et al., 2006, Carnagey & Anderson, 2005).
Measure of in-session NPBA. As a way to assess participants’ expression of anger and aggression during the game play portion of the session, participants’ vocalizations were audio recorded and then coded. Audio recordings were not available for three participants due to mechanical errors with the recording equipment. Responses were originally coded using the following codes: Non-Performance-Based Aggression was coded for any responses clearly directed to the confederate with the purpose of hurting or annoying the confederate (e.g., “you suck,” “looks like you got tore up that time,” “If this was any other game I’d be kicking your ass!”); Directed Angry Responses were any statement that appeared to be an angry or annoyed response to something the confederate said but without the intention to hurt the confederate (e.g., “whatever,” “pssssh,” “I know I suck at this!”); Ambiguous Angry Responses were any statements which appeared to express anger or frustration at the game or the participant’s own performance rather than anger towards the confederate (e.g., “This game sucks,” “shit,” “I can’t believe I did that!”); Neutral responses were all other statements made by the participant (e.g., “yea,” “Ever play this before?,” “Ha ha ha”). I coded each separate sentence or phrase the confederate said over the 10 minute game play period.

Reliability was established by having another graduate student and I (both blind to the condition to which the participant was assigned) code a random sample of 100 of the responses in rounds of 20 responses. During the first round, 69% exact agreement was reached. A discussion was then had examining each conflicting pair of codes until consensus was reach. The next round of responses was then coded, resulting in 70% exact agreement. The same process was repeated a third time resulting in a total of 55% exact agreement. It was determined that a majority of the errors between the two coders occurred when determining if a response was a Directed Angry Response or an Ambiguous Angry Response, because it was often very difficult
to determine if the participant was directing the response towards the confederate or towards the game. Therefore it was decided that these two categories should be combined into a single Angry Response category, which was defined as any statement or response which appears to express anger, annoyance, or frustration, but that is not explicitly meant to hurt or annoy the confederate. This type of statement could be related to something the confederate said, directed at the game or in response to the participant’s own performance. (e.g., “whatever,” “pssssh,” “I know I suck at this!,” “This game sucks,” “shit,” “I can’t believe I did that!”). The Non-Performance-Based Aggression and Neutral coding categories remained the same.

The reliability procedure was completed again with a new set of 100 responses coded again in sets of 20 by both myself and the other graduate student. For the first round, 81% exact agreement was reached. A discussion of each disagreement was had and consensus was reached. The second round of coding resulted in 90% exact agreement, which suggested that the new coding system was resulting in much higher agreement. Three additional rounds of coding resulted in 95%, 100%, and 95% exact agreement for each round respectively, indicating that the two coders were agreeing at a satisfactorily high rate. The remaining responses were then split evenly between the two coders.
RESULTS

Overview of Statistical Analyses

Preliminary analyses. Prior to testing the hypotheses, preliminary analyses were computed. Means and standard deviations of video game background variables and moderating variables were examined in order to better describe the sample as a whole. Internal consistency reliabilities were then examined for all scales and subscales. Correlations among the four subscales of the Aggression Questionnaire (AQ) were examined. If the correlations were generally high (above .50) as expected, then the overall scale was used for further analyses. If low to moderate correlations among the subscales were found, then the subscales were kept separate for further analyses.

The three self-report moderator variables (e.g., trait aggression, trait empathy, and social dominance orientation) were expected to be quite skewed because the sample is from a general population. Specifically, it was expected that participants would generally report low trait aggression and social dominance and high empathy. The moderation hypotheses, however, propose that the relation between violent/NPBA conditions and aggressive outcomes would be strongest for participants with high trait aggression and social dominance and low trait empathy. Therefore, if proposed moderator variables are distributed as expected, I will dichotomize them to assign participants to groups more accurately reflecting “high” trait aggression and social dominance and “low” trait empathy by creating dichotomous scores, following research by Arriaga et al. (2006), Engelhardt et al. (2011), and Peng et al. (2007).

Means and standard deviations for the four outcome variables were then examined to better describe the performance of the sample as a whole. Correlations among the three measures
of CRT responses were also examined. If high correlations were found, only the average of CRT responses would be used for further analyses.

Next, separate ANOVAs were computed to examine whether the four experimental groups varied on any of the control variables (i.e., video game history variables and demographic variables) or three moderating variables. As noted, no significant differences across conditions were expected due to random assignment.

Hypothesis 1-4: Experience of Non-performance-based Aggression (NPBA) and type of video game played will predict aggressive cognitions, affect, behavior, and participant NPBA.

To examine whether observing NPBA and playing violent video games causes an increase in aggressive outcome variables, four independent samples ANOVAs were computed comparing the levels of aggressive cognitions among the four experimental groups.

Hypothesis 5-7: Trait Aggression, trait empathy, and social dominance orientation will moderate the relations of Video Game Play Condition and NPBA Condition, with Aggressive Cognition, Affect, Behavior, and own NPBA during the game. Three sets of four ANOVAs were computed, one for each aggressive outcome. Dichotomous variables were entered for video game group (violent vs. nonviolent game), NPBA experienced by the participant (aggressive vs. neutral confederate), and level of moderator (high vs. low). Two-way interactions examined whether trait aggression served as a moderator of condition effects, and a three-way interaction examined whether trait aggression moderated the combined effects of the two conditions.

Preliminary Analyses

The average number of hours of video games played per week was 1.9 hours (range 0 to 9 hours) and the average number of hours spent playing video games in a format where participants could communicate with others online was 1.3 (range 0 to 9). Participants indicated
that, on average, the games they liked playing most contained slightly more than a medium amount of violent content (mean was 4.1 on a 7-point scale) and violent graphics (mean was 3.8 on a 7-point scale). Participants perceived their skills at playing their top five favorite games to be higher than the median (mean was 5.0 on a 7-point scale). The mean Violent Video Game (VVG) Exposure score was 15.80 with a standard deviation of 7.04 (Possible Scale Range= 1-49, Obtained Range: 2.4 to 34.3).

Next the subscales of the proposed moderator variables were examined for data reduction and scale distributions. The four scales of the Aggression Questionnaire were highly to moderately correlated, with correlations ranging from .40 to .71. Therefore, the overall Aggression Questionnaire scale was used for all further analyses. The overall Aggression Questionnaire mean indicated that on average participants were at the lower end of this scale (M = 76.25, SD = 18.27, Possible Scale Range= 29-145; Obtained Range=: 39 to 120). If participants scored in the middle of the response range for each item on the 1-5 scale, they would have a mean of 87 on this scale. So, as expected, this scale was skewed towards the low end. Therefore this variable was dichotomized by placing the top 25% of participants in a high trait aggression group and the rest of the 75% of participants in a low trait aggression group.

The average of the Empathic Concern scale indicated that participants experienced an average level of trait empathy towards the higher end of the scale (M = 3.7, SD = .54, Possible Scale Range= 1-5, Obtained Range: 2.29 to 5.00). If participants scored in the middle of the response range for each item on the 1-5 scale, they would have a mean of 3 on this scale. Therefore, as expected this scale was skewed towards the high end. Therefore trait empathy was dichotomized by including the 25% of participants with the lowest scores in a low trait empathy group and the other 75% of participants in a high trait empathy group.
Results also indicated that participants held low levels of average social dominance orientation based on the Social Dominance Orientation Scale ($M = 2.89, SD = 1.11$, Possible Scale Range= 1-7, Obtained Range: 1 to 6). If participants scored in the middle of the response range for each item on the 1-7 scale, they would have a mean of 4 on this scale. Therefore, as expected this scale was also skewed towards the low end. As a result, this variable was also dichotomized with the 25% of participants with the highest scores being placed in a high social dominance orientation group and the other 75% being placed in a low social dominance orientation group.

Examining the four outcome variables for the overall sample, it was found that, on average, participants’ endorsed lower levels of aggressive affect on the State Hostility Scale ($M = 2.03, SD = .11$, Range: 1.18 to 4.37). Analyses of responses from the Word Completion task revealed that an average of 22% of participants’ responses were considered to be aggressive words ($M = .22, SD = .06$, Range: .06 to .36). Examining participants’ responses on the CRT revealed that participants tended to set an initial noise blast in the medium-low range ($M = 4.43, SD = 2.53$, Range: 0 to 10), an average noise blast in the medium range ($M = 5.22, SD = 1.76$, Range: .40 to 10), and tended to set an average of 7 out of 25 blasts in the “High intensity” range ($M = 7.29, SD = 5.60$, Range: 0 to 25). The average noise blast, high intensity, and first response measures of the CRT responses were moderately to highly correlated, with rs ranging from .51 to .89. Therefore only the average intensity noise blast was used as the measure of aggressive behavior for all other analyses. Next, the coding of participants’ vocalizations during the video game portion of the study was examined. It was found that, on average, participants made about 20 responses during a session ($M = 20.12, SD = 14.37$, Range: 0 – 72). Of these responses, the majority was coded as Neutral ($M = 12.07, SD = 10.94$, Range: 0-55). Angry Responses were the
next most frequent type of response ($M = 5.67, SD = 6.13$ Range: 0-32) and Participant NPBA was the least frequent type of response ($M = 1.60, SD = 3.86$, Range: 0-22).

Separate ANOVAs were computed to examine whether the four experimental groups varied on any of the control variables or three moderating variables. As expected, the groups did not significantly vary on average age, year in school, GPA, parent education, relationship status, or past exposure to violent video games. Groups also did not vary on trait aggression, trait empathy, or social dominance orientation. See Table 2 for the means and standard deviations of all control variables and moderator variables across the four experimental conditions.

**Main Analyses**

*Hypothesis 1: Experience of Non-performance-based Aggression (NPBA) and type of video game played will predict aggressive cognitions.* To examine whether observing NPBA and playing violent video games causes an increase in aggressive cognitions, an ANOVA was computed comparing the levels of aggressive cognitions among the four experimental groups. No significant between group differences were found [$F (3, 120) = .57, p = .636$]. This indicates that there were not significant differences among the four experimental groups on their level of aggressive cognitions after playing the video game as was measured by the ratio of number of aggressive words to the overall number of words they completed on the Word Completion Task. For complete results including group means, see Table 3.

*Hypothesis 2: Experience of Non-performance-based Aggression (NPBA) and type of video game played will predict aggressive affect.* To examine whether observing NPBA causes an increase in aggressive affect, an ANOVA was computed comparing the levels of aggressive affect among the four experimental groups. No significant between group differences were found [$F (3, 120) = .66, p = .582$]. This indicates that there was no between group differences in level of
aggressive affect as measured by the State Hostility Scale after playing the video game. See Table 3 for complete results including group means.

**Hypothesis 3: Experience of Non-performance-based Aggression (NPBA) and type of video game played will predict aggressive behavior on the CRT.** To examine whether observing NPBA causes an increase in aggressive behavior, an ANOVA was computed comparing the levels of aggressive behavior among the four experimental groups. No significant between group differences were found for average intensity of noise blast set on the CRT \(F(3, 116) = .98, p = .403\). This indicates that the groups did not differ on their level of aggressive behavior after playing the video game. Refer to Table 3 for complete results including group means.

**Hypothesis 4: Experience of Non-performance-based Aggression (NPBA) and type of video game played will predict participants’ own NPBA.** To examine whether observing NPBA in session increases participants’ own levels of NPBA, an ANOVA was computed comparing the levels of aggressive behavior among the four experimental groups. Results indicated that experimental groups significantly differed on the amount of non-performance-based aggression they engaged in during the experiment \(F(3, 117) = 7.52, p = .000\). The significant group differences, however, varied from what had been predicted. The nonviolent game/aggressive confederate group had a significantly higher mean for NPBA than all of the other three groups. No other significant between group differences were found (see Table 3 for full results including group means).

To further explore the effect of experimental condition on participants’ NPBA responses, three ANOVAs were computed with total participant vocalizations, angry responses, and neutral responses made by the participant as the dependent variables. Groups did not vary across the total vocalizations made during the video game portion of the study \(F(3, 117) = 1.12, p = .346\)
or on the number of angry responses made \[ F(3, 117) = 1.27, p = .287 \]. Participants did vary on the number of neutral responses made \[ F(3, 117) = 3.09, p = .030 \]. A comparison of group means indicated that those in the two conditions in which the confederate engaged in neutral responses made significantly more neutral responses themselves, than participants in the group that played the violent video game and the confederate engaged in NPBA. There were no significant differences in the number of neutral responses made by the group that played the nonviolent game and had the confederate that engaged in NPBA and any of the other three groups (see Table 3 for full results including group means).

Hypothesis 5: Trait Aggression will moderate the relations of Video Game Play Condition and NPBA Condition, with Aggressive Cognition, Affect, Behavior, and own NPBA during the game. I predicted that participants who had high levels of trait aggression would experience a larger short-term boost in aggression when exposed to the violent video game and to the confederate engaging in NPBA. Four ANOVAs were computed (one for each aggressive outcome variable) to examine this hypothesis (see Table 4).

For the ANOVA examining aggressive cognitions as the dependent variable, Table 4 shows that the only significant effect was a significant interaction between type of video game play and trait aggression \[ F(1, 104) = 4.85, p = .030 \]. The aggressive cognition means for the groups were then compared by computing a follow-up ANOVA with a new variable combining the video game condition and trait aggression variables into a single variable with four groups (i.e., violent video game/high trait aggression, violent video game/low trait aggression, nonviolent video game/high trait aggression, nonviolent video game/low trait aggression). It was found that for the group who played the nonviolent game, there was no significant difference on aggressive conditions for those with high trait aggression \( M = .21, SD = .08 \) and those with low
trait aggression ($M = .23, SD = .06$). However, for the groups who played the violent video game, participants who had high levels of trait aggression were found to have significantly higher levels of aggression cognitions ($M = .25, SD = .06$) compared to participants with low levels of trait aggression ($M = .21, SD = .07$). This interaction is displayed in Figure 1.

For the ANOVA examining aggressive affect as assessed by the State Hostility Scale, a main effect for trait aggression was found [$F (1, 104) = 9.16, p = .003$]; participants with high trait aggression had higher levels of aggressive affect ($M = 2.27, SE = .10$) than those with low trait aggression ($M = 1.93, SE = .06$). An interaction was also found between level of trait aggression and type of video game played [$F (1, 104) = 4.56, p = .035$]. A follow-up ANOVA indicated that those who played the nonviolent game and had high trait aggression had significantly higher aggressive affect after playing the game ($M = 2.38, SD = .86$) than those who played the nonviolent game and had low trait aggression ($M = 1.85, SD = .42$) and those who played the violent game and had low trait aggression ($M = 2.01, SD = .47$). No other significant differences between group means were found. This interaction is displayed in Figure 2.

For the ANOVA examining aggressive behavior on the CRT as the dependent variable, no significant main effects or interactions were found.

For the ANOVA examining participant NPBA as the dependent variable, two main effects were found. The first was for NPBA experienced [$F (1, 101) = 13.32, p < .001$]; participants in the group that experienced NPBA from the confederate exhibited significantly more NPBA ($M = 3.09, SE = .56$) than those in the group that experienced neutral statements from the confederate ($M = .17, SE = .57$). The second was for type of video game played [$F (1, 101) = 4.57, p = .035$]; participants in the group that played the nonviolent game exhibited
significantly more NPBA ($M = 2.49$, $SE = .59$) than those in the group that played the violent game ($M = .78$, $SE = .54$), a finding that was counter to the hypothesis.

_Hypothesis 6: Trait Empathy will moderate the relations of Video Game Play Condition and NPBA Condition, with Aggressive Cognition, Affect, Behavior, and own NPBA during the game._ I predicted that participants who had low levels of trait empathy would experience a larger short-term boost in aggression when exposed to the violent video game and to the confederate engaging in NPBA. Four ANOVAs were computed (one for each aggressive outcome variable) to examine this hypothesis (see Table 5).

For the three ANOVAs examining aggressive cognitions, aggressive affect, and aggressive behavior on the CRT as the dependent variables respectively, no significant main effects or interactions were found.

For the ANOVA examining NPBA as the dependent variable, a main effect was again found for NPBA experienced [$F (1, 101) = 8.44$, $p = .005$]; participants in the group that experienced NPBA from the confederate exhibited significantly more NPBA ($M = 2.67$, $SE = .53$) than those in the group that experienced neutral statements from the confederate ($M = .39$, $SE = .58$).

_Hypothesis 7: Social Dominance Orientation will moderate the relations of Video Game Play Condition and NPBA Condition, with Aggressive Cognition, Affect, Behavior, and own NPBA during the game._ I predicted that participants who had high levels of social dominance orientation would experience a larger short-term boost in aggression when exposed to the violent video game and to the confederate engaging in NPBA. Four ANOVAs were computed (one for each aggressive outcome variable) to examine this hypothesis (see Table 6).
For the three ANOVAs examining aggressive cognitions, aggressive affect, and aggressive behavior on the CRT as the dependent variables respectively, no significant main effects or interactions were found.

For the ANOVA examining NPBA as the dependent variable, a main effect was again found for NPBA experienced \[ F (1, 101) = 13.01, p < .001 \]; participants in the group that experienced NPBA from the confederate exhibited significantly more NPBA \( M = 3.17, SE = .55 \) than those in the group that experienced neutral statements from the confederate \( M = .29, SE = .58 \).
DISCUSSION

The current study sought to expand on previous research linking exposure to violent video games to increases in aggressive behavior, affect, and cognitions. This study focused particularly on the effects of playing multiplayer online games where players are exposed to verbal non-performance-based aggression (NPBA). NPBA refers to behaviors players engage in to harm or irritate other players, but such behaviors are not necessary in order to perform well or win the video game (e.g., yelling at or verbally assaulting other players through online communication, purposefully killing your own team mate). A previous unpublished study (Kryszak, 2011) found that verbal NPBA is the most frequently observed type of NPBA. The study also explored the relation between history of exposure to violent video games, history of exposure to NPBA, and trait aggression and found that the relation between reported high levels of past violent video game play and trait aggression was only significant for those who reported being frequently exposed to NPBA while they played video games. Because this study was based on correlational data, however, no cause and effect inferences could be made. Another recent study (Ross & Weaver, 2012) found that experiencing pseudo-physical NPBA (e.g., the confederate repeatedly killed the participant’s avatar) caused increases in participants’ own pseudo-physical NPBA as well as their aggressive affect. This study did not allow participants to communicate with each other so it could not explore effects of experiencing verbal NPBA (e.g., verbal threats and insults). The current study sought to expand on past research by further exploring in an experimental context the relation between experiencing verbal NPBA and subsequent increases in aggression-related variables. More specifically the goal of the current study was to determine if exposure to verbal NPBA while playing a video game would cause a short-term increase in aggressive affect, cognition, and behavior after playing the game as well
as an increase in NPBA participants used in the game. The study also sought to determine if this relation was moderated by personality variables suggested by past research as possible moderators of the relation between exposure to violent video games and aggression: Trait aggression, trait empathy, and social dominance orientation.

The following sections will elaborate on the results of the study by first reviewing participants’ use of video games in general and use of violent video games in particular and their general levels of trait aggression, trait empathy, and social dominance orientation. Then, each of the major hypotheses will be reviewed, including the results that were found, how these results compare to past research, and the implications of each finding. Finally, limitations of this study and directions for future research will be discussed.

**Participants’ Video Game Use, Trait Aggression, Trait Empathy and Social Dominance**

Participants spent an average of 1.9 hours a week playing video games in general. Of these 1.9 hours, they spent an average of 1.3 hours playing video games in a format where participants could communicate with others online. These levels of video game play are similar to those found in previous research with a general population of university students (Anderson & Dill, 2000; Kaiser Family Foundation, 2009; Sherry et al., 2003). This suggests that even though a requirement for admission in the study was past experience playing video games in an online format, this sample is representative of the typical population of college-age males, likely because playing video games on a casual basis is now a popular and accepted form of recreation for this population. Participants perceived their skills at playing their top five favorite games to be higher than the median (mean was 5.0 on a 7-point scale), indicating that even though they currently were only playing a few hours a week, they felt their video game skills were better than average. This suggests that this sample was fairly comfortable with video game play in general.
Participants indicated that, on average, the games they liked playing most contained slightly more than a medium amount of violent content and graphics, which is in line with research that has indicated that players prefer violent games over nonviolent games (Gentile, Lynch, Linder, & Walsh, 2004). This also suggests that the majority of participants had a history of exposure to violent video games.

Participants perceived themselves as having levels of trait aggression near the lower end and levels of trait empathy near the higher end of the respective scales measuring these personality traits. These results are consistent with past research looking at these traits in a general college-age male sample, providing further evidence that this sample is relatively representative of this population (Buss & Perry 1992; Ross & Weaver, 2012; Thomas & Levant 2012). Participants also saw themselves as having generally low levels of social dominance orientation, suggesting that as a group they held the belief that groups should be treated similarly and that no one group was better than another.

Hypothesis 1-4: Experience of non-performance-based aggression (NPBA) and type of video game played will predict aggressive cognitions, affect, and behavior.

Counter to my hypotheses, no significant relations were found between experimental group and participants’ levels of aggressive cognitions, affect, and behavior (as measured by the CRT), after playing the video games. Particularly surprising were the lack of significant differences between participants who played the violent game and participants who played the nonviolent game, as several past studies have shown significant between group differences using similar games and the same dependent measures of aggressive cognitions (Anderson et al., 2004; Eastin, 2006), affect (Anderson & Carnagey, 2009; Barlett et al., 2008; Carnagey & Anderson, 2005; Ivory & Kalyanaraman), and behavior (Anderson & Carnagey, 2009; Anderson & Dill,
2000; Bartholow et al., 2006, Carnagey & Anderson, 2005). It is unclear why past studies found that violent games seemed to cause an increase in aggression over nonviolent games, but that the current study found no differences between those who played a violent game and those that played a nonviolent game. Possible game differences other than level of aggression may have led to this lack of expected results. While coding the sessions, it became obvious that participants had far more experience playing first person shooter games than racing games in general. When the study first started, Gears of War 4 and Dirt 3 were both relatively new games, although over the next year, it became increasingly more common for participants to say that they had played Gears of War previously. Only a hand full of participants, however, indicated that they had ever played Dirt 3. This difference in experience level between playing first person shooters and racing games, and more specifically between playing Gears of War 4 verses Dirt 3, may have led to participants finding it much easier to play Gears of War 4 and more frustrating to play Dirt 3. Although speculative, perhaps the frustration they felt playing Dirt 3 would have also acted as a situational variable increasing their aggressive cognitions and affect and their physiological arousal. Unfortunately, because frustration level after playing the game was not assessed, there is no way to test this hypothesis.

Partial support was found for the hypothesis predicting that experiencing NPBA would increase participants’ own use of NPBA. As expected, those who were exposed to NPBA during game play engaged in a higher amounts of NPBA themselves compared to those who were exposed to neutral comments in session, but only during the nonviolent game. It was found, however, that those who were exposed to NPBA, but while playing the violent game, engaged in significantly less neutral statements than participants in the other three conditions. These results are similar to those found by Ross and Weaver (2012), showing that those who experienced
avatar-based NPBA, engaged in more of this type of behavior than those who did not experience NPBA. Based on social learning theory (Bandura et al., 2001), it is likely that the confederate provided a model of behavior that made participants feel comfortable using similar NPBA statements themselves. It is also likely that participants observed the confederate successfully using NPBA to cause them to feel angry and frustrated. Relating this back to the GAM model, the confederates’ use of NPBA was a situational variable that likely increased aggressive cognitions and feelings, as well as psychological arousal, making participants more likely to use NPBA themselves.

Counter to the original hypothesis, however, was that those who played the nonviolent game engaged in higher levels of NPBA during the session than those who played the violent game. It was thought that the violence in the game would act as a situational variable that would lead to higher levels of aggressive cognitions and affect as well as physiological arousal, which would increase the likelihood that participants would engage in NPBA. It may be possible that other differences between the games, such as possible frustration caused by the nonviolent video game as discussed previously, led to the counterintuitive results.

*Hypothesis 5: Trait Aggression will moderate the relation of Video Game Play Condition and NPBA Condition with Aggressive Cognition, Affect, and Behavior.*

Partial support was found for this hypothesis. Trait aggression was found to moderate the relation between video game condition and aggressive cognitions, such that those in the group where participants played the violent video game and had high levels of trait aggression had higher levels of aggressive cognitions after playing the game that those in the other three groups. Relating these results back to the GAM model, only the combination of the person input of high trait aggression with the situational variable of exposure to a violent video game led to the
activation of aggressive cognitions. This finding is similar to past research which found that the connection between playing a violent video game and increases in aggressive behavior were only significant for those with a high level of trait aggression (Engelhardt et al., 2011).

Trait aggression also moderated the relation between video game condition and aggressive affect, although results differed from what was hypothesized. Those who had high trait aggression and played the nonviolent game had significantly higher levels of aggressive affect than those with low trait aggression who played the violent and nonviolent game. Surprisingly, no significant differences were found between the group that played the violent game and had high trait aggression and any of the other groups. These results may possibly be related to the State Hostility Scale measuring participants’ level of frustration at Dirt 3, as it is noted that this measure specifically asks about frustration and irritability. Again, it is possible that the frustration participants experienced while playing the unfamiliar game acted as the situational input that combined with the person input of trait aggression to create the increases in aggressive affect. Furthermore, it is possible that because this negative affect was directed at the game, it did not increase aggressive behavior towards another player in the CRT.

Trait aggression did not act as a moderator between video game condition and aggressive behavior as measured by the CRT or in-game NPBA, nor did it moderate the relation between NPBA condition and any of the four outcome variables. As is discussed further in the limitations section, it is possible that the level of NPBA experienced in session was not a strong enough situational variable to produce the expected change in aggressive behavior outcomes.

Hypothesis 6: Trait Empathy will moderate the relation of Video Game Play Condition and NPBA Condition with Aggressive Cognition, Affect, and Behavior.
Contrary to my hypotheses, trait empathy did not moderate the relation between video game condition or NPBA condition and any of the four aggressive outcome variables. It should be noted that the majority of research that has examined the connection between empathy and violent video games, has looked at empathy as an outcome variable rather than a moderator. Although decreases in empathy can lead to an increased tolerance and acceptance of violent behavior as normal and a decrease in empathic responding, which in turn can lead to more aggressive behavior (Ballard et al., 2006; Bartholow et al., 2006), low empathy has not directly been related to short-term situational increases in aggression. Therefore, having low trait empathy may not be directly related to having a higher likelihood of having a short-term increase in aggression after one session of playing a violent video game. While trait empathy may have been thought to play a larger role in behavior on the CRT, the CRT opponent may have been viewed as too impersonal to trigger feelings of empathy, as participants were given no information about the opponent (i.e., this was not the same opponent they faced during video game play). Trait empathy may have played a more significant moderating role if before the CRT, it had been suggested to participants that their opponent had experienced NPBA during video game portion. It is likely that given this type of information, those high in trait empathy would set lower noise blasts, particularly if they too had experienced NPBA, whereas those low in trait empathy would have continued to set higher noise blasts.

Hypothesis 7: Social Dominance Orientation will moderate the relation of Video Game Play Condition and NPBA Condition with Aggressive Cognition, Affect, and Behavior.

No support was found for social dominance orientation as a moderator of the relation between video game condition and NPBA condition and aggressive cognition, affect, and behavior. Social dominance orientation, or the extent to which one desires that one’s in-group
dominate and be superior to out-groups, may not have been relevant in this particular experimental situation because participants may have viewed the confederate as part of their in-group (e.g., another male college student). The study advertisement asked for a specific group (i.e., college-age males with some experience playing video games). As a result, even those with high social dominance orientation would have been unlikely to have viewed the confederate as part of an outsider group that deserved to be put down; therefore high social dominance orientation would not have acted as a person input in this situation. If the experiment had pitted one team against another or indicated that the confederate or CRT opponent was part of an outsider group (e.g., female, different race, not college educated), social dominance orientation might have become a significant moderator.

Limitations and Future Research

The world of video games is a fast-paced industry with constantly evolving technology. Companies have worked to create systems and games that appeal to the broad masses, and it has become increasingly popular for games to include an online feature that allows players to communicate in real-time with one another. This mode of play has created a unique social environment for players to interact that allows for contact with friends known outside the video game community, as well as with strangers from across the world. Little research has been completed which provides insight into how this multiplayer interactive environment fits into the larger body of research examining the effects of playing video games on aggressive behavior. This is likely due to the difficulties inherent in attempting to recreate a naturalistic multiplayer environment that still can be reliably controlled. The current study was the first of its kind to attempt to create a naturalistic multiplayer video game setting where players could communicate
with the confederate in real-time. As a result, there were several limitations of this current study that should be addressed in future research.

A critical limitation was attempting to create a natural interaction between the confederate and participant while attempting to control the “dose” of NPBA given to each participant in those conditions. I attempted at first to control this aspect of the experiment by employing a script that the confederate would have read in the same way each time, but this ended up sounding unnatural, leading to participants realizing it was staged. The, more flexible protocol that was employed resulted in a far more natural experience with only a small percentage of participants becoming suspicious. This approach was limited, however, in that I cannot say that all participants received the same level of NPBA. Even if a script had been employed, it would have been unlikely that the confederates would have been able to deliver it with the same level of emotion each time. Future research should examine the possibility of employing flexible voice recordings in place of a live conversation. While this method would run into the same types of issues with attempting to create a natural interaction, it may be possible with advanced technology to create a larger database of possible responses that could be hot-keyed onto a laptop. Then two confederates could be employed, one to play the game and one to listen and respond to the participant. If the listener was well-versed in the map of possible responses, he or she may be able to react in a more realistically paced way with the recorded responses. Data could then be kept on which responses were used and in what order. This method would ensure that the amount and intensity level of NPBA would remain consistent across trials.

Another related limitation was that the types of aggressive responses allowed by the IRB were far less intense than most participants are typically exposed to when playing online games.
While formal data were not collected on this issue, many participants commented during the debriefing that the level of profanity and aggressiveness was far less insulting than what they were used to. Because participants all had previously played online multiplayer games, they had all likely been previously exposed to NPBA, creating a further limitation for the study. It is likely that the players who regularly play these games have become desensitized to NPBA through regular exposure. As a result, the NPBA statements used in this experiment may not have been potent enough stimuli to act as a situational input that would have increased participants’ aggression. Future studies assessing this population should look to create more intense NPBA protocols, making the case that people who regularly play video games online are already voluntarily exposed to an intense level of aggressive insults, slurs, threats, and profanity; therefore the most effective way to appropriately study the effects of exposure to this level of NPBA would be to employ a research protocol with the same level of intensity. Another way to address this issue would be to conduct a similar experiment with those who have little-to-no experience playing online games. It would be particularly interesting to replicate this experiment with younger children, as they will likely have had less exposure to NPBA and their person inputs are weaker due to less life experience, leading to situational inputs having a greater effect on their immediate aggressive cognitions, affect, and behavior. This experiment should also be replicated with female participants, particularly as the female population of video game players continues to steadily expand.

A third limitation of the current experiment, which is one that plagues this body of research as a whole, is finding aggressive and nonaggressive games that are matched on characteristics such as how enjoyable and frustrating they are. As previously mentioned, research has shown that players prefer games with at least some aggression; therefore players are also
much more likely to have more experience playing aggressive games versus nonaggressive games. Preliminary results found that Dirt 3 and Gears of War 4 were matched on level of frustration and enjoyability. As noted previously, however, both of these games were newer at the time of this study so few had past experience with them. As the study progressed, however, Gears quickly became the more popular of these two games. As of September 2013, 5.95 million copies of Gears of War 4 had been sold while only 640,000 copies of Dirt 3 had been sold (vgchartz.com). Regarding the current sample, 31 out of 53 participants (58%) reported they had played Gears of War previously while only 4 out of 57 participants (7%) reported they had played Dirt previously. Unfortunately a measure of game likability and frustration was not included in the current study, although it was noted that during coding of participant statements it appeared that participants’ anger was more often directed at the game while playing Dirt 3 than while playing Gears of War 4. This suggests that they may have been more frustrated with the nonviolent game. This frustration at the game may have acted as a situational input that may have increased aggression, eliminating any significant difference between the two games as aggressive-provoking stimuli.

Despite these limitations, the current study has contributed to the body of video game research by providing initial findings as to the effects of exposure to verbal NPBA on aggressive outcomes in a sample with previous video game play experience. Although many of the hypotheses were not supported by the results, playing violent video games was found as expected to be related to an increase in aggressive cognitions for those high in trait aggression. Further research will be able to improve on this initial methodology, providing more reliable evidence for whether exposure to NPBA increases aggressive outcomes. Future research will also be able to examine this relation in additional populations (e.g., children, females, those with
no prior exposure to online video games). As online video games continue to grow in popularity, it would also be beneficial for research to examine possible prosocial benefits that could come from interacting with others in this type of social environment. For example, is it possible that games that foster cooperation over competition, even in a violent setting, may actually increase traits such as empathy?

Overall this study added to the current body of research examining the connection between playing violent video games and aggression in a few key ways. The study sought to expand the small body of research on the effects of playing multiplayer online games, which is now one of the most popular formats of game play. The study also introduced a new experimental methodology for examining the effects of experiencing verbal NPBA, which can now be improved upon in future research. Finally, a few main findings contribute further evidence that NPBA likely affects aggression-related variables above and beyond just playing violent video games. First, results suggested that that when exposed to verbal NPBA, participants will engage in more of this behavior themselves, particularly when playing a game that may have increased frustration. It was also found that the relation between playing a violent game and increases in aggressive cognition were only significant for those high in trait aggression.

Together these findings further support that idea that not all games and not all gamers are the same. Future research should therefore continue to focus on parsing out which game factors are the most salient situational inputs and which individual differences are the most salient person inputs, which when combined, lead to the greatest increases in aggression.
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APPENDIX A

Original NPBA Script

Aggressive condition

- You ready to get tore up?
- You *really* need more practice
- I thought people in here were supposed to have experience….
- Man, my sister plays better than you!
- You should just quit now
- Man, you *suck* at this!
- Wow dude, you are such a *loser*….
- You’re pathetic!
- You just got owned!
- Go home. You’re done.

Nonaggressive condition

- This game is awesome
- I’ve only played this a few times
- I haven’t played a game like this in a while
- I got it now
- That was awesome!
- Man, I’m good
- Damn it!
- Shit!
- That sucked!
- I can’t believe I did that.
- Saw that coming…
APPENDIX B

Script for participant recruitment for Online Study

Hi, my name is Liz Kryszak and I am a graduate student in clinical psychology here at BGSU. I am currently looking for male participants to complete an experimental study examining how playing multiplayer online video games affects reaction time. To be in the study you must be male, over 18-years-old, and have played online video games in a format where you could communicate with others at some point in the past year. The study has two parts. First you will complete an online questionnaire asking about your personality and video game play habits which you can do from the comfort of your own home. Then once that’s completed you will then come into our lab for a 1 hour session to play a video games against another player and complete a few measures of reaction time. Completion of the surveys will take about 30 minutes and your participation in the lab will take approximately 1 hour.

All together you would be able to earn 1 ½ credits of research for the entire experiment. Those who are interested can now access the sign up for the first part of the study through SONA. It is titled “Part 1: Effects of Video Game Play on Reaction Time.” Once you complete the online survey and I assign you credit you can sign up for part 2. I will have Michelle send you my email in case you have questions. Thank you for your time.

Information for SONA

Study Name: Part 1: Effects of Video Game Play on Reaction Time

Abstract: This study will have you play a video game against another participant and then complete tasks to measure your reaction time. You will also complete a few short online questionnaires about your video game play history and other personality variables that may affect reaction time.

Description: Participation in this study involves first completing a online questionnaires that will take about 30 minutes. Participants will then come to the Psychology Building for a one time session to complete an experimental study which is expected to take 60 minutes. For completing the online surveys you will receive ½ hour of research credit and for your participation in second part of the study in the psychology building you will receive 1 hour of research credit. If you have any questions or comments about this study, you may contact the investigator, Elizabeth Kryszak, by phone at 419-372-2301 or by email at ekrysza@bgsu.edu, or the investigator’s advisor, Eric Dubow, by phone at 419-372-2556 or by email at edubow@bgsu.edu.

Eligibility Requirements: To qualify for this study you need to be male, 18 years of age or older, and have played online video games in a format where you could communicate with another person within the last year. If you have questions about your eligibility please contact Elizabeth Kryszak at ekrysza@bgsu.edu.
APPENDIX C

Video Game Experiment Part I Informed Consent for Online Measures

- You are invited to participate in a research study examining how playing video games against another person affects their reaction time.

- You are eligible to participate if you are a male, at least 18 years old, and a student at BGSU. You must also have played online video games in a format where you could communicate with others at some point within the last year.

- Your participation currently will involve answering a series of questions online about how often you play video games and what games you play, behaviors you do while playing video games, and questions about your personality. We anticipate that completing these questionnaires will take approximately a half hour. You will be given more information about the second part of the study when you come into the lab at your assigned time.

- The benefits of participating include helping us understand more about video game playing among university students and how it relates to other variables like reaction time and personality. Additionally, you will have the opportunity to receive research credit or extra credit in a Psychology class if your instructor allows this. If extra credit is being offered to participate in research, your instructor will offer an equal non-research means of obtaining extra credit. Even if you do not complete the second part of the study, you will receive a ½ credit for completing the online surveys.

- The anticipated risks to you are no greater than those normally encountered in daily life. Deciding to participate or not will not impact your grades, class standing, or relationship to the institution.

- Please note that you are free to withdraw from the study at any time, even after you begin to complete the online survey. You may click on the X at the top right hand corner of your computer window to exit the survey at any time. Your responses will not be saved until you click the “submit” button at the end of the survey. If you exit and then decide later that you would like to participate, you can visit this web address again by clicking on the link in SONA. None of your information will be used if you choose to terminate the experiment before it is completed. Please note that your participation is completely voluntary and you are free to skip any questions you do not want to answer.

- Please note that your questionnaire answers are confidential. Any contact information that you provide will NOT be linked to your survey answers. The information you provide if you are able to earn extra credit or research credit will be stored in the SONA database on a secure server separate from your survey responses, and will be used only to inform your instructor that you participated and should receive credit. Any information you provide will be accessed only by the research investigators.
• Since the Internet is not 100% secure in terms of privacy, please do not leave the partially completed survey open or unattended if completing it on a public computer. You may want to clear the browser page history and cache when finished with the survey.

• We hope to publish an article summarizing the overall results of this study, but no one person’s answers will be presented - only a summary of data from many participants.

• In addition, if you have any questions about the study, you may contact the principal investigator: Elizabeth Krysza B.A., Graduate Student, Psychology Department, BGSU, (419) 372-2301, ekrysza@bgsu.edu or the investigator’s advisor, Eric Dubow, by phone at 419-372-2556 or by email at edubow@bgsu.edu.

• You may also contact the Chair of the Human Subjects Review Board, Bowling Green State University, (419) 372-7716, hsrb@bgsu.edu, if any problems or concerns arise during the course of the study.

Your completion of this online survey indicates your voluntary consent to participate in this research investigation. You may refuse to participate in this investigation or withdraw your consent and discontinue participation in this study without penalty. If you choose not to participate, please exit this site by clicking on the X in the upper right hand corner of this screen. If you wish to give your consent and continue, please select the following option and click the “next” button:

☐ I have been presented with and have read the above statement of risks and benefits of participating in this project and I agree to participate.
Video Game Experiment Part II Informed Consent for Lab Session

- You are invited to participate in a research study examining how playing video games against another person affects their reaction time.

- You are eligible to participate if you are a male, at least 18 years old, and a student at BGSU. You must also have played online video games in a format where you could communicate with others at some point within the last year.

- Your participation will involve playing 10 minutes of a video game against another participant who you will not meet in order to simulate an actual gaming situation. You will then complete reaction time tasks. One of these tasks will involve you playing against another participant (different from the one you played the game against). We anticipate that your participation will take approximately 60 minutes.

- The benefits of participating include helping us understand more about video game playing among university students and how it relates to other variables like reaction time and personality. Additionally, you will have the opportunity to receive research credit or extra credit in a Psychology class if your instructor allows this. If extra credit is being offered to participate in research, your instructor will offer an equal non-research means of obtaining extra credit.

- The anticipated risks to you are no greater than those normally encountered in daily life. It should be noted that we are encouraging both you and the other player to act as you naturally would when playing the video games. Therefore some participants may find some comments made to be offensive although likely similar to those experienced any other time while playing online games. Deciding to participate or not will not impact grades/class standing/relationship to the institution. Please note that your participation is completely voluntary and you are free to skip any questions you do not want to answer.

- Please note that you are free to change your mind and stop participating at any time, even after you begin to participate in the experiment. If you choose to stop participating just notify the research investigator. None of your information will be used if you choose to terminate the experiment before it is completed.

- Please note that your questionnaire answers and performance on the reaction time tasks are confidential. Any contact information that you provide will NOT be linked to your survey answers and results on any experimental task. The information you provide if you are able to earn extra credit or research credit will be stored in the SONA database on a secure server separate from your survey responses, and will be used only to inform your instructor that you participated and should receive credit. Any information you provide will be accessed only by the research investigators.
• We hope to publish an article summarizing the overall results of this study, but no one person's answers will be presented - only a summary of data from many participants.

• In addition, if you have any questions about the study, you may contact the principal investigator: Elizabeth Kryszak B.A., Graduate Student, Psychology Department, BGSU, (419) 372-2301, ekrysza@bgsu.edu or the investigator's advisor, Eric Dubow, by phone at 419-372-2556 or by email at edubow@bgsu.edu.

• You may also contact the Chair of the Human Subjects Review Board, Bowling Green State University, (419) 372-7716, hsrb@bgsu.edu, if any problems or concerns arise during the course of the study.
Video Game Experiment Consent Page

I have been presented with and have read the above statement of risks and benefits of participating in this experiment and I agree to participate. My signature also indicates that I am at least 18-years-old and have played online games in a format where I could communicate with others at some point within the last year. I have been given a copy of the information page to keep for my own records.

Signature __________________________
Debriefing Script (adapted from Mills, 1976)

Thank you very much for your participation in this study. There is more to this study than I have told you so far. Before I tell you exactly what it is, I want to explain why it is necessary in some psychological studies not to tell people all about the study at the very beginning. This is because it could affect the results so they would not be a good indication of how people react in a real-life situation. In certain studies, if we tell people what the purpose of the study is and what we predict about how they will react in certain situations, they might deliberately do what it is they think we want them to do, in order to help us out and give us the results we want. It is also possible that the opposite could happen, where participants would deliberately try not to do what we predicted would happen to show us we could not figure them out. In both situations the results would be invalid. So, can you see why in some kinds of studies we can’t tell people all about the whole purpose of the study at the beginning?

Now I would like to explain what we were actually looking at in this study. What we were really interested in is how the behaviors participants observe or experience while playing video games might affect how they feel, what thoughts they have, and their behavior. We were not actually interested in reaction time. We expect that those who play against another player who says aggressive things will have feelings, thoughts, and behaviors that will be more aggressive than those who play against another player who doesn’t make these kinds of comments. In order for us to control the behavior of the player you played against, we actually employed another student as a research assistant to play the game against each person who came in. This way, all participants play against the same opponent so everyone’s experience playing the game is similar. We randomly assigned participants to two groups: one where the research assistant made aggressive statements towards the participants when playing the game and one where he did not. You were in the ________ condition so the research assistant was instructed to _________ while you played the game. We also audio taped you during the play period so we could assess your verbal responses to the confederate. All we will do with this information is tally the number of statements that you made. We will not directly quote anything you said. After we tally the number of statements the tape will be erased. One final thing we were unable to tell you before the study began was that during the reaction task where you pressed the button as fast as you could, you were playing against the computer instead of another participant. This way we could control how many times you won or lost the task. The purpose of this task was not to measure reaction time but instead to measure aggressive behavior by looking at the average level of noise blasts participants set. It was necessary for us to not tell you the true purpose of the study in the beginning or that the person you were playing against was a research assistant because it likely would have affected how you acted while playing the game and your responses on the measures after the game. If we explained the true purpose of the study beforehand, you probably would have understood where we were coming from but it would have been impossible for you to act naturally. If we told you that the person you were playing against was pretending to act a certain way or that you had to pretend to play against another person on the reaction time task, it probably would have affected your performance and the noise blasts you set. We tried really hard to make this whole situation believable so that everyone in the experiment believes that they are playing against another actual participant. We want to be sure that we give our hypotheses a fair test because we don’t know whether they are true. If we were already certain they were correct,
we wouldn’t go through all the trouble to bring participants in to test it. Do you see why we couldn’t tell you about the true purpose of the experiment beforehand? Do you have any questions so far?

I would like to emphasize that this experiment is not a test of your personality, ability, or character. There are no correct responses. We are looking for people’s natural responses. Also, we are not interested in the responses of any one individual. Instead, we are interested in how the average video game player is affected by observing an aggressive opponent. In order to figure this out, we need to collect the responses of lots of participants and then average them together. What this means is that it is going to be necessary for us to ask you not to say anything about the study to anyone else. If you talked to someone else about the study, then if they participate it would be the same as if I told them at the beginning the whole purpose of the study. Their responses wouldn’t be spontaneous or natural and would not be able to be used. If this happened enough times, then we wouldn’t have data to give us valid results and so all the data you provided us and all the data from those who already participated would be wasted. I hope you can see why it is extremely important that I have to ask you not to talk about the study with anyone. It may seem that the more I tell you about the experiment the more you may want to tell others, so it might seem that we are taking a chance in telling you all about it. My experience has actually been the opposite, that if I try to explain the experiment thoroughly and describe the reason for doing it the way we did, people are more likely to cooperate and not talk about the experiment. We also explain all this so you can get an educational experience out of this. I hope you learned something about research and experiments while participating and after this explanation. Do you have any other questions about this experiment or research on video games and aggression in general? I do hope that you will not talk about the experiment with others so that they can have the full experience that you did. Thank you again for all your help!
How many hours do you typically play video games each day?

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many of the hours you listed above do you play online where you can communicate with other players?

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX F

Violent Video Game Exposure (Anderson & Dill, 2000)

What is your favorite game? ________________________________

How often do you play this game?

1  2  3  4  5  6  7
Rarely Occasionally Often

Do you play this in an online format where you can communicate with other players (i.e., by talking to them on a headset or by typing messages to them)?  Yes  No

How often do you play this game in an online format where you can communicate with other players?

1  2  3  4  5  6  7
Rarely Occasionally Often

How violent is the content of this game?

1  2  3  4  5  6  7
Little or no violent content Extremely violent content

How violent are the graphics of this game?

1  2  3  4  5  6  7
Little or no violent graphics Extremely violent graphics

Compared to others who play this game, how would you rate your skills at this game?

1  2  3  4  5  6  7
I never win My abilities are I always win
or do well average or do the best
APPENDIX G

Demographic Questionnaire

Age: _____ years

Year in school:  
- Freshman
- Sophomore
- Junior
- Senior

GPA:  
- 1.0-1.49
- 1.5-1.99
- 2.0-2.49
- 2.5-2.99
- 3.0-3.49
- 3.5-4.0

Do you currently have a job?  
- Yes, full time
- Yes, Part time
- No

What is your relationship status?  
- Single
- Single but ended a committed relationship within the last year
- In a committed relationship
- Engaged
- Married

What was the last grade your mother completed in school?  
- Less than 12th grade
- Graduated high school
- Some College
- Associates Degree
- Bachelor Degree
- Masters Degree
- Advanced graduate degree (e.g., MD, MBA, PhD, JD)

What was the last grade your father completed in school?  
- Less than 12th grade
- Graduated high school
- Some College
- Associates Degree
- Bachelor Degree
- Masters Degree
- Advanced graduate degree (e.g., MD, MBA, PhD, JD)
APPENDIX H

Aggression Questionnaire (AQ; Buss & Perry, 1992)

Scale: 1 = not characteristic of me to 5 = extremely characteristic of me

 Physical Aggression
1. Once in a while I can't control the urge to strike another person.
2. Given enough provocation, I may hit another person.
3. If somebody hits me, I hit back.
4. I get into fights a little more than the average person.
5. If I have to resort to violence to protect my rights, I will.
6. There are people who pushed me so far that we came to blows.
7. I can think of no good reason for ever hitting a person.*
8. I have threatened people I know.
9. I have become so mad that I have broken things.

 Verbal Aggression
1. I tell my friends openly when I disagree with them.
2. I often find myself disagreeing with people.
3. When people annoy me, I may tell them what I think of them.
4. I can't help getting into arguments when people disagree with me.
5. My friends say that I'm somewhat argumentative.

 Anger
1. I flare up quickly but get over it quickly.
2. When frustrated, I let my irritation show.
3. I sometimes feel like a powder keg ready to explode.
4. I am an even-tempered person.*
5. Some of my friends think I'm a hothead.
6. Sometimes I fly off the handle for no good reason.
7. I have trouble controlling my temper.

 Hostility
1. I am sometimes eaten up with jealousy.
2. At times I feel I have gotten a raw deal out of life.
3. Other people always seem to get the breaks.
4. I wonder why sometimes I feel so bitter about things.
5. I know that "friends" talk about me behind my back.
6. I am suspicious of overly friendly strangers.
7. I sometimes feel that people are laughing at me behind my back.
8. When people are especially nice, I wonder what they want.

*reversed scored
APPENDIX I

Interpersonal Reactivity Index (IRI; Davis 1980)

The following statements ask about your thoughts and feelings in a variety of situations. For each item, show how well it describes you by choosing the appropriate number on the scale at the top of the page: 1, 2, 3, 4, or 5. When you have decided on your answer, fill in the letter in the blank next to the item. **READ EACH ITEM CAREFULLY BEFORE RESPONDING.** Answer as honestly and as accurately as you can. Thank you. (*Italics are reverse scored items*)

1       2          3            4     5
Does NOT Describe Me Well Describes me
Me Well        VERY Well

Empathic Concern Scale

__ 2. I often have tender, concerned feelings for people less fortunate than me.
__ 4. *Sometimes I don’t feel very sorry for other people when they are having problems.*
__ 9. When I see someone being taken advantage of, I feel kind of protective towards them.
__ 14. *Other people’s misfortunes do not usually disturb me a great deal.*
__ 18. *When I see someone being treated unfairly, I sometimes don’t feel very much pity for them.*
__ 20. I am often quite touched by things I see happen.
__ 22. I would describe myself as a pretty soft-hearted person.
APPENDIX J

Social Dominance Orientation Scale (Pratto, Sidanius, Stallworth, & Malle, 1994)

Scale: 1 = Strongly disagree to 7 = Strongly agree

1. Some groups of people are simply inferior to other groups.
2. In getting what you want, it is sometimes necessary to use force against other groups.
3. It’s OK if some groups have more of a chance in life than others.
4. To get ahead in life, it is sometimes necessary to step on other groups.
5. If certain groups stayed in their place, we would have fewer problems.
6. It’s probably a good thing that certain groups are at the top and other groups are at the bottom.
7. Inferior groups should stay in their place.
8. Sometimes other groups must be kept in their place.
9. It would be good if groups could be equal.*
10. Group equality should be our ideal.*
11. All groups should be given an equal chance in life.*
12. We should do what we can to equalize conditions for different groups.*
13. Increased social equality is beneficial to society.*
14. We would have fewer problems if we treated people more equally.*
15. We should strive to make incomes as equal as possible.*
16. No group should dominate in society.*

*reversed scored
Word Completion Task to Measure Aggressive Cognitions (Anderson et al., 2004)

This is a list of words with letters missing. Fill in as many of the blanks as you can in 3 minutes.

Code#__________

1 b _ h _ _ _
2 i n _ _ r e
3 e x _ e _ _
4 m u _ _ e r
5 p r _ _ e
6 s p e a _
7 f l i _ _ e r
8 e x p l _ _ e
9 w _ _ m
10 k _ l _ _
11 t _ p _
12 h _ _ r _
13 a _ t _ r
14 c h o _ _ e
15 s _ m p _ _
16 a t t _ c _
17 c _ m p _ _ t
18 d e s _ _ _
19 s h _ l _
20 s h o _ t
21 r _ _ p _ _ t
22 s t r _ _ e
23 l _ _ e
24 b _ r _ n
25 s t _ _ o _
26 p _ _ s o n
27 p _ s t _ r
28 m _ _ g l e
29 b l _ _ n d
30 s n _ _ r e
31 b _ e
32 h _ t
33 g _ _ p e
34 s m _ _ c k
35 s m _ _ e
36 k _ n _ _ _
37 t _ _ n e
38 s _ _ b
39 s h _ r _
40 d r _ _ n
41 p _ _ n e
42 a n g _ _
43 f l _ _ t
44 f i _ _ t
45 p _ c k
46 h a _ e
47 a _ t
48 c _ t
49 w _ n
50 a _ e
51 _ r y
52 w a _
53 f _ _ m _
54 s l _ _ p
55 b _ _ k
56 r _ p e
57 f o _ e _ t
58 o f _ _
59 l _ _ o n
60 c r _ _ l
61 c _ e _ _ e t e
62 s t _ _ r _ y
63 m _ t c _
64 f _ r _ _
65 t _ _ _ e
66 n _ _ t _
67 w _ _ d _ w
68 w _ _ k e d
69 v i s _ _ n
70 e n _ a g e
71 s c r _ _ n
72 h _ _ r _ d
73 t _ l _ p h _ _ _
74 d i s _ _ s _ e d
75 c _ n t _ _ l
76 p r o v _ _ e
77 p _ n b _ l l
78 o u t _ _ _ e
79 c _ _ l
80 r _ d e
81 m _ n _ g e
82 i n s _ _ _
83 s _ _ d _
84 b _ _ t
85 b r _ _ z e
86 r e v _ _ t
87 c o o _ _ 87
88 s _ _ y 88
89 d _ _ r
90 s m _ _ c k
91 f r _ _ t
92 _ u n c h
93 s h _ r e
94 a _ u s e
95 c l _ _ r
96 h _ _ t
97 w _ _ t _ r
98 s _ _ a h
APPENDIX L

State Hostility Scale (Anderson, Deuser, & DeNeve, 1995)

Please indicate the extent to which you agree or disagree with each of the following mood statements. Use the following 5 point rating scale. Write the number corresponding to your rating on the blank line in front of each statement.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree</th>
<th>Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

- I feel furious.
- I feel willful.
- I feel aggravated.
- I feel tender.*
- I feel stormy.
- I feel polite.*
- I feel discontented.
- I feel like banging on a table.
- I feel irritated.
- I feel frustrated.
- I feel kindly.*
- I feel unsociable.
- I feel outraged.
- I feel agreeable.*
- I feel angry.
- I feel offended.
- I feel disgusted.
- I feel tame.*

*Item needs to be reverse scored. The asterisks are not present in the scale when presented to research participants.
APPENDIX M

Suspicion Check

Put in your own words what you thought the point of this experiment was

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________
APPENDIX N

DATE: September 11, 2013

TO: Elizabeth Kryszak, MA
FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: [204408-5] Assessing the Effects of Observing Non-Performance-Related Aggression During Online Violent Video Game Play on Aggressive Behavior
SUBMISSION TYPE: Continuing Review/Progress Report

ACTION: APPROVED
APPROVAL DATE: September 10, 2013
EXPIRATION DATE: September 9, 2014
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Full Board review category

Thank you for your submission of Continuing Review/Progress Report materials for this project. The Bowling Green State University Human Subjects Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Please note that you are responsible to conduct the study as approved by the HSRB. If you seek to make any changes in your project activities or procedures, those modifications must be approved by this committee prior to initiation. Please use the modification request form for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. All NON-COMPLIANCE issues or COMPLAINTS regarding this project must also be reported promptly to this office.

This approval expires on September 9, 2014. You will receive a continuing review notice before your project expires. If you wish to continue your work after the expiration date, your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date.

Good luck with your work. If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hsrb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board’s records.
Table 1

Frequencies and Percentages of Sample Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
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<td>Age</td>
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<td></td>
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<tr>
<td>18</td>
<td>31</td>
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<td>19</td>
<td>41</td>
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<td>20</td>
<td>19</td>
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<td>21</td>
<td>16</td>
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<tr>
<td>22</td>
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</tr>
<tr>
<td>23</td>
<td>1</td>
<td>0.8%</td>
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<tr>
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<td>14</td>
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</tr>
<tr>
<td>Year</td>
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<td></td>
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<tr>
<td>Freshman</td>
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<tr>
<td>Sophomore</td>
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<tr>
<td>Junior</td>
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<tr>
<td>Senior</td>
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<td>4.8%</td>
</tr>
<tr>
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<td>9.7%</td>
</tr>
<tr>
<td>GPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0 – 1.49</td>
<td>3</td>
<td>2.4%</td>
</tr>
<tr>
<td>1.5 – 1.99</td>
<td>11</td>
<td>8.9%</td>
</tr>
<tr>
<td>2.0 – 2.49</td>
<td>18</td>
<td>14.5%</td>
</tr>
<tr>
<td>2.5 – 2.99</td>
<td>28</td>
<td>22.6%</td>
</tr>
<tr>
<td>3.0 – 3.49</td>
<td>31</td>
<td>25.0%</td>
</tr>
<tr>
<td>3.5 – 4.0</td>
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<td>Employment</td>
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</tr>
<tr>
<td>Relationship Status</td>
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<tr>
<td>Married</td>
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<td>0%</td>
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<tr>
<td>Mother Education</td>
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<td></td>
</tr>
<tr>
<td>Less than HS</td>
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<tr>
<td>Graduated HS</td>
<td>20</td>
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<tr>
<td>Some college</td>
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<td>13.7%</td>
</tr>
<tr>
<td>Associate degree</td>
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<td>9.7%</td>
</tr>
<tr>
<td>Education Level</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Bachelor degree</td>
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<td>28.2%</td>
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<tr>
<td>Master degree</td>
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<td>16.9%</td>
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<tr>
<td>Advanced degree</td>
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<td>1.6%</td>
</tr>
<tr>
<td>Missing</td>
<td>13</td>
<td>10.5%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Father Education</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4.8%</td>
</tr>
<tr>
<td>Graduated HS</td>
<td>26</td>
<td>21.0%</td>
</tr>
<tr>
<td>Some college</td>
<td>13</td>
<td>10.5%</td>
</tr>
<tr>
<td>Associate degree</td>
<td>10</td>
<td>8.1%</td>
</tr>
<tr>
<td>Bachelor degree</td>
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<td>29.8%</td>
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<tr>
<td>Master degree</td>
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<tr>
<td>Advanced degree</td>
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<td>6.5%</td>
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<tr>
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<td>11.3%</td>
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</tbody>
</table>
Table 2

**ANOVA Results and Means and Standard Deviations for the Between Group Differences in Moderator and Control Variables for the Four Experimental Groups**

<table>
<thead>
<tr>
<th></th>
<th>Violent Game/NPBA</th>
<th>Violent Game/Neutral</th>
<th>Condition</th>
<th>Nonviolent Game/NPBA</th>
<th>Nonviolent Game/Neutral</th>
<th>Overall Sample</th>
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</thead>
<tbody>
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<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means (SD)</td>
<td>19.43 (1.35)</td>
<td>18.43 (3.58)</td>
<td>19.21 (1.24)</td>
<td>18.64 (4.02)</td>
<td>18.93 (2.80)</td>
<td></td>
</tr>
<tr>
<td>F (df)</td>
<td>.79 (3, 108)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year in School</strong></td>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Means (SD)</td>
<td>1.64 (.91)</td>
<td>1.50 (.63)</td>
<td>1.72 (.92)</td>
<td>1.68 (.99)</td>
<td>1.63 (.86)</td>
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<tr>
<td>F (df)</td>
<td>.36 (3, 108)</td>
<td></td>
<td></td>
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<tr>
<td><strong>GPA</strong></td>
<td></td>
<td></td>
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<tr>
<td>Means (SD)</td>
<td>4.25 (1.27)</td>
<td>4.20 (1.35)</td>
<td>4.07 (1.46)</td>
<td>4.28 (1.31)</td>
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<tr>
<td>F (df)</td>
<td>.13 (3, 107)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Father Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means (SD)</td>
<td>3.79 (1.66)</td>
<td>4.23 (1.63)</td>
<td>3.54 (1.69)</td>
<td>4.42 (1.84)</td>
<td>3.98 (1.71)</td>
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</tr>
<tr>
<td>F (df)</td>
<td>1.51 (3, 106)</td>
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<tr>
<td><strong>Mother Education</strong></td>
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<tr>
<td>Means (SD)</td>
<td>3.82 (1.36)</td>
<td>4.34 (1.42)</td>
<td>4.03 (1.64)</td>
<td>4.32 (1.84)</td>
<td>4.13 (1.56)</td>
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<tr>
<td>F (df)</td>
<td>.70 (3, 106)</td>
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<tr>
<td><strong>Relationship status</strong></td>
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<tr>
<td>Means (SD)</td>
<td>2.17 (1.02)</td>
<td>1.93 (.94)</td>
<td>2.07 (1.02)</td>
<td>2.44 (.96)</td>
<td>2.14 (.99)</td>
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<tr>
<td>F (df)</td>
<td>1.27 (3, 107)</td>
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<tr>
<td><strong>Exposure to VVG</strong></td>
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</tr>
<tr>
<td>Means (SD)</td>
<td>15.03 (6.09)</td>
<td>14.68 (7.09)</td>
<td>14.83 (8.24)</td>
<td>19.09 (5.79)</td>
<td>15.80 (7.05)</td>
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<tr>
<td>F (df)</td>
<td>2.45 (3, 107)</td>
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<tr>
<td><strong>Trait Aggression</strong></td>
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<tr>
<td>Means (SD)</td>
<td>77.59 (18.88)</td>
<td>79.42 (20.50)</td>
<td>72.84 (19.15)</td>
<td>74.88 (13.31)</td>
<td>76.25 (18.27)</td>
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<tr>
<td>F (df)</td>
<td>.73 (3, 108)</td>
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<tr>
<td><strong>Trait Empathy</strong></td>
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<tr>
<td>Means (SD)</td>
<td>3.63 (.60)</td>
<td>3.71 (.55)</td>
<td>3.66 (.52)</td>
<td>3.61 (.53)</td>
<td>3.66 (.54)</td>
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<tr>
<td>F (df)</td>
<td>.17 (3, 108)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Social Dominance Orientation</strong></td>
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<tr>
<td>Means (SD)</td>
<td>2.87 (1.22)</td>
<td>2.85 (1.12)</td>
<td>2.99 (1.00)</td>
<td>2.99 (1.11)</td>
<td>2.92 (1.10)</td>
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</tr>
<tr>
<td>F (df)</td>
<td>.13 (3, 108)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Note.* NPBA=Non-Performance-Based Aggression. VVG = Violent Video Games. a Years in School: 1=Freshman, 2=Sophomore, 3=Junior, 4=Senior. b GPA: 1=.0-1.49, 2=1.5-1.99, 3=2.0-2.49, 4=2.5-2.99, 5=3.0-3.49, 6=3.5-4.0. c Father and Mother Education: 1=Less than 12th grade, 2=Graduated high school, 3=Some College, 4=Associates Degree, 5=Bachelor Degree, 6=Masters Degree, 7=Advanced graduate degree. d Relationship Status: 1=Single, 2=Single but ended a committed relationship within the last year, 3=In a committed relationship, 4=Engaged, 5=Married.
Table 3

Hypotheses 1-4. ANOVA Results and Means and Standard Deviations for the Between Group Differences in Aggression Outcome Variables for the Four Experimental Groups

<table>
<thead>
<tr>
<th></th>
<th>Violent Game/NPBA</th>
<th>Violent Game/Neutral</th>
<th>Condition Nonviolent Game/NPBA</th>
<th>Nonviolent Game/Neutral</th>
<th>Overall Sample</th>
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<tbody>
<tr>
<td>Aggressive Cognitions</td>
<td></td>
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<tr>
<td>Means (SD)</td>
<td>.22 (.08)</td>
<td>.21 (.06)</td>
<td>.22 (.07)</td>
<td>.23 (.05)</td>
<td>.22 (.06)</td>
</tr>
<tr>
<td>F (df)</td>
<td>.64 (3, 120)</td>
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<tr>
<td>Aggressive Affect</td>
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</tr>
<tr>
<td>Means (SD)</td>
<td>2.15 (.48)</td>
<td>1.97 (.42)</td>
<td>2.02 (.58)</td>
<td>2.00 (.63)</td>
<td>2.04 (.53)</td>
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<tr>
<td>F (df)</td>
<td>.66 (3, 120)</td>
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<tr>
<td>Aggressive Behavior</td>
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<tr>
<td>Means (SD)</td>
<td>5.04 (1.89)</td>
<td>5.21 (1.75)</td>
<td>5.11 (1.94)</td>
<td>5.76 (1.30)</td>
<td>5.27 (1.75)</td>
</tr>
<tr>
<td>F (df)</td>
<td>.98 (3, 116)</td>
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<td>Participant NPBA</td>
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<tr>
<td>Means (SD)</td>
<td>1.68 (4.02)\textsuperscript{b}</td>
<td>.10 (.30)\textsuperscript{b}</td>
<td>3.88 (5.53)\textsuperscript{a}</td>
<td>.39 (1.34)\textsuperscript{b}</td>
<td>1.60 (3.86)</td>
</tr>
<tr>
<td>F (df)</td>
<td>3.43 (3, 117)\textsuperscript{***}</td>
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<tr>
<td>Total Vocalizations</td>
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<tr>
<td>Means (SD)</td>
<td>16.00 (9.56)</td>
<td>20.35 (13.69)</td>
<td>21.32 (15.54)</td>
<td>22.54 (17.25)</td>
<td>20.12 (14.37)</td>
</tr>
<tr>
<td>F (df)</td>
<td>1.12 (3, 117)</td>
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<td>Angry Vocalizations</td>
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<tr>
<td>Means (SD)</td>
<td>5.57 (4.83)</td>
<td>3.97 (3.29)</td>
<td>6.76 (7.69)</td>
<td>6.32 (7.38)</td>
<td>5.67 (6.14)</td>
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<tr>
<td>F (df)</td>
<td>1.27 (3, 117)</td>
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<tr>
<td>Neutral Vocalizations</td>
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<tr>
<td>Means (SD)</td>
<td>8.32 (6.30)\textsuperscript{b}</td>
<td>15.06 (11.71)\textsuperscript{a}</td>
<td>10.03 (11.25)\textsuperscript{a}</td>
<td>15.00 (12.08)\textsuperscript{a}</td>
<td>12.07 (10.94)</td>
</tr>
<tr>
<td>F (df)</td>
<td>3.09 (3, 117)\textsuperscript{*}</td>
<td></td>
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</tr>
</tbody>
</table>

Note. NPBA=Non-Performance-Based Aggression. Means with different subscripts are significantly different from each other in a between-groups comparison test.
*\(p < .05\). **\(p < .01\). ***\(p < .001\).
Table 4

Hypothesis 5: ANOVAs Predicting Aggressive Cognition, Affect, and Behavior (CRT and NPBA) from Violent/Nonviolent Game Condition, NPBA/Neutral Game Condition, and with Trait Aggression as the Moderator Variable

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>Aggressive Cognition $F (df)$</th>
<th>Aggressive Affect $F (df)$</th>
<th>Aggressive Behavior (CRT) $F (df)$</th>
<th>Aggressive NPBA $F (df)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>VG Condition</td>
<td>.04 (1, 104)</td>
<td>.34 (1, 104)</td>
<td>.29 (1, 100)</td>
<td>4.57 (1, 101)*</td>
</tr>
<tr>
<td>NPBA Condition</td>
<td>.10 (1, 104)</td>
<td>.01 (1, 104)</td>
<td>1.52 (1, 100)</td>
<td>13.32 (1, 101)**</td>
</tr>
<tr>
<td>Trait Aggression</td>
<td>1.01 (1, 104)</td>
<td>9.16 (1, 104)**</td>
<td>1.18 (1, 100)</td>
<td>.21 (1, 101)</td>
</tr>
<tr>
<td>VG*Trait Aggression</td>
<td>4.85 (1, 104)*</td>
<td>4.56 (1, 104)*</td>
<td>.08 (1, 100)</td>
<td>.68 (1, 101)</td>
</tr>
<tr>
<td>NPBA*Trait Aggression</td>
<td>.56 (1, 104)</td>
<td>2.04 (1, 104)</td>
<td>.06 (1, 100)</td>
<td>.60 (1, 101)</td>
</tr>
<tr>
<td>VG*NPBA</td>
<td>.62 (1, 104)</td>
<td>.92 (1, 104)</td>
<td>.52 (1, 100)</td>
<td>3.56 (1, 101)</td>
</tr>
<tr>
<td>VG<em>NPBA</em>Trait Aggression</td>
<td>.01 (1, 104)</td>
<td>.08 (1, 104)</td>
<td>.13 (1, 100)</td>
<td>1.44 (1, 101)</td>
</tr>
</tbody>
</table>

Note. N=112. VG = Video Game. CRT= Competitive Reaction Time Task. NPBA= Non-Performance-Based Aggression.

*p < .05. **p < .01. ***p < .001.
Table 5

Hypothesis 6: ANOVA Predicting Aggressive Cognitions, Affect, and Behavior from Violent/Nonviolent Game Condition, NPBA/Neutral Game Condition, with Trait Empathy as the Moderator Variable

<table>
<thead>
<tr>
<th>Predictors (n=112)</th>
<th>Aggressive Cognition</th>
<th>Aggressive Affect</th>
<th>Aggressive Behavior (CRT)</th>
<th>Aggressive NPBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>VG Condition</td>
<td>1.31 (1, 104)</td>
<td>.04 (1, 104)</td>
<td>.42 (1, 100)</td>
<td>3.50 (1, 101)</td>
</tr>
<tr>
<td>NPBA Condition</td>
<td>.19 (1, 104)</td>
<td>.62 (1, 104)</td>
<td>1.57 (1, 100)</td>
<td>8.44 (1, 101)**</td>
</tr>
<tr>
<td>Trait Empathy Group</td>
<td>.11 (1, 104)</td>
<td>.38 (1, 104)</td>
<td>.02 (1, 100)</td>
<td>.19 (1, 101)</td>
</tr>
<tr>
<td>VG*Trait Empathy</td>
<td>1.09 (1, 104)</td>
<td>1.11 (1, 104)</td>
<td>.01 (1, 100)</td>
<td>.02 (1, 101)</td>
</tr>
<tr>
<td>NPBA*Trait Empathy</td>
<td>.25 (1, 104)</td>
<td>.02 (1, 104)</td>
<td>.07 (1, 100)</td>
<td>1.23 (1, 101)</td>
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<tr>
<td>VG*NPBA</td>
<td>.64 (1, 104)</td>
<td>.05 (1, 104)</td>
<td>.93 (1, 100)</td>
<td>1.23 (1, 101)</td>
</tr>
<tr>
<td>VG<em>NPBA</em>Empathy</td>
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<td>.46 (1, 104)</td>
<td>1.03 (1, 100)</td>
<td>.17 (1, 101)</td>
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</tbody>
</table>

Note. N=112. VG = Video Game. CRT= Competitive Reaction Time Task. NPBA= Non-Performance-Based Aggression. *p < .05. **p < .01. ***p < .001.
Table 6

**Hypothesis 7: ANOVA Predicting Aggressive Cognitions, Affect, and Behavior from Violent/Nonviolent Game Condition, NPBA/Neutral Game Condition, with Social Dominance Orientation as the Moderator Variable**

<table>
<thead>
<tr>
<th>Predictors (n=112)</th>
<th>Aggressive Cognition</th>
<th>Aggressive Affect</th>
<th>Aggressive Behavior (CRT)</th>
<th>Aggressive NPBA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F$ (df)</td>
<td>$F$ (df)</td>
<td>$F$ (df)</td>
<td>$F$ (df)</td>
</tr>
<tr>
<td>VG Condition</td>
<td>.32 (1, 104)</td>
<td>.11 (1, 104)</td>
<td>.25 (1, 100)</td>
<td>2.45 (1, 101)</td>
</tr>
<tr>
<td>NPBA Condition</td>
<td>.01 (1, 104)</td>
<td>.38 (1, 104)</td>
<td>2.11 (1, 100)</td>
<td>13.01 (1, 101)**</td>
</tr>
<tr>
<td>Trait Social Dominance Group</td>
<td>.01 (1, 104)</td>
<td>1.04 (1, 104)</td>
<td>2.13 (1, 100)</td>
<td>.88 (1, 101)</td>
</tr>
<tr>
<td>VG*Social Dominance</td>
<td>.03 (1, 104)</td>
<td>.92 (1, 104)</td>
<td>.14 (1, 100)</td>
<td>.17 (1, 101)</td>
</tr>
<tr>
<td>NPBA* Social Dominance</td>
<td>.48 (1, 104)</td>
<td>.24 (1, 104)</td>
<td>1.29 (1, 100)</td>
<td>.30 (1, 101)</td>
</tr>
<tr>
<td>VG*NPBA</td>
<td>.03 (1, 104)</td>
<td>.35 (1, 104)</td>
<td>.58 (1, 100)</td>
<td>.89 (1, 101)</td>
</tr>
<tr>
<td>VG<em>NPBA</em> Social Dominance</td>
<td>.45 (1, 104)</td>
<td>.28 (1, 104)</td>
<td>1.26 (1, 100)</td>
<td>.80 (1, 101)</td>
</tr>
</tbody>
</table>

*Note. N=112. VG = Video Game. CRT= Competitive Reaction Time Task. NPBA= Non-Performance-Based Aggression.  
*p < .05. **p < .01. ***p < .001.*
Figure Caption

*Figure 1.* Trait aggression as a moderator of the relation between violent vs. nonviolent video game play condition and aggressive cognitions.

*Figure 2.* Trait aggression as a moderator of the relation between violent vs. nonviolent video game play condition and aggressive affect.