PERSPECTIVE TAKING IN VIOLENT VIDEOGAMES

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ABSTRACT

While the relationship between violent videogame play and aggression has been widely investigated empirically, the results have been largely inconclusive and highly controversial. This research synthesizes the current literature and responds to the call for a broader and more ecologically valid approach to videogame research. Two studies examine different aspects of videogame play that were hypothesized to impact the relationship between violent video games and aggression including; different game narratives, the game environment and, most importantly, player perspective. This research utilized action identification theory (AIT; Vallacher & Wegner, 1985) as its theoretical framework. This framework makes predictions on how individuals' actions are identified when describing their own behavior. The AIT also informed the development of a new individual difference measure of player's perceptions of their actions, employing the rationale that there are important implications for whether an action is perceived as concrete or abstract (Vallacher & Wegner, 2000). Previous research has shown that cooperation and prosocial goals lead to fewer hostile cognitions and decreased arousal along with increases in prosocial cognitions and behaviors (Ewoldsen et al. 2012; Gitter, Ewell, Guadagno, Stillman & Baumeister, 2013). I hypothesize this is due to the level of abstraction the game player applies to their perceived action. I believe that cooperative play or prosocial intentions lead players to think in a more abstract manner and therefore, perceive their actions as less aggressive or violent.

Study 1 manipulated game narrative and context and found evidence that competitive narratives increased hostility in players. It was also found that player performance was a significant predictor of numerous variables including hostility and positive affect. Abstraction was not found to significantly mediate the relationship between experimental condition and aggression. Study 2 manipulated abstraction in an attempt to demonstrate its effect on the relationship between game narrative and aggression. Study 2 replicated the finding from Study 1, that player performance was related to aggression and positive affect. Unexpectedly, participants in Study 2 viewed the competitive condition more abstractly than the cooperative condition. Experts were not found to be more aggressive or hostile than novices. Implications for future research are discussed.

DEDICATION

This dissertation is dedicated to the victims of both the Sandy Hook and Columbine school massacres. These tragic events have acted a catalyst for my research and will forever remain a motivator. The pain of their families is likely indescribable however, hopefully some good can be brought forth from such terrible circumstances.

LIST OF ABBREVIATIONS AND SYMBOLS

a	Cronbach's index of internal consistency
df	Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data
F	Fisher's *F* ratio: A ration of two variances
M	Mean: the sum of a set of measurements divided by the number of measurements in the set
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
r	Pearson product-moment correlation
t	Computed value of *t* test
<	Less than
=	Equal to
η_p^2	Partial Eta Squared effect size

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CHAPTER 1

INTRODUCTION

In the United States, after a rare act of violence occurs, such as a mass shooting at a school or other venue, a popular violent movie or violent videogame will be implicated as a cause of, or contributor to, the event. For instance, after the 1999 massacre at Columbine High School, Eric Harris and Dylan Kleybold were noted in media reports to be players of "DOOM" (Id Software, 1993), one of the earliest commercially available violent video games in which players shot their adversaries in order to progress (Korach, 2008). Adam Lanza, who perpetrated one of the most heinous crimes of its kind, killing 26 small children and teachers in Newtown, Connecticut, was described in the media as a loner who chronically played "Call of Duty" (Activision, 2012) and other shooting style games (Candiotti, Botelho & Watkins, 2013). The powerful narratives promulgated by these news stories often serve as catalysts to the debate on the impact of virtual violence on subsequent aggressive behavior in the real world, but alone, these rare events cannot establish a reliable relationship between violent videogame play and violent behavior.

Beyond the perspective of the above tragic events, the relationship between violent videogame play and aggression has been widely investigated empirically (Anderson et al., 2010; Anderson & Bushman, 2001). Currently, aggression models such as the Generalized Aggression Model (GAM) claim that playing violent video games leads to aggressive cognitions, desensitization and an increased likelihood of committing violent behavior. It has been argued, however, that these claims are framed too narrowly to understand the entire relationship between

gameplay and player responses. The purpose of this investigation is to review and synthesize the strengths and weaknesses of the current literature that links videogame play to aggression by identifying possible limitations to generalizability of results and methodological problems in previous research. Next, the present paper will identify options for improvement over and above the established research paradigms typically employed in this literature. To begin, I will briefly review the history of this literature focusing on how newly emerging media has been spuriously linked to various societal problems, including violence. I will then review the most currently accepted theoretical model associated with violent videogame play and aggressive behavior and review the studies that have established a link between aggressive behavior and violent videogame play. I will also identify potential problems associated with the current literature, present a competing hypothesis that specifies that competition during gameplay is the primary predictor of game-related aggression, and discuss why this subject warrants further investigation. I then apply previous psychological theory on action identification to offer a new explanation of the competition hypothesis. More specifically, I argue that the perception of one's actions during violent video gameplay is a crucial moderator of the relationship between video games and aggressive thoughts and actions. Finally, I report the results of two studies that test this new hypothesis.

Violence in the Media

Historically, the introduction of new media has been followed by a period of intense critical scrutiny. This scrutiny is typically focused on the negative aspects of the emerging technology, such as its influence in promoting violence or promiscuity, and fear that the new media will have wide adverse effects on those who use it (Wartella & Jennings, 2002). This happened with movies in the 1900s, the radio in the 1920s, television in the 1950s, and again

with the Internet as it became publically accessible in the mid-1990s (Kraut, et al., 1998). Psychologist Azriel L. Eisenberg's comment, in 1931, on the societal effects of radio could be used to describe almost any emerging form of popular media:

> "The popularity of this new pastime among children has increased rapidly . . . This new invader of the privacy of the home has brought many a disturbing influence in its wake. Parents have become aware of a puzzling change in the behavior patterns of their children. They are bewildered by a host of new problems, and find themselves unprepared, frightened, resentful, and helpless. They cannot lock out this intruder because it has gained an invincible hold of their children (p.5, 1931)."

The concerns raised among experts of that era have typically led to research investigating the negative impacts of the new form of media on society. One of the most well-known examples of this type of research was the famous "Bobo" doll study. Bandura, Ross, and Ross (1963) exposed children to a live model aggressing, a model on film aggressing, or a no aggression control condition and then subsequently examined the extent to which the children behaved aggressively towards the doll. Their finding that children in the film condition displayed much more aggression towards the "Bobo" doll than those in the control condition, and similar aggression to those in the live model condition, led to a long line of research investigating modeling effects of film and TV violence on adolescents (Wartella & Jennings, 2002). A similar phenomenon occurred with video games two decades later (Ferguson, 2010).

Since the introduction of violent video games, people have been concerned about the extent to which video games contribute to aggressive behavior among players (Ferguson, 2010). The increasing popularity of video games, along with the corresponding increase in the realism

of video game graphics, has contributed to an ongoing and escalating debate between the gaming industry, video game players (colloquially referred to as "gamers"), policy makers, parents, and researchers over the societal impact of video game violence. Hundreds of studies and numerous meta-analyses have been published that have advanced the claim that violent video games cause aggression in players (Anderson & Bushman, 2001; Bushman & Huesmann, 2006; Freedman, 2002; Paik & Comstock, 1994). From these studies, an established body of literature developed and provided evidence for a link between aggression and videogame play. From many of these, a link between video games and aggressive cognitions and hostile feelings has also been shown (Anderson, & Murphy, 2003; Bartholow, Bushman, & Sestir, 2006).

Despite the magnitude of the extant literature on video game play and aggression, only a small proportion of this body of work has provided evidence for a causal link between violent video games and actual violent behavior among players (Anderson & Bushman, 2001; Anderson et al., 2010). Though these early studies are critical to understanding the relationship between violence and video games, they have been criticized for extrapolating from cognitive and emotional outcomes to behavioral ones, and for their uncritical acceptance of the methodologies employed in the studies that were reviewed. Ferguson (2010), argued that researchers in this area hold a specific agenda to link videogame violence with aggression, and the search for a link between video games and videogame player aggression has been pursued so vigorously that the broader impacts and consequences of game playing have been generally neglected. He goes on to assert that, in order to better understand the social impact of video games, scholars must approach the study of video games with a more broad perspective; one that accounts for the many nuances of videogame play.

The current investigation intends to answer Ferguson's (2010) call to examine video game research from a broader and ecologically valid approach. Along with the previously described issues, the majority of the prior research on the negative effects of videogame play does not accurately reflect how people actually play video games. Specifically, previous research has typically examined a specific type of violent game (first-person shooters; FPS). While this genre of videogame remains popular (i.e., 39% of total top 20 total videogame sales are FPS), it does not comprise the majority of sales among the top twenty videogame titles ("Yearly Video Game Chart," 2013). Thus, it is reasonable to question whether other types of violent videogame play demonstrate the same effect on aggression as FPS types. Additionally, in most commercial video games, violence is embedded in various plots and strategic objectives that define success or failure. Most popular titles have several different variations of story, objectives, and opportunities for networked interaction with other players. Given these differences, it begs the question: How could all these different contexts attenuate or amplify aggression in the player?

The limited generalizability of extant studies, coupled with possible publication biases, has left the videogame literature inconclusive, leading to disagreement within the research community. To further our understanding of the relation between video game play and aggression, research must be conducted that takes into account the full range of player and game play variables that are likely to affect the extent to which violent videogame play is linked to aggression. These include player personality characteristics, player expertise, and the videogame context. Understanding the impact of these variables on aggression is required to produce fair and ecologically valid evidence pertaining to the extent to which violent video games promote player violence. The purpose of the current study is to investigate the way that player expertise

interacts with the broad goals and strategies of violent videogame play to affect hostile thoughts among players. More specifically, I make the counter-intuitive prediction that the more people play violent video games, the less likely they are to become more aggressive as a result of playing them.

THE GENERAL AGGRESSION MODEL

The vast majority of violent videogame research has used the general aggression model (GAM) as the theoretical framework to understand the effect of violent video games. In order to understand the ways in which aggression is conceptualized in the current videogame literature, it is important to review the model and the manner in which it has been applied to violent videogame research. One of Ferguson's (2010) major critiques was that videogame research is conducted with a narrow perspective. I argue that the GAM may be reinforcing that problem as it claims that the causes of aggression can only come from a limited number of sources. In this section, I will review the basic tenets of the GAM, highlight aspects of the model that may be limiting current videogame research and identify important issues that the model neglects.

The general aggression model (GAM) synthesizes several earlier theories of aggression (Anderson & Bushman, 2002) to present aggression as a complex process through which the characteristics of the person and the situation interact to influence affect, cognition, and arousal. They argue that the sum of these internal states impact the appraisal of the current situation and determines whether aggressive actions are judged to be acceptable or effective. The roles that arousal and scripts --automatic patterns in behavior-- play in aggression have been especially emphasized as relevant to understand the effects of violent videogame play.

Arousal

Increases in arousal have been shown to increase aggressive tendencies (Zillmann, 1988) and violent videogame play has consistently been found to lead to increased arousal (Anderson & Bushman, 2001). The GAM is used to promote the idea that arousal from violent videogame

play evokes aggressive thoughts and energizes aggressive behaviors. However, because research has shown that nonviolent games can also increase arousal, arousal alone cannot account for the effects of violent game play (Carnagey & Anderson, 2005). If a violent game can cause as much arousal as a nonviolent game, it can only be a necessary condition for aggression, not a sufficient one.

Aggressive Scripts

Another major hypothesis about violent video games that derives from the GAM is that videogame play increases the accessibility and use of aggressive scripts, which represent aggression as an effective response in conflict situations (Anderson & Bushman, 2001). Aggressive scripts have been addressed in previous literature regarding the violence promoting effects of television and film and were adapted into the GAM from this previous work by Huesmann (1986). Researchers theorized that, as people learn about social situations, they develop cognitive scripts representing responses that are effective in those situations. These scripts do not have to be created by the person, but can be learned by observing from others. Therefore, if one learns that an aggressive script leads to favorable outcome in a certain situation, that script is likely to be activated, and to guide behavior, in similar situations (Huesmann, 1986). When applied to video games, Anderson and Bushman (2001) posit that repetitive violent videogame play frequently portrays the successful application of aggressive scripts and thereby leads to the increased use of aggressive scripts in real life. For example, if a player sees that acting aggressively is an effective strategy in the virtual world, s/he may be more likely to apply aggressive scripts more frequently in other situations to achieve success.

Long-Term Effects

Studies and meta-analyses have theorized that repetitive violent gameplay can not only lead to an increase in aggressive scripts but also long term effects including desensitization to violence, increased aggression in general, and the inability to distinguish between real and fantasy violence (Anderson & Bushman, 2002; Anderson et al. 2010; Carnagey & Anderson, 2005; Willoughby, Adachi, & Good, 2012). The repetitive increases in arousal, coupled with increased reliance on aggressive scripts may lead to permanent changes in a person's ability to manage aggressive impulses. However, research investigating these long-term effects has been mixed (Ferguson et al., 2008; Williams & Skoric, 2005; Willoughby, Adachi, & Good, 2012).

Neglected Aspects

Even if the GAM is considered the model that best explains the relation between videogame violence and aggressive behavior, there are various aspects of the model that remain unclear. First, the GAM does not state if these aggressive scripts must be consciously identified as aggressive or successful to result in later aggressive cognitions or behaviors. The script is designated as aggressive by the researcher not by the player. Does the player need to realize his behavior is aggressive and successful in order for it to be repeated in the future? If the player does not unconsciously label this idea as an aggressive script, how is it designated for use in later situations? Also, if the player is not rewarded in the game for his or her violent strategies, would this decrease aggressive thoughts?

Additionally, the situations encountered in video games that warrant the application of aggressive scripts are often fantasy oriented and/or highly unrealistic. A typical gamer may never see a real life application of a successful aggressive script from a game. If you are frustrated with the car in front of you, how likely are you to call in an air strike on that car via

your military satellite phone? Are these fantasy scripts actually evoked in real life contexts? Even if they are, can the player not cognitively distinguish that it would be inappropriate?

In the majority of the literature, the third principle of the GAM, how cognition may attenuate or exacerbate both arousal and affect, has not been addressed. In the extant literature, the operational definition of cognition and the concepts that comprise cognition are poorly defined. In fact, the majority of violent videogame research reviewed in the present study does not take player cognitions (besides hostile thoughts) or perceptions into account. There are numerous possible thoughts and perspectives a player can have that could affect the relation between violent videogame play and aggression. Specifically, a player's goals while playing (e.g., to win or to make friends), and the competition types they engage in (e.g., capture the flag or free for all) within the game, are just a few examples of common cognitions a player might consider during a regular gameplay experience.

REVIEW OF VIOLENT VIDEOGAME RESEARCH

Over the last two decades, research focused on the link between violent video games and aggression has become increasingly controversial. To understand that controversy, it is critical to examine the videogame literature from a historical perspective. In this section, I review the literature as a whole, using several influential studies within the literature as key examples. In addition, I outline notable critiques concerned with methodology and generalizability and discuss how researchers in this area attempted to address critical design and methodological issues across many different research paradigms, including correlational, experimental, and longitudinal research. Through this review of the literature I will identify aspects of videogame play that have not been addressed in the current research and how these omissions may have misshapen our understanding of the effects of violent video games on aggression. Before going further it is important to note how I will use the word aggression. Though aggressive behavior is often referred to in the GAM, there is limited research linking violent videogame play to actual violent or aggressive behavior. Throughout this discussion when I refer to aggression in general, it is in reference to aggressive cognitions, thoughts or tendencies that stem from playing violent videogames. In cases where actual violent or aggressive behavior is mentioned it will be noted specifically as such.

Correlational Research

Correlational research on the aggression-promoting effect of videogame play emerged as depictions of violence in the games became increasingly common and realistic. Though the field quickly moved on to more sophisticated methods, correlational work has remained tied to this

literature, interwoven and presented along with experimental work. Many of these correlational studies investigated a young or adolescent population, relating their videogame playing behavior to various measures of aggressive outcomes (Ferguson et al., 2008; Gentile, Lynch, Linder, & Walsh, 2004; Lin, & Lepper, 1987). Generally, the results have produced a consensus that video games and aggression are somehow related. Other correlational studies have been conducted investigating public opinion and perceptions of violence in video games (Funk, Flores, Buchman, & Germann, 1999), showing that the majority of the public overestimate public concern for the topic. Recent work has focused on the neural processes of aggressive thoughts and experience level of expert gamers (Bartholow, Bushman, & Sestir, 2006; Regenbogen, Herrmann, & Fehr, 2010). These studies all suggest that there is a link between gameplay and aggression, though interpretations and implications of this link are highly variable. As with all correlational work, causation cannot be established, but these correlational studies establish a foundation for the experimental work that has followed.

Experimental Research

There have been numerous experiments attempting to investigate the link between videogame play and aggression, but in retrospect, the majority of these studies suffer from numerous methodological problems. For instance, some studies failed to include comparable nonviolent control games (Anderson, & Ford, 1986; Cooper & Mackie, 1986); while other studies did not attempt to find nonviolent game counterparts that were similar to the contexts of the violent game (Calvert & Tan, 1994; Kirsh, Olczak, & Mounts, 2005). One of the earliest and most influential experimental studies was conducted by Irwin and Gross (1995), in which they had 7-8 year old boys play a violent or a non-violent video game. The experimenters coded aggressive behaviors during a free play session, gave participants nonviolent versus violent toys

to choose from, and coded aggressive behaviors during an interaction in which participants were frustrated by a confederate. Results showed that children who played the violent game were more likely to choose aggressive objects in the free play session and were more aggressive towards a confederate during the subsequent frustration manipulation. Despite evidence to support their hypothesis, issues can be raised with the study. Although the results generally support a causal connection between video game play and aggressive behavior, the violent and non-violent games differed on a wide array of potentially important confounding variables, such as enjoyment, difficulty, frustration, game type, or in game goals. The researchers also did not add a condition in which participants did not experience the frustration manipulation so there was no control condition for this manipulation. Finally, this study sampled from a very narrow population (7-8 year old males) making the results difficult to generalize. This study serves as an example of exceedingly common methodological problems found throughout the videogame literature.

Bushman and Anderson have generated a large portion of the influential experimental research investigating the link between violent videogame play and aggression, as it corresponds to their GAM. Anderson and Dill (2000) published a study designed specifically to address the shortcomings of previous work such as lack of controls and poor generalizability. College students participated in a session where they played both a violent and nonviolent game session with a partner. One week later, they completed another session alone, playing either the violent or the nonviolent game. They were told once again that they did indeed have a partner; however in reality the gameplay of the "other player" was computer controlled. Following the completion of the second videogame session, participants completed a competitive reaction time task in which they could punish their fictitious opponents with bursts of painfully loud noise. Games

were pretested for frustration, difficulty, and excitement. They reported that the violent game condition made aggressive cognitions more accessible than the nonviolent game, though no differences in state hostility emerged across conditions. They also found that the violent game condition caused more aggression towards the opponent (i.e., participants gave their opponents longer noise bursts) than did the nonviolent game. However, this effect only occurred following a loss to the fictitious opponent who had previously provoked the participant. In addition, only one of the four aggressive noise behavior variables yielded results that were significant. An argument could be made that if statistical correction for multiple dependent variables was applied, even this finding would have failed to reach statistical significance (Ferguson, 2010). Even if these results are accepted as valid, the results could also be explained as an effect of the competitive reaction time task. The actual videogame session did not feature any type of competition. To date, the current literature indicates that little experimental work has taken into account the goals and context of the games used in this research. Despite the issues mentioned in the above research, further experimental results have replicated the link between violent gameplay and aggression (Anderson, & Murphy, 2003; Bartholow, Bushman, & Sestir, 2006). Taken together, these results are difficult to discount.

Contradictory Experimental Research

Not all research on the relationship between aggression and video games supports a causal connection. Many of the above findings along with other work have failed to consistently produce increases in hostile cognitions (Anderson & Dill, 2000; Carnagey & Anderson, 2005). Other research that has controlled for player perspective in the game and other possible game related confounds have failed to replicate findings of aggressive cognitions and aggressive behavior when playing a violent game (Baldaro, et al., 2004; Ferguson et al., 2008; Schie, &

Wiegman, 1997; Williams & Skoric, 2005). Even further, certain types of cooperative violent gameplay has resulted in a decrease of aggression in participants (Barnett, & Coulson, 2010; Schmierbach, 2010), while other correlational work claimed that children who play computer games (regardless of context) on a regular basis scored higher on outcome measures such as self-concept, self-esteem and lower on measures of risky behavior (Durkin, & Barber, 2002).

Meta-Analyses and Longitudinal Investigations

Because of the large number of published studies linking video games and aggression, a number of meta-analyses have been published on this topic. Anderson and Bushman (2001) has served as the bellwether of these studies in that it supports a particularly steadfast conclusion that violent videogame play increases aggressive behavior in children and young adults. Anderson and Bushman (2001) sampled 35 different experimental works generating a small positive relationship of $r+ = .19$. Numerous claims have surfaced that this particular meta-analysis reviewed a biased sample of original studies (Ferguson, 2010). Additionally, several meta-analyses have followed, contradicting previous results (Ferguson, 2007) or claiming that the link between aggressive behavior and violent games is so weak that it poses no real threat to everyday life (Sherry, 2001; 2007). Researchers continue to debate, however, as the results of another published meta-analysis (Anderson et al., 2010) reaffirmed the claim that violent game play is linked to aggressive thought, behavior and actions while also criticizing previous works. In terms of meta-analyses, the conversation has approached what appears to be an impasse, as two different camps have spent sufficient time attempting to disprove the other side.

Longitudinal and retrospective research has investigated these concepts but the results have also been mixed. Ferguson et al. (2008) correlated participation in violent criminal behavior with aspects of one's upbringing. They concluded that, whereas gender, trait aggression, and

family violence were predictive of violent crime, exposure to videogame violence was not. Conversely, a study that monitored high school students each year, for all four years of high school, showed that violent game play facilitated sharper increases in, and higher levels of, aggression over time (Willoughby, Adachi, & Good, 2012). This study is particularly notable because it accounted for numerous potentially confounding variables (e.g., exposure to violence, family history, trait aggression etc.) with their statistical model. To my knowledge there is only one true longitudinal experiment on this subject that was conducted by Williams and Skoric (2005). In this study, over 213 participants of various ages were recruited to play a violent online game for an entire month. After an average exposure of 56 hours of gameplay, the researchers saw no moderate or large increases in aggression compared to a control group. Recently, fMRI research has shown that long term exposure to violent video games did not limit experienced gamers' ability to differentiate fantasy violence from real violence (Regenbogen, Herrmann, & Fehr, 2010).

The Competition Hypothesis

One of the primary competing hypotheses to the GAM, with respect to video games, is the competition hypothesis. The competition hypothesis states that it is the competitive aspect of violent video games rather than their violent nature that is responsible for their observed effects on aggression. This idea has only been loosely defined and discussed within the literature but has received some preliminary empirical support. A study by Carnagey and Anderson (2005), attempted to rule out the competition hypothesis while replicating previous findings (Anderson & Bushman, 2001; Anderson & Dill 2000; Bushman, & Anderson, 2002). In this paper, the experimenters created three different versions of the same racing game "Carmageddon 2". In the first condition, participants were rewarded for hitting pedestrians and other players, in the second

condition participants were punished for this behavior, and in the third condition there were no pedestrians and other cars were designed to behave passively. The experimenters concluded that both conditions 1 and 2 were competitive and if the competition hypothesis was valid, there should be no differences between conditions. In Study 1, there were no differences between the first two versions of the game in terms of state hostility measures. Study 2 revealed significant differences between condition 1 and 2 on a measure of aggressive thought accessibility. Study 3 demonstrated increased aggressive behavior via noise bursts in condition 1 compared to all others conditions. However, once again, a separate reaction time task that provoked the participant was used to assess aggressive behavior. The researchers concluded that rewarding participants for violent behavior increased aggression; however, several findings of the study were seemingly overlooked. First, Study 1 validated the idea that competition increases aggression because there was no difference between violent and non-violent versions of the competitive game conditions. Second, in all three studies, the videogame version without competition yielded the lowest scores on aggression. The researchers did not have a nonviolent competitive version of the game and even though violence was punished in second condition, it still occurred often. Additionally, in these conditions, participants once again were not competing against another player, they were merely trying to win a race. In contemporary violent videogame play, players regularly compete openly with one another. The notion that the reward and punishment conditions were equally competitive was not demonstrated by this research. Overall, the results of this research can be interpreted as support for the competition hypothesis because the conditions without competition generated the lowest aggression. These findings also lend support to the idea that goal orientation in a game may be a crucial moderator of the effects

of violent video games on subsequent aggressive cognitions. Players rewarded for aggression were bound to be more aggressive and those punished should have been more careful.

UNDERSTANDING GAMES IN CONTEXT

For the sake of simplicity, characteristics of video games and videogame players such as goal orientation, expertise and competition can be referred to as game context or game narrative. We define game context as the different nuances of violent videogame play that are highly varied between titles or within the games themselves. For example, many popular titles have numerous game contexts that vary the goals of the player, who they play with and the structure of that gameplay. These ideas of context and narrative are also aspects that could be considered the "Cognition" element of the GAM, but have thus far been overlooked in the literature. In this section, I outline different contexts that may impact the relationship between aggression and video games, review any relevant literature that exists on these contexts and discuss how this research can be expanded. Game context could emerge as one of the most important predictors of aggressive thoughts and behaviors related to violent video games.

Perspective

The first aspect of modern video games that can vary widely by game is perspective. The majority of previous research has used stimulus material consisting of violent first-person shooting (FPS) style games, due to their popularity (Ferguson, 2010). The term FPS indicates that the game is played through the eyes of the character from a first-person vantage point while the character is usually holding some type of weapon. Besides FPSs, there are various different types of violent video games played from the third person perspective (the primary character is seen in full view from behind or from the side), including two dimensional one-on-one fighting style games (i.e., Mortal Kombat), third person action adventure games (i.e., Prince of Persia),

and birds-eye strategy action games (i.e., Command & Conquer 3) to name a few. Some games even offer the ability to switch between perspectives throughout the course of a game. Although the extant literature has focused primarily on FPSs, other perspectives have also been studied. At this point researchers have yet to coordinate or control for possible differences between first-person and third person formats. As previously stated, FPS style games accentuate the players' view on the weapon and the action happening in front of them. It is plausible that this accentuation could increase aggression. A study by Agerström, Björklund, and Carlsson (2013) asked participants imagine a scenario in either third or first-person perspective and found that in the third-person scenario participants made more moral judgments about imagined future scenarios compared to the first-person scenario. Applying these results to the video game context, it is reasonable to expect that players may make less morally sound judgments in the first-person perspective because the nature of the perspective causes them to regard the game in a less abstract, more concrete manner.

Expertise

Many of the studies reviewed above focused on the long-term impact of violent videogame play on players. However, many of those studies attempted to establish a correlational relationship between the amount of gameplay and aggressive outcomes without accounting for players that could be considered experts. According to the GAM, experts, or those who play violent games the most often and on a regular basis, should show the most aggressive thoughts and actions. However, in other literatures, experts are known to perceive and behave differently than novices (Hinds, Patterson & Pfeffer, 2001) and videogame experts demonstrate better spatial recognition skills and increases in processing speed compared to novice players (Dye, Green, & Bavelier, 2009; Green, & Bavelier, 2007). Some work has even shown that

regular players of violent massively multiplayer online role playing games (MMORPGs) showed decreased in-game aggressive decision making compared to non-players (Barnett, Coulson, & Foreman, 2009). Anderson and Bushman (2001) concluded that experts show less arousal during gameplay because they become desensitized to violence and are more accepting of aggressive outcomes; however, not enough research has been conducted that attempts to differentiate between the cognitions of experts and non-expert gamers. There is literature to suggest that there may be a difference between the two and the topic is worth investigating further.

Competition

Today the majority of violent video games are multiplayer and with the onset of networked gaming, players can also decide who to play with and how they want to play. A player may choose to play with friends in person (on the same console together) or could play online with friends or even strangers around the world via the Internet. They could also choose to compete against those same people in direct competition or work cooperatively to pursue a common goal. Players can decide how to compete or cooperate by selecting from numerous gameplay formats (games within the game) including capture the flag, team matchups, or completely unrealistic narratives like a zombie invasion. The average FPS player will connect to the Internet and engage in a lengthy session. A recent survey found that the average gamer plays 2.5 hours a day online (Metro, 2013). A friend may be an ally in one game and an enemy in another. These different options, available in just one game, illustrate the difficulty in generalizing the previous findings on violent video games to the current selection of available game titles.

There is evidence to suggest that these different game styles can impact aggression. Recently, Adachi and Willoughby (2011) have highlighted differences between competitive and

cooperative gameplay strategies. They provide evidence that supports the competition hypothesis previously discussed. In a 2 (Game type: Competitive vs. Noncompetitive) x 2 (Violent vs. Nonviolent) laboratory study, the researchers found that, regardless of the presence of violence, participants playing competitive games were more aggressive than those who played noncompetitive games. These findings were especially robust as they controlled for difficulty, pace of action, and arousal. Cooperation, which many consider the opposite of competition, has been linked to reduced aggression and even prosocial cognitions. Specifically, Schmierbach (2010) randomly assigned players into three different gameplay types within a single game. Subjects were paired up and played "Halo 2", a popular FPS, cooperatively, competitively, or independently. Participants in the cooperative condition reported fewer aggressive cognitions than those in the competitive or independent conditions. Similar studies have replicated these effects in online contexts, reporting less arousal in the cooperative conditions compared to a solo context (Lim, & Lee, 2009). When viewed within the framework of the GAM, it seems likely that reducing aggressive cognitions and arousal would lead to a decrease in aggressive impulses and behavior. Other work in this area has shown playing games with a prosocial or cooperative narrative or goal results in equal levels of prosocial and hostile cognitions, while violent narratives only increased violent cognitions (Gitter, Ewell, Guadagno, Stillman, & Baumeister, 2013). Behavioral outcomes have also illustrated differences between competitive and cooperative contexts. Ewoldsen et al. (2012), found that participants in a cooperative game play condition were more likely to engage in cooperative behavior via a task in which participants shared resources, relative to those who played a competitive version of the same videogame.

These examples demonstrate that game context moderates the relation between violent videogame play and aggression. However, what remain unclear are the underlying mechanisms

through which the moderating effects of context occur. Does the act of cooperating with another player while playing a violent video game alter how the player thinks about the game afterwards or does it change his/her perception of his/her behavior during play? In order to answer this question we must first attempt to understand how a player perceives the game.

ACTION IDENTIFICATION

In order to understand how a gamer might perceive his/her actions, I turn to a theory dedicated to the process of perceiving ones actions in general. Though a player may be barreling through a virtual world with a rocket launcher, s/he may be doing so in an attempt to "rescue a fallen comrade" and "save the world." If that is the case, does s/he perceive his or her actions as violent or helpful and does that perception influence aggressive cognitions? If a script is learned through this play, what is the nature of the script that is encoded? Is it a script about shooting a gun, a script about gaining a strategic advantage, or a script about saving the world?

Vallacher and Wegner (1985) introduced action identification theory (AIT) in order to understand stability and change in goal related behavior. According to AIT, any given human behavior can be thought about by the actor at various levels of abstraction, and that there are important implications for whether an action is identified concretely or abstractly (Vallacher & Wegner, 2000). For instance, if a person is watching TV and you ask that person what they are doing, they can say they are staring at the TV screen (very concrete), watching football, watching television, or even something not visibly apparent such as procrastinating (very abstract). Each of these possible answers may accurately reflect the person's activity. According to AIT, this hierarchy is operationalized through a simple rule: Any action A is a higher level of abstraction than a second B, if it makes sense to say that you can perform action A by doing B (Wegner et al., 1984). In our example, we claim that watching football is more abstract than staring at the TV screen. If we apply the formula we see that you can indeed be watching football by staring at a screen, but it would make no sense to say you were staring at a screen by watching football.

Stability of Action

The idea of stability refers to how well particular action identifications can be maintained, resisting alternative emerging identifications (Vallacher & Wegner, 1987). Identifications that are more abstract are usually more stable and result in the continuation of the action until it is complete. This is important, as the most prominent identification can influence what actions occur next. For example, if you are "watching football", you may return to the television after getting a half-time snack, but once the game ends you are likely to move on to something else as that action is completed. However, if you are "watching TV," you may continue watching after the game is over as that action has not yet been completed. As long as a particular identification is prominent, emerging actions that may alter the identification will not influence it. If a person is "watching football" and a commercial comes on reminding that person to run an errand, s/he may note that they have to attend to it later, but the current action of "watching football" still needs to be completed.

Shifting Levels

In addition to this, AIT proposes two principles that govern shifting between low and high levels of abstraction when action identifications become unstable. The first is that humans generally adopt higher levels of abstraction when thinking about their actions (Vallacher & Wegner, 2000). Applied to the earlier gaming example, if you asked a player what he or she is doing, the gamer would generally prefer to understand his/her actions as high in abstraction and perhaps describe his/her behavior as "saving the world." Additionally, research suggests that more abstract perspectives lead to more morally sound judgments and decision making (Agerström, Björklund, & Carlsson, 2013). Participants who thought about future situations in a more abstract manner --manipulated by temporal distance-- demonstrated more altruistic

decision making when compared to those in a more concrete scenario (Agerström & Björklund, 2009). Therefore, if people prefer to think at an abstract level, gamers may be more likely to perceive their high abstract actions as more helpful or positive, and make more morally sound decisions within the game context. If a players' overarching goal is positive s/he is likely to maintain a positive identification and see their behavior as good. Maintaining an overall abstract goal may be critical in avoiding hostile cognitions and aggressive behaviors.

The second principle of shifting is that when an action is disrupted in some way, a person will move to a lower level of abstraction to refocus his/her actions (Vallacher & Wegner, 1985). This principle speaks to the idea that humans prefer to perform actions well and if they cannot, they will simplify the action in order to achieve a form of success. If one is attempting an abstract goal of "solving a puzzle", but cannot immediately find a solution, they may simplify their strategy by first "finding all the edge pieces" to begin making progress. As the solution becomes more apparent they will return to the higher more abstract goal of "solving the puzzle." Once again using the above gaming example, if the game player is having trouble "saving the world" s/he might refocus his/her action on a more concrete action "killing enemy players" until the impasse is resolved. This creates an interesting situation specific to our example, in that a generally positive action or goal (saving the world) has become a more aggressive action (killing an enemy) that is embedded in the more abstract positive goal.

Action Emergence

One of the most important aspects of AIT that applies well to gaming behavior is the idea of action emergence. Action emergence occurs when a change in the level of action identification, such as shifting from "saving the world" to "killing a bad guy," results in a change in subsequent action after the less abstract goal is complete (Wegner et al., 1984). This process is

caused by an interaction of the two previously mention principles. If an action becomes difficult or is being performed poorly a person will shift perception to a lower level of abstraction; however, one prefers to identify actions at a moderate level of abstraction so they will move to higher level. Through this process, it is believed that new action can emerge. Wegner et al. (1984), created a now classic example of this process using coffee cups. Participants were given a cup of coffee in either a standard cup, or a cup affixed to a tin can full of rocks. The special cup was designed to force participants to think about the actual mechanics of drinking their coffee (at a low level of abstraction). Next, participants were given questionnaires designed to suggest that drinking coffee was a way of relaxing or a way to become alert. Finally, participants were allowed to listen to music and their stimulation seeking or avoidance was measured by how much they adjusted the volume of the music. Turning the volume up was said to be sensation seeking while turning it town was interpreted as avoidance. The researchers found that in the special cup condition, participants followed the influence of the questionnaires and reduced the volume if they received the stimulation avoidance suggestion or increased the volume if they received the stimulation seeking prime. Those who drank from the conventional cup were not influenced by the suggestions. These results suggest that when participants shift from an abstract identification "drinking coffee", to a concrete action identification "figuring out the cup", participants become susceptible to the emergence of completely new perception of their action that did not previously exist.

Therefore, if a gamer identifies his/her playing as saving his/her virtual world and then faces a difficult opponent s/he may switch to a lower level identification, such as killing an opponent. After defeating that opponent, this new lower level action identification may lead the player to a new, more aggression-oriented high level goal such as destroying enemies.

If a player shifts to an aggressive action identification, it may cause him/her to have more aggressive cognitions via the action emergence process.

Expertise

There is one more aspect of AIT that may be relevant to violent videogame play. As mentioned above, expertise or regular gameplay has been hypothesized to affect aggression. Research from outside the realm of games has found that expertise has a unique impact on the levels of abstraction at which action is perceived and regulated. Hinds, Patterson and Pfeffer, (2001) conducted a novel study comparing how experts and novices perceive actions. They found that experts used more abstract statements and fewer concrete statements, compared to novices, when describing their behavior on a task, suggesting that experts perceive tasks in a more abstract way. If this is the case, expert gamers should perceive their actions as more abstract compared to a novice gamer. Taken together with previously mentioned research (Agerström, Björklund, & Carlsson, 2013), the expert gamer may be more likely to adopt a more abstract perspective which may lead to morally sound judgments and altruistic decision making.

I hypothesize that abstraction and game context may be relevant to whether or not gamers perceive their behavior as aggressive or not. Additionally, the context of the game may assist in maintaining this level of abstraction. For example in a cooperative narrative, it may be easier for a player to maintain abstract goals. Cooperative behavior is noted to be easier and yield better results than competitive behavior (Johnson, Johnson, & Skon, 1979). If the player sees the task as less difficult they may be less likely to descend to a lower identification and emerge to one that is more aggressive. If the player's actions are perceived as cooperative, this perception could lead to higher abstraction and a decrease in arousal and hostile cognitions and an increase in prosocial cognitions and behavior.

Summary

Research has revealed a strong relationship between violent video games and aggressive thoughts or cognitions (Carnagey & Anderson, 2005; Kirsh, Olczak & Mounts, 2005). There is ample evidence to support these claims, however, recent scrutiny has uncovered many questions left unanswered, suggesting the need for viable alternative hypotheses. The majority of prior research has focused on hostility measures, cognitive and behavior tasks that ignore the perceptions of the player. There are many aspects of gameplay such as competition, perspectives and narrative that have not been thoroughly investigated or controlled for and I believe there is reason to suspect these aspects could impact aggression. The concepts of arousal and aggressive scripts have been applied to this research via the GAM (Anderson & Bushman, 2002) but the third major component of the model, "cognition", has not been adequately addressed. I have also outlined a possible framework of how cognition and perception may influence aggression via action identification theory. The proposed research is not intended to dispute the current findings on violent video games, but rather to test and add to the current model in a way that enhances external validity in attempt to improve generalizability while investigating aspects of video games that have gone overlooked.

CURRENT RESEARCH

The purpose of the proposed research is to obtain a better understanding of how violent video games are perceived by players, what factors can influence players' action identifications, and the effects of those identifications on subsequent aggression. Previous work has demonstrated that cooperation and prosocial goals lead to decreased hostile cognitions and arousal along with increases in prosocial cognitions and behaviors (Ewoldsen et al. 2012; Gitter et al., 2013; Lim & Lee, 2009; Schmierbach, 2010). I hypothesize that this is due to the level of abstraction of the perceived action. I propose that cooperating with another player or having prosocial intentions leads players to think in a more abstract manner and therefore, perceive their actions as less aggressive or violent.

The above review has led me to the general research question of what impact does the context of video games have on aggressive thoughts and behaviors. I suggest that game context affects the third pillar of the GAM (cognition) and different aspects of context (game type or interaction type) can each influence aggression in their own way. I hypothesize that competition is one of the primary causes of aggression resulting from videogame play and that competition will increase aggression regardless of other aspects of a game's context. I suspect the very nature of competition increases aggression by generating aggressive goals within a player. I also hypothesize that cooperation will reduce aggression compared to both competitive and control narratives by activating abstract prosocial goals. I maintain that these increases and decreases occur via the gamers' perception of their actions. Because people prefer to view their actions as abstract (Vallacher & Wegner, 2000), and abstract perceptions tend to be more moral and

altruistic (Agerström, Björklund, & Carlsson, 2013), I hypothesize that the more abstractly a player perceivers his or her actions, the more likely they will feel less aggressive and have fewer aggressive thoughts, as a consequence of playing violent video games. In addition, I predict that competitive scenarios will decrease abstraction while cooperative ones will increase the level of abstraction perceived by the player. It is my prediction that abstraction acts as a mediator between the game context (competitive or cooperative) and hostility.

Preliminary Research

In order to understand how abstractly or concretely a participant perceives an action, Vallacher and Wegner (1989) created a scale called the Behavior Identification Form (BIF). This scale assesses participant responses to a general action such as "riding a bike". Participants must select one of two options, one concrete (i.e., "pushing the pedals") and one abstract (i.e., "getting some exercise"). In order to understand the level of abstraction at which gamers interpret their actions, I have developed a version of the BIF (entitled the Behavior Identification Form – Gaming; BIF-G) tailored to common actions that occur when playing the video game "Call of Duty: Black Ops 2." This measure serves as one of the primary dependent variables of this research. I hypothesized that abstraction mediates the relation between game context and hostility and this measure will provide a way to test that hypothesis.

To develop the BIF-G, I recruited 53 participants and asked them watch a 2-3 minute video depicting gameplay from the popular videogame "Call of Duty: Black Ops 2." Prior to watching the video, participants filled out the original BIF along with an author-generated questionnaire to determine their expertise in video game playing. After viewing the clip, participants were asked to list ten actions that the player performed during the video clip.

These lists of actions were compiled and each of the 530 actions were coded for type of behavior and also for levels of abstraction.

The original BIF (Vallacher & Wegner, 1989) used the ten most frequently listed action categories to generate the items. In order to generate action categories for the BIF-G, three coders reviewed all of the action listings and generated categories based on the most common themes in the listings. They then placed each listing in one of the generated categories. For example a coder may have reviewed all listings and generated the category "navigating" and then placed in it any listing such as "using the map." I then combined the action categories generated by each coder to assess agreement and chose the ten most commonly reported categories.

From those ten action categories selected, I created twenty target actions to generate a total of 20 action items. Additionally, three separate independent coders rated each listing for level of abstraction on a scale of 1 to 5. The ratings were checked by a fourth independent coder for agreement. For each of the 20 action items, a more abstract and a more concrete version of each of item were selected as response choices based on aforementioned abstraction rating. For each item an action is listed and the participant is asked to choose between the two options in response to the question "what are you doing when you are _____". For example, a target action is "moving around the level" and the participant can choose between the concrete example "running" and the abstract option "escaping enemies."

Once the scale was created it was pilot tested in two ways. First, 50 subjects were recruited online via Amazon's Mechanical Turk and asked to imagine themselves playing a videogame and then complete the BIF-G. They were also asked to report gaming experience and their preferred video games. Whenever an abstract score was chosen it resulted in a score of 1 and when the concrete version was selected it was scored as zero. The sum of all 20 items was

taken as a total score. Total scores were examined to test if they were normally distributed and fell within the range of normalcy for skew and kurtosis. Each individual item was investigated for variability and any item that was answered too frequently with only one response (e.g., if 90% of participants chose answer b) was adjusted. Adjusting an item entailed altering the discrepancy between the abstraction scores of the two answers. For example, if one choice was ranked a 2 in abstraction and the other choice was ranked a 5, the response ranked 2 would be replaced with a response ranked 3. Therefore, if a concrete answer was so concrete it was rarely selected, it was replaced with slightly more abstract to increase its appeal as a choice. The final version of the scale can be found in Appendix A.

In a second pilot study, 207 participants were recruited online via the University of Alabama subject pool. Each participant filled out a slightly different but similar videogame usage form (Appendix B) and the revised BIF-G. If it is the case that those that play more video games view things in a more abstract manner, then experienced gamers should show higher scores on the BIF-G than non-gamers. Total BIF-G scores were compared with the videogame usage form and several significant, albeit weak, positive correlations emerged (Table 1).

Table 1
Correlations between BIF-G and videogame usage variables.

Experience Varaibles	Total BIF-G
Gaming days per week	.186**
Gaming hours per week	.190**
Total game consoles	.258**
First-person shooter days per week	.140*
First-person shooter hours per week	.162*
Total First-person shooter games	.186**
Action games hours per week	.172*

*Note: Significant correlations ($p \leq .05$) indicated with *, Significant correlations ($p \leq .01$) indicated with ***

Additionally, participants were divided into three groups; Non-players (0-30 minutes of gameplay per week; $n = 120$), casual game players (30 minutes to two hours; $n = 56$) and experts (greater than two hours; $n = 31$). A one-way ANOVA with BIF-G score as the dependent variable revealed significant differences in abstraction across groups, $F(2,204) = 4.88$, $p = .008$, $\eta_p^2 = .05$. Post hoc testing using Fisher's LSD revealed significant difference between non-players ($M = 9.16$, $SD = 3.91$) and experts ($M = 11.5$, $SD = 3.6$) with a marginally significant ($p = .08$) difference between non-players and casual players ($M = 10.3$, $SD = 4.44$). Non-players had the lowest abstraction scores while experts had the highest. Scale reliability results on the BIF-G, investigated via Mplus via exploratory factor analysis, revealed that a model with 1 factor approached conventional levels of reliability when problematic items were removed ($\alpha = .754$). A two factor model had the best fit; however, despite thorough investigation, the underlying distinctions behind these factors could not be determined. I expected that further analyses in the experimental paradigm should reveal more insight on what latent constructs may be driving the separate factor. Overall, the results of this preliminary research suggest that this measure appears reliable and shows correlations with gaming experience. Thus, I expected that it would provide us with insight as to what level the player is identifying their action.

STUDY 1

METHODOLOGY

Design

While originally described as a single independent variable, (Game Type; Direct Cooperative, Direct Competition, Indirect Competition, Indirect Cooperative, and Control) the design was revised to be a 2 (Game Type: Competitive vs. cooperative) x 2 (Environment type: Direct vs indirect) plus 1 (Control) plus 1 (Yoked Control) design. In the direct cooperation condition, the two players worked together to accomplish a common goal in the same virtual game space. In the direct competition condition, players competed on opposite teams in the same game. In the indirect competition condition, players competed but in independent parallel game play, meaning they both participated in the same activity but did not interact with each other in the same virtual "game." In the indirect cooperation condition, participants worked together in separate but parallel games in order to accumulate points. In the control condition, participants played indirectly but were simply instructed to play the game in any manner they would like.

Yoked Control

It has often been asked in videogame literature if video games have more of an effect on participants compared to other violent media such as a movie or television based on the immersive properties of video games (Carnagey, Anderson, & Bushman, 2007). To my knowledge, no other study has attempted to answer this question in a meaningful way. The yoked control condition was created in order to take a first step towards possibly answering that question. For each participant that completed a control condition we recorded that player's

gameplay as we did in all conditions. However, for each control video a separate participant watched a control player's previously recorded video. This condition is described in more detail in the procedure.

Participants

For this study, 274 (172 females) participants were recruited from the introduction to psychology subject pool at a large Southeastern university. Participants received course credit for their participation and were asked to take part in one session that lasted approximately 60 minutes. These participants had a mean age of 18.78 (SD = 2.48) and were predominately Caucasian (92%). For various reasons, 20 participants were excluded from the analyses due to experimenter error. There was a pervasive problem in which an experimenter was not creating direct cooperation conditions correctly that led to half of these exclusions. The others were due to unpredictable crashes with the videogame software or console.

In addition, 27 participants (15 females) were excluded for extreme suspicion Participants filled out a three part suspicion probe in which they were asked "What did you think the study was about? Did you notice anything suspicious?" and "Do you think this study had any ulterior motives?" Each suspicion response was then coded in three ways. If the participant made no mention of aggression in video games or of the purpose of the study they received a zero, if they mentioned a vague connection between aggression and video games they received a one and if they made a comment very similar to the true nature of the study they received a two. If any participant was ever coded as a two or expressed general suspicion for aggression in video games (received a one) in all three questions they were excluded. This level of suspicion is common in gaming research as many participants assume the experiment is investigating the

relationship between aggression and gameplay. Out of this 235, 20 (14 females) failed the manipulation check. For the main analysis those who failed the manipulation check were not excluded. Details on both the suspicion checks and manipulation check are described in the preliminary analysis section.

Materials and Measures

Participants played the popular game "Call of Duty: Black Ops 2" on the XBOX360 game console. This particular game was selected because of its advanced customization features and popularity. The game allowed me to simulate how people typically play while permitting substantial control over crucial game play conditions. All gameplay took place on two 27 inch flat screen HD televisions (one a Vizio and the other a Dynex).

Behavior Identification Form

Participants first filled out the general BIF (Vallacher & Wegner, 1989; Appendix C). The BIF is a 20 item measure in which participant select one of two options, one concrete (i.e., "pushing the pedals") and one abstract (i.e., "getting some exercise"), to describe a target activity (e.g., riding a bike). A total score is then generated reflecting total trait abstraction. This scale assesses a general concept of how concretely (scoring low) or abstractly (scoring high) one thinks of everyday activities. The original publication stated the measure to have a Cronbach's alpha of $\alpha = .85$.

Game Outcomes & Scores

The game itself provided data related to player performance and the outcomes of the matches. We recorded whether the player's team won or lost, along with the total number of

flags a player captured and finally a composite score the game creates based on various successes in the simulated battle.

Videogame Usage Form

The Videogame Usage Form measures videogame players experience and expertise, as well as their specific experience and expertise with different types of video games. This is a 29 item scale in which participants list how many days per week and hours per week they play video games. They also list how many games they own. This measure has been adapted (Appendix D) from contemporary work involving videogame expertise (Green & Bavelier, 2007).

PANAS

Additional data was also collected via the PANAS (Watson, Clark & Tellegan, 1988; Appendix E), in order to understand arousal and other emotions that may correlate with variables of interest. The PANAS is a 20-item scale in which participants gauge how close they feel to certain affective states. It has two subscales for both positive and negative emotions. The PANAS served as a measure of arousal and also as a measure of positive and negative affect. The results were used in order to investigate what effects positive or negative emotions may have on hostility. The original publication stated the measure to have a Cronbach's alpha of $\alpha = .86$.

Behavior Identification Form - Gamer

Three main dependent measures were collected in order to test my hypotheses. The first was the BIF-G, described above in the preliminary research section (Appendix A). This scale helped us determine how abstractly or concretely actions in the game are being perceived.

State Hostility Scale

The second dependent measure was the State Hostility Scale (Anderson, Deuser, & DeNeve, 1995; Appendix F), commonly used in measuring hostility and aggression in videogame research. It was used to assesses one's current level of hostility and aggression. This is a 35-item measure that asks participant how closely they feel to certain emotional states. It has been highly validated and is a staple of this type of research. The original publication stated the measure to have a Cronbach's alpha of $\alpha = .91$.

Stem Completion Task

The third primary dependent measure is the Stem Completion Task developed by Gitter et al., (2013; Appendix G). This measure has participants attempt to complete 96 word stems that can be completed as hostile aggressive words or prosocial words. This measure allowed me to investigate both aggressive and prosocial cognitions using the same measure. For analysis, a percentage is computed based on the number of hostile or prosocial completions versus the number of total completions.

Procedure

Participants signed up for the study using the introductory psychology subject pool. Because two participants were needed to conduct this research, three participants were scheduled for one time session. If three participants arrived at the time of the experiment, one was selected at random and placed in the yoked control condition. If this was not possible, the participant was rescheduled or given an optional task to complete. Participants were told that they were participating in a study on cognitive processing in video games and that I was interested in how individual differences influence video game ability. Participants were tested in pairs. Upon

entering the laboratory they filled out the general BIF and videogame usage questionnaire before beginning any game play. Following these measures players began the videogame session of Call of Duty: Black Ops 2. This game is a popular first-person shooter game in which military fighters attempt to achieve different combat goals. In each condition, the participants played a game format called "capture the flag." The players were given the overarching goal of securing the opposing teams' flag as many times as possible without being killed or losing their own flag. In all cases participants played a 5 on 5 match of "capture the flag" where there were five soldiers competing against each other. Any soldier not controlled by a player was controlled by the computer set on normal difficulty. This difficulty was pretested to be not so difficult for novices and not overly easy for experts. "Capture the flag" is a game in which the characters attempt to capture makers from an enemy base and secure them at their own base. In each condition, players were provided with two primary weapons of their choosing and various accessory weapons such as grenades and knives. All games regardless of condition, took place on the same map, or predetermined stage. The stage is a rough outline of a war torn Middle Eastern country. In all gameplay conditions, players had 5 minutes to practice and become accustomed to the game and its controls in a tutorial environment that involved no other players or "bots."

Following the practice period, participants began one of the randomly assigned 5 conditions; direct competition, indirect competition, direct cooperation, indirect cooperation and control. In the direct competition condition, the two participants were placed on separate teams in the same virtual world. The rest of the team members were computer-controlled players. Players were told that their goal was to capture more flags than the other player via any means necessary. In the indirect competition condition, players were tasked with the same goal;

however, they played in separate virtual worlds. They did not interact with, or observe the gameplay of, the other participant. In the direct cooperation condition, players were both placed on the same team in the same virtual world. They were instructed to work together to try to capture as many flags as possible. In the indirect cooperation condition, participants were given the same goal but placed in separate virtual worlds where they were not able to interact with each other. They were told their scores were added together at the end of the round for one total score. In the control condition, participants placed in separate virtual worlds and just told to play the game for 15 minutes.

In each condition, the experimenter explained the game condition and strategy; the participant read a supporting text description of the game (Appendix H). In each condition, players played for 15 minutes following the practice period. In all conditions, participants' video signal from the game was recorded using a Roxio Game Capture Card. This allowed us to record player's score, who won or lost, and total number of flags captured. Following the game session, players filled out the BIF-G, the stem completion task, the state hostility scale, the PANAS, in that order. Participants were also given a manipulation check on the instructions they received for their gameplay session. Following the completion of these measures, participants were debriefed and dismissed.

This study was approved and began in the spring of 2014. Subjects were recruited and participated during that time; however, it became apparent that the manipulation was unsatisfactory in that nearly forty percent were failing the manipulation check. In light of this information, the manipulation was strengthened. During the description of the condition they were to play, the experimenter emphasized and paused after saying the condition. Following the

description the experimenter asked the participant what condition they were placed in. If they did not know or answered incorrectly, the experimenter explained to them the condition once again.

In the yoked control condition participants were placed in a room without a television or XBOX360. The participant was then given the BIF and videogame expertise form. Following those measures they were then asked to watch a video that was recorded of a control condition participant playing in the 15 minute scenario described above. After the video the same forms as the other conditions were administered. The participant was then debriefed and dismissed.

RESULTS

Preliminary Analysis

Manipulation Check

Preliminary analyses were conducted to investigate the data set for potential problems that would affect the primary analysis. Participants were asked to report whether they were playing directly or indirectly with their partner, and whether they were playing cooperatively or competitively. Those responses were compared to condition to comprise the manipulation check. As mentioned in the procedure, the manipulation was strengthened by having the participant repeat back to the experimenter what the condition they were in. The additions to the procedure resulted in more correct responses to the manipulation check, though there were still several incidents of incorrect responses. In the direct conditions, there was very little error; however, in the indirect conditions incorrect checks were more frequent. If a participant was in the indirect cooperation condition and answered the manipulation check that they were in the direct cooperative condition we choose to list that as similar. It seems that the natural immersive aspects of the videogame triggered participants to think they were playing jointly. If a participant responded opposite of their condition (was in cooperative and said competitive), they were flagged as incorrect. A complete breakdown of the manipulation check results can be found in Table 2.

Table 2
Results of Manipulation Check by Condition.

	Reported Manipulation				
	Direct Competition	Indirect Competition	Direct Cooperation	Indirect Cooperation	Just told to play
Actual Condition	n(%)	n(%)	n(%)	n(%)	n(%)
Direct Competition	34 (87.2)	0	1 (2.6)	0	4 (10.3)
Indirect Competition	11 (26.2)	22 (52.4)	4 (9.5)	1 (2.4)	4 (9.5)
Direct Cooperation	2 (5.9)	0	29 (85.3)	0	3 (8.8)
Indirect Cooperation	4 (10.3)	5 (12.8)	12 (30.8)	15 (38.5)	3 (7.7)
Control	2 (4.8)	0	1 (2.4)	1 (2.4)	38 (90.5)

It should be noted that there was something specifically strange about the indirect cooperation condition in that the majority of the incorrect responses were in this condition. The logistics of this condition may have led people to think they were not cooperating as they are participating in a competitive game without being able to see the partner they are cooperating with. This condition also reflects the two features of gameplay that are least typical of everyday game play, which is usually joint and competitive.

The main analysis was conducted with those who failed the manipulation check included for two reasons. First, these participants were not excluded from the main analysis because the manner in which they failed the check may say something specific to the nature of the game play. Second, excluding these participants resulted in reduced power in the data without noticeable changes to the means or effect sizes, suggesting that the removal of these participants was reducing power without actually changing the results. A copy of the primary analyses

excluding those who failed the manipulation check can be found in Appendix I. In addition, two additional measures (The Personality of partner scale and Oneness scale) were collected, but were discarded from the primary analysis. The description of these measures and their analysis can be found in Appendix J.

Participant Exclusions

After preliminary investigation, it became apparent that there were several additional groups of participants that could also be excluded; those whose sessions were subject to experimenter error, and those that were extremely suspicious. Experimenter errors involved incorrect set up of the game, likely resulting in participant confusion and results that would not contribute to the research questions therefore, this group was excluded. Those flagged for extreme suspicion reported that the experiment was investigating the relationship between violent videogame play and aggression. It is possible that these participants may attempt to adjust their responses to seem less aggressive. Analyses were conducted with and without this group and inclusion of the extremely suspicious significantly altered the results. For this reason those with suspicion were excluded. A copy of the primary analysis that included those who were flagged for extreme suspicion can be found in Appendix K.

Reliabilities

Reliabilities were calculated for each measure using Cronbach's alpha to ensure internal consistency of the measures. In all cases scales used had acceptable alpha levels: BIF $\alpha = .86$; Negative PANAS = .93; Positive PANAS = .87; SHS = 93. The BIF-G demonstrated an acceptable Cronbach's alpha level of .76. This measure was analyzed using exploratory factor analysis to investigate whether two factors were once again present, as was the case in pilot testing. Two factors emerged from this analysis, the first being the primary or main factor that

consisted of 15 of the 20 items. The second weaker factor comprised 5 items. The only commonality between these five items was that four of them represented some of the more aggressive actions of the scale. This aggressive factor was examined in two ways. First, the five items that comprised this factor were removed and a new total score was created for the primary factor. This new total score was correlated with the other dependent variables and did not show significant differences from the original total variable. A total score was also created for the items that comprised the aggressive factor. This variable correlated weakly with the original BIF (as did the BIF-G) and no other variables. In light of these findings the separate factors were ignored and BIF-G scores were comprised of all original items.

Next the BIF-G was investigated for discriminate validity within the data set. The BIF-G was found to be positively correlated with variables associated with gameplay such as game hours per week, $r(191) = .224$, $p = .002$, and player's score, $r(168) = .241$, $p = .002$. It was also found to be strongly positively correlated with the BIF, $r(191) = .434$, $p < .001$. The original BIF was not correlated with game hour per week, $p = .441$, or player's score in the game, $p = .604$. This suggests that the BIF-G was successful in measuring abstraction in game play and in such a way that the BIF could not.

Next I investigated each independent variable for outliers and normality. I also investigated the correlations between all dependent variables. Means and standard deviations for each variable of interest can be found in Table 3.

Table 3
Means and Standard Deviations for Primary Variables of Interest in Study 1.

Variable	Mean	Standard Deviation
State Hostility	2.09	.595
% of Aggressive Stems	.174	.061
% of Positive Stems	.092	.04
BIF-Gamer	11.78	3.77
BIF	15.01	5.59
Negative Affect	15.91	6.57
Positive Affect	27.22	9.68
Player's score	2320.11	2515.32
Game hour per week	2.30	2.11

In addition a correlation matrix of all variables can be found in Table 4.

Table 4
Correlation Matrix of Primary Variables for Study 1.

	1	2	3	4	5	6	7	8
SHS								
%Neg	.11							
%Pos	.01	-.14*						
BIF-G	-.15*	.07	.07					
BIF	-.11	-.09	-.01	.42**				
Pos Affect	-.23**	.01	.03	.17**	.08			
Neg Affect	.71**	.10	.05	-.08	-.18**	.00		
Score	-.32**	-.12	.00	.24**	.06	.40**	-.22**	
Game hours	-.15*	-.14*	.06	.24**	-.01	.38**	-.12	.54**

* *Denote significance at < .05*
** *Denotes significant at < .01*

This initial analysis revealed that player's score in the game was correlated with numerous dependent variables including; the SHS, $r(168) = -.317$, $p < .001$, the BIF-G, $r(168) = .241$, $p = .002$, positive affect, $r(168) = .396$, $p < .001$, negative affect, $r(168) = -.215$, $p = .005$, and game hours per week, $r(168) = .535$, $p < .001$. Because it is reasonable to expect that game

performance is likely to affect their mood, and in light of these numerous correlations, player's score was included as a covariate in all analyses.

It should be noted that gender was not included in the primary analyses. This is because gender and expertise were hopelessly entangled such that males were much more likely to be experts than females and females were much more likely to be novices. Separate analyses were conducted in attempts to account for gender but there were no significant differences when player performance was controlled for. These analyses can be found in Appendix L. The addition of gender as an independent variable also reduced cell sized below 20 which may have produced results that were unreliable.

Primary Analysis

Originally, I planned to analyze the main dependent variables using a one-way design. Overtime, it became clear that using a 2 x 2 ANOVA design instead would account for variance shared by similarities within cells and to allow for the investigation of interaction effects. Two new variables were created in order to facilitate this analysis. The game type variable (competitive vs. cooperative) was comprised of those in the direct and indirect conditions collapsed into either competitive or cooperative groups. The environment type variable was also created in opposite fashion resulting in direct versus indirect groups. The control conditions were analyzed separately in one-way ANOVAs in which they were compared to both the game type and environment type groups to look for differences between the controls and the experimental groups. The control conditions (regular vs. yoked) were also compared on each dependent variable.

State Hostility Scale

In order to test the first hypothesis regarding competition and cooperation, the variables measuring aggression were tested in the analysis model described above beginning with the state hostility scale. A game type by environment type two-way ANCOVA was conducted with total scores on the SHS scale as the dependent variable and player score as a covariate. Player score acted as a significant covariate, $F(1, 134) = 11.85$, $p = .001$, $\eta_p^2 = .084$. There was also a significant main effect for game type, $F(1, 134) = 3.85$, $p = .052$, $\eta_p^2 = .029$, such that those in the competitive condition had higher scores of state hostility than those in the cooperative conditions. There was no significant main effect for environment type, $F(1, 134) = 1.09$, $p = .299$, or for the interaction term, $F(1, 134) = 1.37$, $p = .245$. Means and standard deviations for these analyses can be found in Table 5.

Table 5
Means and Standard Deviations for State Hostility Scale

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	2.14 (.65)	2.42 (.71)	2.28 (.69)
Cooperative	2.07 (.61)	1.98 (.60)	2.03 (.60)
Total	2.11 (.63)	2.20 (.69)	2.15 (.66)

The control conditions were next investigated as outlined above to understand the results of the experimental manipulations compared to a baseline. It should be noted that with the SHS the regular control condition had a significantly different variances compared to the experimental groups as indicated by a significant Levene's test. Whenever a significant Levene's test occurred, a Welch's test was conducted instead to confirm that the results of the ANCOVA were valid. There were no cases where the Welch's test contradicted the results of ANCOVA so it will be mentioned no further. In the game type cells, a one-way ANCOVA with player's score as a significant covariate, $F(1, 167) = 16.69$, $p < .001$, $\eta_p^2 = .092$, showed differences between the experimental groups and the regular control. Post-hoc comparisons confirmed that participants in

the competitive conditions had significantly higher SHS scores than those in the regular control or cooperative conditions. The competitive group also had significantly higher scores on the SHS compared to the cooperative group. A planned contrast designed to test the differences between the regular control and experimental groups was set so that group 1 and group 2 were weighted as -.5 and the control as 1. This contrast was significant, suggesting that those in the control condition were significantly lower in state hostility than those in the experimental groups, $t(112.13) = -3.54$, $p = .001$. It should be noted that the planned contrast t statistic reported is with equal variance not assumed based on the results of the Levene's tests. When comparing the environment type groups (Direct vs. Indirect) to the regular control with player's score a significant covariate, $F(2, 164) = 10.11$, $p < .001$, $\eta_p^2 = .156$, post-hoc analysis showed that the regular control group had significantly lower scores on the SHS than the direct and indirect groups. There were no differences between the direct and indirect groups. The regular control planned contrasts confirmed this result as it significantly differed from the experimental groups, $t(114.26) = -3.57$, $p = .001$.

The yoked control was also compared to the experimental groups and to the regular control condition to search for differences that may have occurred when the player viewed the game rather than played. The above analyses were repeated replacing the regular control with the yoked control condition. It should be noted that because those in the yoked control did not receive a game score that it was not used a covariate in these analysis. In the game type comparison, the overall ANOVA was rendered non-significant, $F(2, 178) = 2.25$, $p = .108$. The planned contrast comparing the yoked control group to the experimental groups was also non-significant, $p = .587$, suggesting that the yoked control group was not different from the experimental groups. Next the environment groups were compared. Adding the yoked control to

this analysis resulted in a non-significant ANOVA for the SHS, $F(2, 183) = .151$, $p = .860$. Finally, there was a significant difference between the regular control and the yoked control $t(183) = -2.21$, $p = .031$, such that those in the yoked control had significantly higher scores of state hostility than those in the regular control. Means and standard deviations for all one-way ANOVAs on the SHS can be found in Table 6.

Table 6
Means and standard deviations for aggressive variables comparing controls.

	Group 1	Group 2	Group 3	Group 4
Dependent Variables	M (SD)	M (SD)	M (SD)	M (SD)
Game Type				
	Competitive	Cooperative	Regular Control	Yoked Control
SHS	2.28^{ab} (.69)	2.03^{ac} (.60)	1.78^{bcd} (.33)	2.09^{d} (.46)
Negative Stems	$.19^{ab}$ (.06)	.17 (.05)	$.16^{a}$ (.07)	$.16^{b}$ (.06)
Positive Stems	.09 (.03)	.10 (.04)	.09 (.05)	.09 (.05)
Environment type				
	Direct	Indirect	Regular Control	Yoked Control
SHS	2.10^{a} (.63)	2.19^{b} (.68)	1.78^{abd} (.33)	2.09^{d} (.46)
Negative Stems	.17 (.06)	$.19^{ab}$ (.06)	$.16^{a}$ (.07)	$.16^{ab}$ (.06)
Positive Stems	.10 (.04)	.09 (.04)	.09 (.04)	.09 (.05)

Letters indicate significant differences between groups.

Stem Completion Task

The next variable regarding aggression was the stem completion task, which consisted of aggressive and prosocial stems. This measure was investigated to understand participant's unconscious accessibility to aggressive or prosocial words. A game type by environment type ANOVA with percentage of aggressive stems completed as the dependent variable yielded a non-significant model, $F(3, 145) = 1.48$, $p = .223$. Player's score was not a significant covariate so it was not used in this model. The one way ANOVA comparing the regular control to the game type groups yielded a marginally significant effect, $F(2, 188) = 2.68$, $p = .071$, $\eta_p^2 = .028$.

Post-hoc analysis showed that the competitive group completed a significantly higher percentage of aggressive stems compared to regular control group. There were no differences between the cooperative and control group or the cooperative and competitive group. Means and standard deviations can be found in Table 7.

Table 7
Means and Standard Deviations for Aggressive Stem Completions

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	.182 (.07)	.193 (.06)	.19 (.07)
Cooperative	.164 (.06)	.183 (.06)	.17 (.05)
Total	.173 (.06)	.181 (.06)	.18 (.06)

Once again, the control groups were analyzed to establish a comparison to baseline. The planned contrast comparing the regular control group to both experimental groups was marginally significant, $t(188) = -1.90$, $p = .059$, suggesting that those in the control condition completed fewer aggressive words than the experimental groups. A marginally significant effect was found when the regular control was compared by environment type in a one-way ANOVA, $F(2, 188) = 2.89$, $p = .058$, $\eta_p^2 = .03$, with aggressive stems as the dependent variable. Further testing via post-hoc analysis shows that the indirect group completed a significantly higher percentage of aggressive stems than the regular control group. There were no differences between the environment groups or the direct and the regular control groups. Planned contrasts confirmed that those in the control group completed significantly fewer aggressive stems than the experimental groups $t(188) = -1.90$, $p = .058$.

The yoked control was also compared to the experimental groups. When the yoked control was compared via game type the one-way ANOVA for percentage of aggressive stems completed remained marginally significant $F(2, 178) = 2.80$, $p = .063$, $\eta_p^2 = .031$. Similar to the regular control, post hoc testing revealed that the competitive group completed a significantly

higher percentage of aggressive stems compared to the yoked control. Planned contrasts revealed that those in the yoked control completed significantly fewer aggressive stems than those in the experimental conditions, $t(180) = -1.92$, $p = .056$. The one-way ANOVA for environment type on percentage of aggressive stems completed was also significant, $F(2, 178) = 3.04$, $p = .051$, $\eta_p^2 = .033$. Post-hoc testing revealed that those in the indirect condition completed a higher percentage of aggressive stems than the yoked control. There were no differences between any other groups. Similar to the regular control, planned contrasts revealed that those in the yoked control completed significantly fewer aggressive stems than those in the experimental conditions $t(180) = -2.01$, $p = .051$. When the regular and yoked control conditions were compared using planned contrasts there were no differences for percentage of aggressive stems completed, $p = .908$; Table 6.

Percentage of prosocial stems completed was investigated to see if the game type manipulation increased or decreased prosocial thoughts in either condition. A game type by environment type ANOVA yielded no significant main effects and player's score was not found to be a significant covariate. There was a significant interaction, $F(3, 147) = 5.48$, $p = .021$, $\eta_p^2 = .036$. Simple effects revealed that those in the direct cooperative condition completed significantly more prosocial stems than any other group. Means and standard deviations can be found in Table 8.

Table 8
Means and Standard Deviations for Prosocial Stem Completions

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	.084 (.03)	.092 (.04)	.088 (.03)
Cooperative	.107 (.04)	.087 (.04)	.096 (.04)
Total	.095 (.04)	.089 (.04)	.092 (.04)

Because this analysis resulted in a significant interaction the comparison of the control conditions was altered. For this analysis the mean and standard deviation of each cell was recorded and compared to that of the control groups using a t-test calculated by hand. The regular control group did not differ from any other cell besides a marginally significant result when compared to the direct cooperation group, $p = .08$, in that those in the direct cooperation cell completed more prosocial stems than those in the control group. The yoked control did not significantly differ from any of the experimental cells. Also there were no differences between the regular and yoked control on percentage of prosocial stems completed, $p = .838$. The means and standard deviations for the control groups can be found in Table 6.

Abstraction

Abstraction, as measured by scores on the BIF-G, was analyzed to test the hypotheses that abstraction could be manipulated via the experimental condition and that it mediated the relationship between aggression and the experimental conditions. To begin we investigated whether abstraction was altered by the experimental manipulations. The analysis was done in the same pattern as the aggression analysis with similar planned contrasts. While player's score was found to be a significant covariate, $F(1, 134) = 8.48$, $p = .004$, $\eta_p^2 = .061$, for the BIF-G there were no significant main effects for game type, $p = .295$, environment type, $p = .461$, and no significant interaction, $p = .128$. Means and standard deviations can be found in Table 9.

Table 9
Means and Standard Deviations for The BIF-G.

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	12.82 (3.87)	11.18 (3.71)	12.00 (3.86)
Cooperative	11.13 (3.64)	11.97 (3.56)	11.58 (3.59)
Total	12.02 (3.80)	11.59 (3.63)	11.79 (3.72)

Both game type, $F(2, 193) = .564$, $p = .570$, and environment type, $F(2, 193) = .727$, $p = .485$, also yielded non-significant results when compared with the regular control group. Addition of the yoked control condition in a similar analysis resulted in non-significant results for game type, $p = .564$, and environment type, $p = .634$. A planned contrast between the regular control and yoked control was also non-significant, $p = .171$; Table 10.

Table 10
Means and standard deviations for BIF-G comparing controls.

	Group 1	Group 2	Group 3	Group 4
Dependent Variables	M (SD)	M (SD)	M (SD)	M (SD)
Game Type				
	Competitive	Cooperative	Regular Control	Yoked Control
BIF-G	12.00 (3.86)	11.58 (3.59)	12.33 (3.39)	11.09 (4.34)
Environment type				
	Direct	Indirect	Regular Control	Yoked Control
BIF-G	12.02 (3.83)	11.59 (3.63)	12.33 (3.39)	11.09 (4.34)

It was originally hypothesized that BIF-G would act as a mediator between the experimental conditions and aggression. Because the experimental conditions were not successful in manipulating abstraction the mediation analysis was not conducted. I did investigate the relationship between abstraction and aggression. A series of regressions with total scores of the BIF-G as the predictor variable and the three aggression variables alternating as the criterion variable were conducted to investigate their relationship. Total scores on the BIF-G did indeed significantly predict scores for the SHS, $\beta = -.14$, $t(188)=-1.98$, $p = .051$. However, it did not significantly predict percentage of aggressive stems completed, $\beta = -.07$, $t(189)=-.960$, $p = .338$, or percentage of prosocial stems completed, $\beta = .06$, $t(189)=-.759$, $p = .449$. It is interesting to note that the inclusion of the yoked control group to this analysis rendered the relationship between the BIF-G and the SHS non-significant, $\beta = -.11$, $t(221)=-1.60$, $p = .116$.

The BIF-G did significantly correlate with positive affect, $r(220) = .240$, $p < .01$. This finding suggests that those who viewed the game more abstractly have higher positive affect, $\beta = .25$, $t(190)=-3.52$, $p = .001$. Player's score was added to this model and was significant, $\beta = .39$, $t(188)=-5.79$, $p < .001$, however, BIF-G remained a significant predictor with positive affect, $\beta = .17$, $t(188)=-2.52$, $p = .013$, suggesting that both variables predict unique proportions of the variance of positive affect.

PANAS

The PANAS was also investigated as an additional measure of both positive and negative feelings following game play so that a more general perspective of affect could be assessed beyond specifically aggressive or prosocial feelings. The PANAS was divided into its positive and negative subscales and totaled. Those totals were placed in the same analysis series as the aggression and abstraction variables. Once again, a two-way ANCOVA model of game type by environment type was conducted on negative affect with player's score as a significant covariate, $F(1, 134) = 4.86$, $p = .029$, $\eta_p^2 = .036$. There were no significant main effects, however, a significant interaction emerged, $F(3, 134) = 4.71$, $p = .032$, $\eta_p^2 = .035$. Simple effects revealed that those in the indirect competition condition experienced the most negative feelings while there were no differences between the other groups. Means and standard deviations can be found in Table 11.

Table 11
Means and Standard Deviations for Negative PANAS.

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	15.32 (5.54)	19.65 (7.78)	17.49 (7.05)
Cooperative	17.19 (8.05)	15.42 (6.69)	16.24 (7.34)
Total	16.21 (6.86)	17.47 (7.49)	16.87 (7.20)

Because this ANOVA resulted in an interaction the control conditions were once again compared to each individual cell via a t-test. Those in the regular control condition scored significantly lower in negative affect than any of the experimental conditions. The yoked control was not significantly different from any of the experimental groups besides the indirect competition condition. Those in the indirect competition cell reported more negative affect than those in the yoked control. The regular control was also not significantly different from the yoked control, $p = 440$. Means and standard deviations for the control conditions can be found in Table 12.

Table 12
Means and standard deviations for PANAS comparing controls.

	Group 1	Group 2
Dependent Variables	M (SD)	M (SD)
Game Type		
	Regular Control	Yoked Control
Negative Affect	13.06 (3.16)	14.75 (6.20)
Positive Affect	28.67 (9.64)	24.44 (8.25)
Environment type		
	Regular Control	Yoked Control
Negative Affect	13.06 (3.16)	14.75 (6.20)
Positive Affect	28.67 (9.64)	24.44 (8.25)

Positive affect was also investigated with a two-way game type by environment type ANCOVA with player's score as a significant covariate, $F(1, 134) = 25.75$, $p < .001$, $\eta_p^2 = .165$. There were no significant main effects for game type, $p = .442$, or environment type, $p = .516$, and the interaction term was also non-significant, $p = .978$. Means and standard deviations can be found in Table 13.

Table 13
Means and Standard Deviations for Negative PANAS.

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	26.15 (9.07)	26.21 (10.21)	26.18 (9.58)
Cooperative	27.06 (9.69)	29.56 (10.70)	28.40 (10.25)
Total	26.58 (9.31)	27.93 (10.52)	27.28 (9.94)

When the regular control condition was compared on positive affect there were no significant effects for game type, $p = .652$, or environment type, $p = .678$. The yoked control was also not significantly different from the game type groups, $p = .176$, or the environment type groups, $p = .183$. There was no difference between the yoked control and the regular control, $p = .107$; Table 12.

Expertise

To better understand how expertise may have affected the outcome variables, participant's reported game experience was used as a predictor on other variables of interest. The analysis was done in two ways, with expertise as a categorical independent variable and secondly as a continuous variable. For the categorical variable, participants were divided once again into three different groups, novices (less than 30 minutes), casual (30 minutes to 1 hour) and experts (2 plus hours) based on their game hours per week in the last six months. Expertise was then used as an independent variable in a series of one-way ANOVAs on the dependent variables beginning with the SHS. It should be noted that these three groups were not of equal size. Therefore, duplicate ANOVAs were conducted using the sum of squares 1 option in SPSS in addition to the typical sum of squares 3 default setting ANOVAs. There were no changes in these analyses using this different method of sum of squares, therefore, it will no longer be mentioned. A significant result emerged with expertise as the independent variable and SHS as the dependent variable, $F(2, 188) = 6.00$, $p = .003$, $\eta_p^2 = .060$. Post-hoc testing showed that non-

gamers had significantly higher levels on the SHS than casual or expert gamers. There was no difference between casual gamers and expert gamers. It is important to note that if player's score was added as a covariate, $F(1, 167) = 18.38$, $p < .001$, $\eta_p^2 = .101$, expertise's effect on aggression was rendered non-significant, $F(2, 167) = .176$, $p = .839$.

A similar ANOVA using percentage of aggressive stems completed was also significant, $F(2, 220) = 3.21$, $p = .042$, $\eta_p^2 = .028$. Post-hoc testing showed that non-gamers filled out a higher percentage of aggressive stems than expert gamers. The difference between casual gamers and non-gamers was marginally significant, $p = .081$, and once again there was no difference between casual and expert gamers. There were no significant differences for expertise on percentage of prosocial stem completions, $F(2, 220) = 1.13$, $p = .324$.

Total scores of the BIF-G were also used as a dependent variable with expertise and a significant result once again emerged, $F(2, 220) = 10.70$, $p < .001$, $\eta_p^2 = .089$. Post-hoc tests revealed that non-gamers displayed significantly lower scores on the BIF-G than casual gamers with no difference between the other groups. Despite being correlated with the BIF-G, total scores on the BIF were not significantly different when categorized by videogame expertise, $F(2, 188) = 1.61$, $p = .203$.

PANAS scores were also analyzed with the expertise categorical independent variable. A significant ANOVA was found for negative PANAS scores, $F(2, 220) = 4.28$, $p = .015$, $\eta_p^2 = .037$. Post-hoc testing revealed that non-gamers reported higher levels of negative feelings compared to expert players. There was no difference between casual and non-gamers. Expertise also demonstrated a significant effect on positive affect, $F(2, 167) = 6.67$, $p = .002$, $\eta_p^2 = .075$, even when player's score was controlled for, $F(2, 167) = 4.01$, $p = .047$, $\eta_p^2 = .24$. Post-hoc testing showed that experts and casual gamers reported higher positive emotions than non-

gamers with no differences between casuals and experts. Means and standard deviations for all expertise one-way ANOVAs can be found in Table 14.

Table 14
Means and Standard Deviations for Expertise ANOVAs

	Novice	Casual	Expert
	M (SD)	M (SD)	M (SD)
SHS	2.20 (.65)	1.99 (.59)	1.82 (.50)
Aggressive Stems	.183a (.06)	.165 (.06)	.159a (.05)
Prosocial Stems	.092 (.04)	.087 (.04)	.100 (.04)
BIF-G	10.83ab (3.72)	12.80a (3.67)	13.36b (3.21)
Negative PANAS	16.95a (7.59)	15.10 (5.10)	13.84a (3.78)
Positive PANAS	23.93ab (8.97)	31.18a (9.02)	34.45b (8.35)

Letters indicate significant differences between groups.

Player's score

The relationship between player's score and other variables of interest was investigated further based on its correlation with those variables and its role as a covariate. Because player's score is driven by game expertise and both predict scores on the SHS, we investigated how both variables would be related to SHS scores if placed in the same model. When the continuous version of game expertise (videogame hours per week) is entered into a regression predicting scores on the SHS a significant result is found, $\beta = .54$, $t(166) = 8.15$, $p < .001$. However, if player's score is entered into the model expertise becomes non-significant, $p = .828$, and player score remains as the only significant predictor, $\beta = -.34$, $t(166) = -3.75$, $p < .001$. As player's score increased aggression decreased. In light of this a mediation analysis was conducted using PROCESS (Hayes, 2012). A mediational model was tested revealing a bootstrapped (5000 replications) confidence interval of -.09 to -.03. Because zero does not fall within this confidence interval it can be said that player score significantly mediates the relationship between expertise and scores on the SHS. This mediation also appeared for both positive and negative effect and

scores on the BIF-G. The relationship between these variables appears complex and is discussed at length in the discussion. It is important to note that player score did not significantly vary by condition, $F(3, 134) = 1.77$, $p = .156$, and there were no significant interaction terms. Means and standard deviations can be found in Table 15.

Table 15
Means and Standard Deviations for Player's score

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	2285 (2647)	1663 (2182)	1974 (2428)
Cooperative	2071 (2455)	3000 (2644)	2570 (2582)
Total	2183 (2540)	2351 (2505)	2270 (2514)

DISCUSSION

The results for Study 1 provided partial support to the first hypothesis that competition plays a role in increased aggression with violent video games. Those in the competitive conditions reported higher state hostility than both those in the cooperative conditions and those in the regular control. In addition, those in the competitive condition had more aggressive stem completions than those in either control conditions. However, those in the cooperative condition showed higher hostility than those in the regular control condition. This finding was very unexpected and the idea that the control condition (i.e. the condition with no instructions) produced the least amount of state hostility is one that is novel in the videogame literature. It could be hypothesized that from this that any overarching goal within the game regardless of it being cooperative or competitive may lead to increased hostility in the player. However, even in the cooperative conditions the player was still told to try their best to win and competed with the other team. It could be hypothesized that because the nature of the capture the flag game is competitive as were the instructions, adding a cooperative theme to a set of competitive instructions may not cancel out the overall competitive nature of the game type.

The direct cooperation condition did produce to the highest percentage of prosocial word stems partially replicating the findings of Gitter et al. (2013). They found similar levels of aggressive stems in all conditions, but their prosocial condition produced significantly more prosocial stems compared to a condition without a prosocial theme. It is interesting that in Study 1 those in the indirect competition condition reported higher negative affect than any other group. This result may be due to frustration caused by not being able to interact and prevent their

opponent from winning in anyway. It might also be concerning to the participant to not know how well as their opponent is performing relative to themselves. While the relationships between direct and indirect play were not the experimental focuses of this investigation it may warrant further investigation.

Study 1 failed to find support for hypotheses 2 or 3 in that level of abstraction was not affected by condition and did not significantly mediate the relationship between experimental condition and the aggression variables. There did appear to be a small negative correlation between the BIF-G and the SHS, however this effect may be spurious. This relationship is investigated further in study 2. Despite the limited or lack of support for the experimental hypotheses there were numerous aspects of Study 1 that made significant novel contributions to the fields of videogame research.

The BIF-G did seem to maintain discriminate validity and may be a useful measure of levels of abstract processing in FPS style video games. This measure correlated well with the BIF and variables that centered around game experience while the original BIF did not correlate with game experience variables. The BIF-G certainly seems worthy of being used in the future with potentially a stronger manipulation of abstraction like the one found in Study 2. The BIF-G also predicted positive affect. By this it could be hypothesized that higher levels of abstract processing may increase positive affect resulting from videogame play.

Yoked Control

The result of each control condition was unpredicted and interesting. Not only did the regular control produce lower levels of aggression, the yoked control did not significantly differ from the experimental conditions in a meaningful way. It should be noted, however, that there were no differences in percentage of aggressive stems completed between the regular control and

the yoked control groups. To my knowledge this is the first time that a videogame study created a control condition that differentiated active play and the mere audio-visual experience of the game action. It has been argued in the past the nature of playing a videogame is especially immersive and may lead to increases in aggression greater than other forms of violent media such as movies or television (Carnagey, Anderson, & Bushman, 2007). The result of this study suggest that simply viewing a game play experience in a video setting resulted in similar results as the actual gameplay. It could be argued that even without being a player the nature of the perspective of the game (first-person) may be naturally immersive even in a video setting. It could also be argued that experts in the yoked control may have been frustrated by not being able to play the video game or with watching another player compete, however this was not the case. There were no differences between experts and novices in the yoked control condition on the SHS, negative PANAS or percentages of negative stems completed. The controls for this study were created to act first as a baseline (regular control) and second for exploratory purposes (yoked control). Both yielded surprising results and certainly warrant further investigation.

Study 1 also illuminated a relationship that had gone previously uninvestigated in videogame research, namely, the effects of performance or player's score on emotions and cognitions. To my knowledge, no study in the past has attempted to account for this variable and if this study is any indication, player performance has a large impact on not only aggression but other variables as well. Most importantly, it seems the better a player performs, the less explicit aggression (via the SHS) they appear to have, regardless of condition.

This study also attempted to account for player expertise in a novel way. Levels of expertise, even when player's score was controlled for, demonstrated significant influence over several variables of interest. Those who were experts viewed the game more abstractly,

completed lower percentages of aggressive stems and had more positive affect from their game play experience than did novices. The idea that aggressive words were less accessible to experts is somewhat contradictory to the idea that experts become desensitized to violence and are more likely to use violent scripts in the future. However, the relationship between score and expertise creates and new conundrum. Without game expertise players would certainly get lower scores, however, player performance seemed to overpower expertise in statistical models. The relationship between these two variables warrants rigorous investigation and novel research to help disentangle these two closely related variables. It is hard to imagine that player game performance could be manipulated in an externally valid way that would be independent of game expertise, though it certainly would be worth an attempt. Overall, this study created more questions than it was able to answer but provided clear future directions in which to investigate, a common result in exploratory research.

STUDY 2

As seen in Study 1, expertise impacted player performance. Previous research has shown that videogame experts demonstrate less arousal than their novice counterparts, which is thought to be due to desensitization (Anderson & Bushman, 2001). There is also research that suggests that experts perceive tasks in their area of expertise more abstractly than do novices (Hinds, Patterson & Pfeffer, 2001). If videogame experts demonstrate less aggression, it may be due to thinking about the game more abstractly than novices. This relates well to Action Identification Theory in that when a task is difficult, people will move from abstract to concrete identifications (Wegner et al., 1984). If a gamer is an expert, s/he can play the game easily without being distracted from the abstract goal. So the expert will perceive the abstract and less violent goal of "capturing the flag" and not the more violent concrete goal "killing your opponent." The purpose of Study 2 was to collect additional evidence that levels of abstraction affect aggression related to violent video games. By creating an analogous paradigm, I intended to demonstrate that cooperation was not driving the reduction in hostile cognitions, but rather it is how the player perceives the game in terms of level of abstraction that affects hostility.

This study employed a 2 (Expertise: High versus Low) x 2 (Controller type: Typical versus Atypical) x 2 (Game type: Cooperative versus Competitive) between subjects design. The first independent variable was level of expertise. Players were prescreened for video game expertise prior to the experiment. Experts were defined as players who average more than 2 hours a week playing FPS style games. This number was adapted from the 5-hour mark set by

Green and Bavelier (2007) study was concerned with experts in terms of cognitive ability while Study 2 was only needed those with expertise in game context.

The second independent variable was controller type. In the typical controller condition players were asked to play with a standard game controller as it is originally set by the manufacturer. In the atypical condition the controller was altered so that the direction controls are inverted and the typical button configuration is altered. The atypical controller should have the effect of shifting the perception of gameplay from abstract to concrete. The experts should have had difficulty with the controller and that difficulty should cause them to refocus to concrete action identifications. However, the novices would not be affected by the controller swap, as they are unfamiliar with the game. The third independent variable was the same as in Study 1: game type (competitive versus cooperative).

METHODOLOGY

Participants

A sample of 214 (104 females) participants was drawn from undergraduate psychology subject pool in a large Southeastern university. Participants were young adults 18 years of age or older and received course credit in introductory psychology for their participation. They participated in one 60-minute session. These participants had a mean age of 18.98 (SD = 1.23) and were predominately Caucasian (89%). Out of those recruited, 104 were experts and 110 were novices (criteria for each category defined below). From the 224, 26 (16 novices) were removed from the data set due to experimenter error or hardware failure.

From the remaining 188, 19 participants were flagged for extreme suspicion using the same manner discussed above. Using a similar investigation as Study 1, two sets of analyses were conducted comparing the entire sample and the sample with those flagged for suspicion removed. There was not a significant difference in the analysis so those flagged for suspicion were included in the analysis. More information on the experimental analyses with those excluded for suspicion removed can be found in Appendix L. With the exclusion of the indirect conditions the manipulation check had fewer problems. Only 7 participants failed the manipulation check in a meaningful way. Those participants were also investigated and the sample did not differ significantly when removed.

Materials, Measures, and Procedure

Participants were prescreened for videogame expertise via the introductory psychology subject pool prescreening questionnaire which included our previously described videogame usage form. The question used to differentiate experts versus novices for this study was “In the

past six months, how many hours per week did you play a first-person shooting style videogame." Those who reported playing zero hours per week were selected as novices while those who reported any number greater than or equal to two hours per week were selected as experts. Recruitment was done in phases across two semesters. At the end of the first semester all those meeting the criteria of an expert were emailed and invited to the study. Time slots were opened in two to three day blocks and participants were told if they wished to participate they were asked to submit three time slots that were convenient to them. Participants were then matched together based on availability in groups of two.

The same procedure was repeated for novices throughout the second semester. Once a sufficient number of novices were recruited experts were recruited again from that same semester. Because the study procedure required two players at a time, if one participant failed to appear the other participant was asked to reschedule. FPS experts were more difficult to recruit than previously anticipated as they made up less than 10% of the subject pool at any given time. For Study 2, experts were only paired with experts and novices only paired with novices to control for error related to gross mismatches in skill and performance.

All other materials, measures, and procedures were similar to Study 1 with minor changes. Players did not receive the videogame usage form to avoid alerting them that expertise was relevant to the study. Participants were still given the general BIF before the study. All participants were given a brief message prior to their training period about the controller. Participants were told that the controller maybe configured differently from what they are accustomed and asked to leave it as is. Participants only received the direct cooperative or direct competition instructions from Study 1.

RESULTS

Preliminary Analysis

The preliminary analysis began with investigation of scale measures for internal consistency. Reliabilities for the scales maintained acceptable Cronbach's alpha levels: BIF α = .80; Negative PANAS = .91; Positive PANAS; = .84; SHS α = .93. The BIF-G demonstrated an acceptable alpha level of .71. Once again, exploratory factor analysis revealed the second aggressive factor comprised of the same 5 items that emerged in Study 1. Similar procedures were used in order to investigate this factor and once again it did not warrant separate consideration. Similar to Study 1 the BIF-G was found to be positively correlated with player score, $r(188) = .266$, $p < .001$, and the BIF, $r(188) = .459$, $p < .001$. The original BIF was not found to be correlated with any other variables.

Means and standard deviations for each variable of interest can be found in Table 16.

Table 16
Means and Standard Deviations for Primary Variables of Interest Study 2.

Variable	Mean	Standard Deviation
State Hostility	1.97	.552
% of Aggressive Stems	.169	.053
% of Positive Stems	.100	.043
BIF-Gamer	12.24	3.42
BIF	16.23	4.70
Negative Affect	16.30	6.08
Positive Affect	30.05	8.79
Player's score	2605.96	2526.08

In addition, a correlation matrix of all variables of interest can be found in Table 17.

Table 17
Correlation Matrix of Primary Variables for Study 2.

	1	2	3	4	5	6	7
SHS							
%Neg	.14[T]						
%Pos	-.11	-.23**					
BIF-G	-.19*	-.09	.03				
BIF	-.02	-.11	.06	.46**			
Pos Affect	-.16*	-.05	.06	.17**	-.04		
Neg Affect	.59**	.08	-.11	-.26**	-.05	-.03	
Score	-.24**	.01	-.04	.21**	-.06	.50**	-.21**

* *Denote significance at < .05*
** *Denotes significant at < .01*
[T] *Denotes marginal significance*

This initial analysis revealed once again that player's score in the game was correlated with numerous dependent variables including; the SHS, $r(173) = -.279$, $p < .001$, the BIF-G, $r(173) = .266$, $p < .001$, positive affect, $r(168) = .512$, $p < .001$, and negative affect, $r(168) = -.239$, $p = .002$.. Player's score was not correlated with negative affect in Study 2 and it was in Study 1. In light of these results, and similar to Study 1 player's score was used as a covariate in all analyses. All variables of interest were tested in a game type (competition vs. cooperation) by controller type (normal vs abnormal) by experience type (expert vs. novice) ANOVA. Once again gender was excluded from the main analyses because it was so closely tied to expertise. Gender was used as an independent variable in order to investigate possible result, those results can be found in Appendix M.

Aggression

To begin, in the primary analysis the aggression variables were tested to see if they were affected by the experimental manipulations. A game type by expertise type by controller type ANCOVA was conducted with player's score as a significant covariate, $F(1, 172) = 13.53$, $p <$

.001, η_p^2 = .076. There were no significant main effects for game type, p = .986, controller type, p = .617 or experience type, p = .487. There were also no significant interactions. Overall ANOVAs models for both percentage of aggressive stems completed, $F(7, 178) = 1.04$, p = .402, and percentage of prosocial stems completed, $F(7, 178) = .744$, p = .635 were non-significant. Means and standard deviations can be found in Table 18.

Table 18
Means and Standard Deviations for Aggression Variables.

	Expert		Novice		
	Normal	Abnormal	Normal	Abnormal	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
SHS					
Competitive	1.89 (.48)	2.01 (.55)	2.01 (.47)	2.02 (.62)	1.99 (.53)
Cooperative	1.87 (.58)	1.95 (.64)	1.96 (.50)	2.01 (.64)	1.95 (.58)
Total	1.88 (.54)	1.98 (.58)	1.99 (.58)	2.02 (.62)	1.97 (.56)
Agg. Stems					
Competitive	.170 (.07)	.167 (.06)	.160 (.06)	.154 (.05)	.163 (.06)
Cooperative	.181 (.05)	.177 (.06)	.162 (.05)	.187 (.03)	.177 (.05)
Total	.176 (.06)	.171 (.06)	.161 (.05)	.169 (.05)	.169 (.05)
Pos. Stems					
Competitive	.099 (.05)	.105 (.03)	.103 (.04)	.107 (.05)	.104 (.04)
Cooperative	.100 (.05)	.105 (.04)	.082 (.03)	.101 (.05)	.097 (.04)
Total	.099 (.05)	.105 (.03)	.093 (.04)	.104 (.05)	.100 (,04)

Behavior Identification Form –Gamer

Abstraction, as measured by the BIF-G, was also tested to see if it was affected by experimental condition. An ANCOVA with total BIF-G scores as the dependent variables and player's score as a significant covariate, $F(1, 172) = 7.41$, p = .007, η_p^2 = .043, resulted in a significant main effect for game type, $F(1, 172) = 6.42$, p = .012, η_p^2 = .038, where those in the competitive condition viewed the game more abstractly than those in the cooperative condition. There was also a marginally significant game type by experience type interaction, $F(3, 172) = 3.55$, p = .061, η_p^2 = .021. Simple effects confirmed that novices in the cooperative condition had

significantly lower abstraction scores than any other group. Means and standard deviations can be found in Table 19.

Table 19
Means and Standard Deviations for the BIF-G.

	Expert		Novice		
	Normal	Abnormal	Normal	Abnormal	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Competitive	12.94 (3.86)	12.96 (2.69)	13.55 (2.77)	12.04 (3.97)	12.76 (3.50)
Cooperative	13.15 (3.62)	12.90 (3.21)	9.74 (3.41)	11.09 (2.93)	11.83 (3.54)
Total	13.07 (3.66)	12.93 (2.90)	11.78 (3.60)	11.59 (3.50)	12.34 (3.46)

Once again the BIF-G was intended to be tested as a mediator between the experimental conditions and the aggression variables. A series of regressions were run with the total scores of the BIF-G as the predictor variable and the three aggression variables alternating as the criterion variable. Total scores on the BIF-G did indeed significantly predict scores for the SHS, β = -.21, $t(187)$= -2.90, p =.004. The BIF-G remained a significant predictor of aggression even when player score was added to the model, β = -.15, $t(172)$= -2.00, p =.047, suggesting that each variable predicted a unique proportion of the variance. The BIF-G did not significantly predict percentage of aggressive stems completed, β = -.06, $t(189)$= -.741, p =.460, or percentage of prosocial stems completed, β = .03, $t(185)$=-.389, p =.698. A mediation model using MEDIATE (a macro specifically developed to test mediation with categorical independent variables; Hayes & Preacher, 2014) was created with BIF-G total scores as the mediator between condition and SHS scores. The confidence interval established for the indirect effect included zero suggesting that mediation was not established. The BIF-G once again predicted positive affect, β = .20, $t(172)$= 2.62, p =.010.

Unlike Study 1, when player's score was added to the model, the BIF-G became non-significant, $\beta = .07$, $t(171) = .951$, $p = .343$, and player's score remained the only significant predictor, $\beta = .50$, $t(171) = 7.27$, $p < .001$.

PANAS

Similarly to Study 1, both positive and negative subscales of the PANAS were investigated to determine if they were manipulated by the experimental condition. Positive affect was entered into a similar ANCOVA with player's score as a significant covariate, $F(1, 172) = 41.17$, $p < .001$, $\eta_p^2 = .201$ resulting in a significant main effect for game type, $F(1, 172) = 4.08$, $p = .045$, $\eta_p^2 = .024$, where those in the competitive condition reported higher positive affect than those in the cooperative conditions. There was also a marginally significant main effect for experience type, $F(1, 172) = 3.30$, $p = .071$, $\eta_p^2 = .020$, where that experts reported more positive affect than novices. The ANCOVA for negative affect yielded non-significant findings, $F(7, 164) = 1.72$, $p = .097$. Means and standard deviations can be found in Table 20.

Table 20
Means and Standard Deviations for PANAS.

	Expert		Novice		
	Normal	Abnormal	Normal	Abnormal	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Pos. PANAS					
Competitive	33.44 (8.12)	33.13 (9.24)	28.14 (8.18)	27.79 (9.39)	30.42 (9.07)
Cooperative	34.23 (6.55)	29.60 (8.40)	27.84 (8.69)	24.14 (8.87)	29.22 (8.82)
Total	33.93 (7.09)	31.52 (8.94)	28.00 (8.32)	26.04 (9.24)	29.82 (8.94)
Neg. PANAS					
Competitive	16.13 (7.47)	16.83 (5.77)	15.86 (5.34)	17.17 (6.92)	16.55 (6.26)
Cooperative	15.27 (5.13)	14.75 (4.54)	17.94 (8.32)	15.86 (4.99)	15.89 (5.84)
Total	15.60 (6.05)	15.89 (5.29)	16.83 (6.87)	16.54 (6.04)	16.21 (6.04)

Player's Score

Player's score was once again correlated with numerous variables as mentioned in the preliminary analysis section. Unlike Study 1, Study 2 did produce differences in player's score based on the experimental manipulation when entered into the ANOVA used for conditional analysis. There was a significant effect for controller type, $F(1, 172) = 20.50$, $p < .001$, $\eta_p^2 = .111$, in that those in the abnormal condition had significantly lower scores than those in the normal condition. This finding suggests that the abnormal controller did hinder player performance. Unsurprisingly, there was also an effect for level of experience, $F(1, 172) = 32.22$, $p < .001$, $\eta_p^2 = .163$, whereas experts had higher scores than novices. In addition to these two main effects there was also a significant game type by experience type interaction, $F(3, 172) = 6.28$, $p = .013$, $\eta_p^2 = .037$. Simple effects confirmed that experts in the cooperative condition had significantly higher scores than any other condition. This is likely due to the fact that two experts cooperating together resulted in much higher productivity for the team than did the collaboration of two novices. Means and standard deviations can be found in Table 21.

Table 21
Means and Standard Deviations for the Player's score.

	Expert		Novice		
	Normal	Abnormal	Normal	Abnormal	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Competitive	3609 (2521)	2249 (1632)	2618 (2869)	1127 (1067)	2283 (2218)
Cooperative	5154 (2227)	3167 (2910)	2031 (2481)	837.7 (1069)	2924 (2772)
Total	4566 (2434)	2666 (2320)	2347 (2679)	988 (1066)	2605 (2526)

DISCUSSION

The results of Study 2 were unexpected in that the manipulations failed to yield meaningful effects on the key dependent variables. It can be observed from the fact that player's scores were lower in the abnormal controller condition that the controller manipulation succeeded in at least making the game more difficult. However it did not result in lowering abstract levels of action identification in the context of the game. It could be the case that reducing the action identification used in regards to the controller does not reduce the level of abstraction in the game environment. There was also no interaction between level of experience and controller in terms of player's scores, meaning that the abnormal controller resulted in lower scores for the novices as well. This was an unforeseen problem. It may be the case that some aspects of the game are intuitive such as directional controls and the inversion of these controls represents a disturbance in all cases regardless of experience.

Study 2 did not replicate the findings on aggression for Study 1 with regard to game type. It is difficult to determine why this might be. One idea is that the sample was composed in a very different way compared to Study 1. Study 1 randomly sampled students of various experience levels into the study while Study 2 recruited two extreme sides of experience level. It could be the case that the effects of game type in Study 1 cannot be replicated within this extreme sample and that the variance accounted for in the first study may relate to casual game players. This is unlikely, however, because the result of removing subjects closer to the mean results in more profound differences between those extremes.

The experimental manipulation did impact scores of the BIF-G in that those in the competitive condition demonstrated more abstraction then those in the cooperative. This finding was unpredicted and in opposition of the original hypothesis. It may be that the competitive condition stimulates higher levels of abstraction by accentuating the competitive goal inherent in the game. The interaction showing that novices in the cooperative condition experienced the least amount of abstraction was also unpredicted. Cooperating with another player may come as too overwhelming for the novice, forcing them to focus on more concrete aspects of the game.

It is interesting to note that the correlation matrix for Study 2 is very similar to the correlation matrix for Study 1. It may be the case that many of these correlations will remain consistent, and Study 1 and Study 2 failed in an unrecognizable way to manipulate those relationships.

Despite the lack of findings based on the experimental manipulation, Study 2 still contributes to the overall conversation about the effect of video games. In Study 2, the relationship between BIF-G and aggression was clearer and replicated marginal findings in Study 1. The BIF-G predicted a unique portion of the variance associated with aggression even when game performance was controlled for. Based on these results, it does seem that abstraction plays a role in aggression in video games though it may not be as pronounced as hypothesized. It could be argued that this finding may be related to an increase in experts in this sample, however, if experts from both studies are compared there are no significant differences in abstraction as measured by the BIF-G.

In addition the BIF-G was once again related to positive affect. Abstraction does seem to be significantly related to positive affect in that those who view the game more abstractly enjoy it more. To my knowledge this finding that experts enjoy tasks more than novices, while not

groundbreaking, is novel not only to video games but to psychology in general. It was strange that the competitive condition in Study 2 produced the highest levels of abstraction as abstraction and aggression are negatively correlated. While this effect may be spurious the implications of it being correct urge a drastic revision to my hypotheses about abstraction and the effects of cooperation and competition. This idea will need to be replicated in order to verify its existence.

Another interesting finding of Study 2 is that results concerning player performance (represented by player's score) were soundly replicated. Many of the variables of interest were impacted by player performance within the game and remained one of the strongest effects across both studies. In nearly all studies regarding aggression in video games, player performance in not accounted for and it appears that it must be in order to obtain an accurate representation of the relationship between other variables and aggression.

GENERAL DISCUSSION

The overall aim of this study was to expand the narrow focus around videogame research and attempt to account for previously omitted variables. Though some of the manipulations did not have the hypothesized effects, I feel that this research did accomplish the principle goal. Study 1 did provide some support for the first hypothesis that a competitive narrative can increase aggression in participants. However, there was no support for the idea that cooperation reduces aggression especially compared to a control. Also Study 2 failed to replicate these findings related to competition in Study 1. There was also no evidence in either study that abstraction plays a role as a mediator between aggression and game type. However, there was small negative relationship between abstraction and state hostility. In addition, abstraction was significantly related to positive affect in both studies suggesting that those who view the game abstractly may have more positive emotions associated with gameplay and slightly less aggression. The BIF-G also appeared to be a worthy measure of abstraction in gaming and demonstrated discriminate validity from the original BIF.

Possibly the most significant contribution made by these studies is the uncovering of the role of performance on cognitions and emotions experienced during game play. Looking back, it seems obvious that how well you do on a task is likely to affect your attitudes about that task. However, this concept had not been previously accounted for in experimental videogame research. This is most likely because of previously unavailable technology capable of capturing score of the game along with that fact that there are many aggressive games that do not calculate a composite score relating to performance. This simple realization is an excellent representation

of how narrowly focused this field of research on aggression and video games had become. Accompanying this new finding however is the paradox that is presented when considering expertise and performance simultaneously. This situation appears complex as performance is likely highly dependent on expertise however statistical models demonstrate that performance is a better predictor of variance within the SHS than expertise.

It should be noted once again that in the context of this study aggression refers to aggressive thoughts and the accessibility of aggressive words. At no point did either study attempt to measure aggressive or violent behavior in the participants. Many aggression models claim aggressive and violent behaviors stem from aggressive and violent thoughts and accessibility so I believe it was critical to start with cognitions before moving to behavior. While I plan to investigate actual behavior in future studies, actual behavior was omitted for the sake of research simplicity.

Limitations

The primary limitation of this study was using the "capture the flag" scenarios as the primary game format. Originally, this game mode was used in order to control for game format so that players were not participating in tasks that were substantially different across condition. At this project's inception this aspect was viewed positively, however at the end it may have handicapped the manipulations. The nature of the game "capture the flag" is inherently competitive regardless of whether players are placed in a situation and asked to cooperate, ultimately they are still competing. This inherent competition may have undermined the cooperative instructions resulting in weak or nonsignificant findings. Videogame research is often criticized for incongruent control conditions. I used this game format across all conditions

in attempt to avoid that criticism but looking back it seems that different tasks should be experimented with.

Similarly, the indirect manipulation was problematic. It appears that the nature of the game is so immersive that players often believed they were playing directly with their opponent or partner regardless of the instructions they received. This manipulation may be more effective if it could be incorporated into the game itself where participants would receive feedback on how their indirect partner was progressing. It would take significant programming skills or working closely with someone in the videogame industry as outside instructions cannot currently be incorporated in the game. Another way to strengthen this manipulation would be to allow the indirect players to communicate via headset (a feature common in many networked video games). This would allow each player to fully understand that they are not in the same game but are still working together to, or competing for, an overall goal.

One of the primary aims of this study was to recreate videogame scenarios that were generalizable to everyday life; however, the experimental manipulations created some circumstances that would not be commonly found outside of the laboratory. Normally, a player would choose the game and the format they wish to play in, where in this case participants were forced to play a specific game and under instructions given to them. In addition, most players choose to play games with friends or acquaintances during networked play and in my experiments they were forced to interact with a stranger. These aspects detract from that generalizability, but certain concessions must be made in order to test other aspects in more externally valid way or for logistical purposes.

There were several instances of technological problems experienced during both studies that resulted in loss of subjects. Unfortunately, all three XBOXs (one machine died permanently

during Study 1) that were used and both of the computers used for recording were either second hand or refurbished and experienced regular problems. The protocol for both studies was significantly more advanced than a typical experiment and required rigorous training. Even with these considerations problems occurred. These problems were unforeseen and though adequate samples were gathered it is impossible to say how the data would appear if several subjects would not have to be removed from both studies. .

The final limitation discussed here is the fact that the role of frustration was not accounted for in these studies. The role of frustration was intentionally ignored in this project for fear of overcomplicating my research goals. It can easily be argued that the reason performance is negatively correlated with aggression is that failing to perform instills frustration which then leads to aggressive thoughts and feelings. However, aggression did not increase in Study 2 in the abnormal controller conditions when player performance was significantly reduced. If frustration is related to performance and plays a significant role in aggression resulting from gameplay it would stand to reason that there would be increases in the aggressive variables in this condition.

Future Directions

The greatest benefit of this study is the numerous future avenues for research that are suggested by the results. My first goal is to further investigate the role of performance as it relates to aggression. Increased performance was negatively correlated with aggression in both studies and mediated the relationship between expertise and aggression. I plan to develop a study that will manipulate level of performance and provide false feedback in a believable way for players in attempts to gauge how an overly negative or overly positive performance may impact

aggression. This idea will be challenging as it must be done carefully in order to seem genuine. Videogame players will likely be able to tell how well they perform in game regardless of what feedback they are provided with. In addition, I hope this future study will help disentangle the relationship between expertise and performance.

Regardless of the success of the manipulations in the current study, I will continue to investigate the relationship between competition and aggression. This project has given me sufficient insight on how to create better manipulations that can more clearly investigate cooperation and competition while still being externally valid. In addition I hope to improve the direct versus indirect manipulation as I believe that this variable may still impact cognitions and feelings during gameplay.

Finally, the role of abstraction in gaming merits further investigation. The data here clearly does not support my hypothesis that abstraction is the primary mechanism that facilitates aggression. However, there does appear to be a relationship between the two. The BIF-G appears to be sufficient in measuring this concept and I plan to include it in my future studies to continue to investigate this relationship. Overall my long term goal for this line of research is to help unite the gaming industry and psychologists to create better games that will reduce aggression and increase positive emotion in all that choose to make video games a part of their life.

Conclusion

This research was largely exploratory. With this type of research often come unexpected results, numerous complications and more questions than answers. However, it is important to understand that regardless of how many hypotheses I correctly predicted that progress was made in understanding the impact of videogame play on society. This project provided me with several new directions in which to explore and shed light on the complicated interaction that takes place

when one plays a violent videogame. I was able to establish a new relationship between abstraction and gaming while exposing the seemingly obvious concept of performance. In addition this project will allow me to perfect future manipulations to better illuminate or replicate previous findings. I hope that others will see the value in this project and I will continue my efforts to make significant contributions to this field.

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APPENDIX

APPENDIX A
BIF-G

Any behavior can be described in many ways. For example, one person might describe a behavior as "writing a paper," while another person might describe the same behavior as "pushing keys on the keyboard." Yet another person might describe it as "expressing thoughts." This form focuses on your personal preferences for how different behaviors related to the video game you just played might be described. Below you will find several actions or events that might have occurred during the game session you just had. For each action or event there are two different ways the event might be described. For example:

1. Crouching behind a crate
a. Avoiding the enemy
b. Staying low

Your task is to pick the option, a or b, that best describes how you think about the action or event. Simply click the radio button for the option you prefer. There are no right or wrong answers.

1. Capturing the flag
   a. Bringing the flag to your base
   b. Scoring points in the game*

2. Reloading your gun
   a. Putting in more bullets
   b. Keeping you weapon functional*

3. Moving around the level
   a. Running
   b. Escaping enemies*

4. Checking the map
   a. checking your location
   b. Finding paths to your objective*

5. Communicating with others
   a. Using the radio
   b. Coordinating personnel*

6. Firing your weapon
   a. Pulling the trigger
   b. Shooting at an opponent*

7. Using a grenade
   a. Pulling a pin and throwing
   b. Attempting to kill an opponent*

8. Moving Quietly
   a. Avoiding enemies*
   b. Not making noise

9. Eliminating an opponent
   a. Killing people
   b. Reducing Threats*

10. Attacking the enemy flag carrier
   a. Avoiding defeat*
   b. Shooting an opponent

11. Aiming
   a. Targeting enemies*
   b. Using the gun's sights

12. Protecting your flag
    a. Guarding the flag's location
    b. Preventing the other team from winning*

13. Organizing Players
    a. Calling out instructions
    b. Planning a coordinated attack*

14. Taking cover
    a. Hiding behind a crate
    b. Avoiding enemy fire*

15. Planting a mine
    a. Killing an opponent
    b. Clearing an area*

16. Staying alive
    a. Not getting shot
    b. Protecting yourself and others*

17. Activate the drone weapon
    a. Learning enemy locations*
    b. Using the touch screen

18. Jumping
    a. Moving around obstacles
    b. Avoiding gunfire*

19. Hiding behind a wall
    a. Crouching
    b. Evading the enemy*

20. Assessing enemy strength
    a. Counting enemy soldiers
    b. Developing a game strategy*

APPENDIX B
VIDEOGAME USAGE FORM
GREEN & BAVELIER, 2007

Instructions: Please select from the choices provided.

1. How many days a week do you play video games?
   0-7
2. How many hours per week do you play video games?
   I don't play video games
   0-30 Minutes
   30 minutes – 1 hour
   1-2 hours
   2-3 hours
   3-4 hours
   4-5 hours
   5-6 hours
   6-7 hours
   7-8 hours
   8-10 hours
   10-12 hours
   12+ Hours

3. How many video game consoles, such the Nintendo Wii, do you own?

4. How many individual video games do you own?

Instructions: Please select 0 for "I don't play video games," 1 for "Puzzle games," 2 for "Simulator games," 3 for "Action/adventure games," 4 for "First-person shooter games," and 5 for "Role-playing games."

What kind of video game is your favorite to play?

Instructions: Please type your answer to the following questions into the space provided.

1. Do you play any online video games (e.g., World of Warcraft, Second Life, Warhammer, EverQuest, The Sims Online, Spore)?

2. If yes, please list the games

3. If yes, how many hours per day do you play online video games?

4. If yes, how many hours per week do you play online video games?

Instructions: For each of the following game types please answer in the following questions.

(types listed, First-person shooters, Role Playing Games, Action Adventure / Fighting Games, Sports Games, Phone Games, Call of Duty)

1. How days a week do you play this type of video game?
   0-7 Days

2. How many hours per week do you play this type of video game?
   I don't play video games
   0-30 Minutes
   30 minutes – 1 hour
   1-2 hours
   2-3 hours
   3-4 hours
   4-5 hours
   5-6 hours
   6-7 hours
   7-8 hours
   8-10 hours
   10-12 hours
   12+ Hours

3. How many individual video games of this type do you own?

APPENDIX C
BEHAVIOR IDENTIFICATION FORM
(VALLACHER & WEGNER, 1989)

Any behavior can be described in many ways. For example, one person might describe a behavior as "writing a paper," while another person might describe the same behavior as "pushing keys on the keyboard." Yet another person might describe it as "expressing thoughts." This form focuses on your personal preferences for how a number of different behaviors should be described. Below you will find several behaviors listed. After each behavior will be two different ways in which the behavior might be identified. For example:

1. Attending class
a. sitting in a chair
b. looking at a teacher

Your task is to choose the identification, a or b, that best describes the behavior for you. Simply place a checkmark next to the option you prefer. Be sure to respond to every item. Please mark only one alternative for each pair. Remember, mark the description that you personally believe is more appropriate for each pair.

1. Making a list
a. Getting organized-
b. Writing things down

2. Reading
a. Following lines of print
b. Gaining knowledge-

3. Joining the Army
a. Helping the Nation's defense-
b. Signing up

4. Washing clothes
a. Removing odors from clothes-
b. Putting clothes into the machine

5. Picking an apple
a. Getting something to eat-
b. Pulling an apple off a branch

6. Chopping down a tree
a. Wielding an axe
b. Getting firewood-

7. Measuring a room for carpeting
a. Getting ready to remodel-
b. Using a yard stick

8. Cleaning the house
a. Showing one's cleanliness-
b. Vacuuming the floor

9. Painting a room
a. Applying brush strokes
b. Making the room look fresh-

10. Paying the rent
a. Maintaining a place to live-
b. Writing a check

11. Caring for houseplants
a. Watering plants
b. Making the room look nice-

12. Locking a door
a. Putting a key in the lock
b. Securing the house-

13. Voting
a. Influencing the election-
b. Marking a ballot

14. Climbing a tree
a. Getting a good view-
b. Holding on to branches

15. Filling out a personality test
a. Answering questions
b. Revealing what you're like-

16. Toothbrushing
a. Preventing tooth decay-
b. Moving a brush around in one's mouth

17. Taking a test
a. Answering questions
b. Showing one's knowledge-

18. Greeting someone
a. Saying hello
b. Showing friendliness-

19. Resisting temptation
a. Saying "no"
b. Showing moral courage-

20. Eating
a. Getting nutrition-
b. Chewing and swallowing

21. Growing a garden
a. Planting seeds
b. Getting fresh vegetables-

22. Traveling by car
a. Following a map
b. Seeing countryside-

23. Having a cavity filled
a. Protecting your teeth-
b. Going to the dentist

24. Talking to a child
a. Teaching a child something-
b. Using simple words

25. Pushing a doorbell
a. Moving a finger
b. Seeing if someone's home-

APPENDIX D
VIDEOGAME USAGE FORM
(ADAPTED FROM GREEN & BAVELIER, 2007)

Instructions: Please type the number into the blanks provided.

How many days a week do you play video games?

How many hours per week do you play video games?

How many video game consoles, such the Nintendo Wii, do you own?

How many individual video games do you own?

Instructions: Please select 0 for "I don't play video games," 1 for "Puzzle games," 2 for "Simulator games," 3 for "Action/adventure games," 4 for "First-person shooter games," and 5 for "Role-playing games."

What kind of video game is your favorite to play?

Instructions: Please type your answer to the following questions into the space provided.

Do you play any online video games (e.g., World of Warcraft, Second Life, Warhammer, EverQuest, The Sims Online, Spore)?

If yes, please list the games

If yes, how many hours per day do you play online video games?

If yes, how many hours per week do you play online video games?

Instructions: For each of the following game types please answer in the following questions.

(types listed, First-person shooters, Role Playing Games, Action Adventure / Fighting Games, Sports Games, Phone Games)

How days a week do you play this type of video game?

How many hours per week do you play this type of video game?

How many individual video games of this type do you own?

Please list at least ten things you would likely do in the scenario listed.

APPENDIX E
PANAS
(WATSON, CLARK & TELLEGAN, 1988)

Listed below are a number of words that describe different feelings and emotions. Read each item and mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way **generally/right now**. Use the following scale to record your answers.

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

____1. interested

____2. distressed

____3. excited

____4. upset

____5. strong

____6.guilty

____7. scared

____8. hostile

____9. enthusiastic

____10.proud

____11. irritable

____12. alert

____13. interested

____14. inspired

____15. nervous

____16. determined

____17. attentive

____18. jittery

____19. active

____20. afraid

APPENDIX F
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.

Strongly Disagree (1), Disagree (2) Neither Agree Nor Disagree (3) Agree (4) Strongly Agree (5)

____ 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.
____ I feel like I'm about to explode.
____ I feel friendly.
____ I feel understanding.
____ I feel amiable.
____ I feel mad.
____ I feel mean.
____ I feel bitter.
____ I feel burned up.
____ I feel like yelling at somebody.
____ I feel cooperative.
____ I feel like swearing.
____ I feel cruel.
____ I feel good-natured.
____ I feel disagreeable.
____ I feel enraged.
____ I feel sympathetic.
____ I feel vexed.

APPENDIX G
STEM COMPLETION TASK
(GITTER ET AL., 2013)

For the following words please complete as many of them as you can within 5 minutes. If you have trouble with a word, feel free to move on to the next word.

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 _ n _
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 _ r _ 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 f _ _ _
59 l _ _ o n
60 c r _ _ l
61 c _ e _ t e
62 s t _ r _ y
63 m _ t c _
64 f _ r _ _
65 t _ _ 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 _ t 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 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 _
88 s _ _ y
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 _ n t
97 w _ t _ r
98 s _ a s h

APPENDIX H
GAME CONDITION DESCRIPTIONS

Description 1 – Competitive – Today you play "Call of Duty: Black Ops 2. In this particular scenario you will be competing against another person in a game of "Capture the Flag." The object of the game is to secure the opponents flag with any means necessary. This may include fighting with your opponent.

Description 2 – Indirect Competitive – Today you play "Call of Duty: Black Ops 2. In this particular scenario you will be competing against another person in a game of "Capture the Flag." You and the other player, while competing are not in same realm but merely attempting to defeat a computer generated opponent before the other person can do so. The object of the game is to secure the opponents flag with any means necessary.

Description 3 – Cooperative – Today you play "Call of Duty: Black Ops 2. In this particular scenario you will be cooperating with another person in a game of "Capture the Flag." The object of the game is to secure the opponents flag with any means necessary. This may include fighting with a computer generated opponents.

Description 4 – Indirect Cooperative - Today you play "Call of Duty: Black Ops 2. In this particular scenario you will be cooperating with another person in a game of "Capture the Flag." You and the other player, while cooperating are not in same realm but merely attempting to defeat a computer generated opponent and score as many points together as possible. The object of the game is to secure the opponents flag with any means necessary. This may include fighting with a computer generated opponents.

Description 5 – Control – Today you play "Call of Duty: Black Ops 2.

APPENDIX I

Primary Analysis for Study 1with Failed Manipulation Checks Removed

Correlation Matrix of Primary Variables for Study 1.

	1	2	3	4	5	6	7	8	9	10	11
SHS %Agg	.12										
%Pro	.00	-.19**									
BIF-G	-.09	-.04	.04								
BIF	-.08	-.07	.00	.39**							
Pos Affect	-.21**	-.01	.00	.22**	.03						
Neg Affect	.71**	.12	.04	-.09	-.19**	.02					
Score	-.34**	-.12	-.04	.21**	.04	.42**	-.25**				
Game hours	-.15*	-.14*	.04	.23**	-.01	.37**	-.14*	.54**			
Masculine	.11	.06	.06	.03	-.06	.02	.13	-.19*	-.10		
Feminine	-.14	-.25**	-.12	.07	.05	.12	-.01	.09	.08	-.14	
Oneness	-.26**	-.03	-.05	.14	-.03	.33**	.15*	.16*	.17*	-.16*	.29**

* *Denote significance at < .05*

** *Denotes significant at < .01*

Means, Standard Deviations and Statistics for Variables of Interest

	Direct	Indirect	IV	Test Statistic	Effect Size
	M (SD)	M (SD)		F (P value)	η_p^2
SHS			Overall	5.46 (.001)	.157
Competitive	2.13 (.66)	2.48 (.71)	Score	12.66 (.001)	.098
Cooperative	2.08 (.63)	2.05 (.64)	Game Type	2.82 (.096)	.023
			Environment	2.43 (.121)	.020
			Interaction	1.41 (.237)	.012
Agg. Stems			Overall	1.53 (.203)	.035
Competitive	.183 (.07)	.193 (.06)	Game Type	2.93 (.089)	.022
Cooperative	.162 (.05)	.178 (.06)	Environment	1.62 (.205)	.023
			Interaction	.104 (.748)	.001
Pos. Stems			Overall	2.68 (.050)	.059
Competitive	.084 (.03)	.093 (.04)	Game Type	1.87 (.174)	.014
Cooperative	.108 (.04)	.086 (.04)	Environment	.989 (.322)	.008
			Interaction	5.29 (.023)	.039
BIF-G			Overall	2.41 (.053)	.157
Competitive	12.82 (3.93)	11.32 (3.86)	Score	5.53 (.020)	.098
Cooperative	11.17 (3.46)	12.00 (3.38)	Game Type	1.01 (.096)	.023
			Environment	.352 (.121)	.554
			Interaction	2.18 (.142)	.142

APPENDIX J
EXPLORATORY ANALYSIS

Explanation and Result for POP and Oneness Scale

Personality of Partner Scale

To investigate the relationship between the player and their partner, I adapted the Personal Attributes Questionnaire (Spence, Helmreich, & Stapp, 1974) by modifying the instructions so that the subject would consider the attributes of their partner rather than themselves. This is a 24 item scale in which participants will infer the personality of the person they played with based on that interaction. For the remainder of the study this adapted version will be referred to as the Personality of Partner scale. The original measure is divided into two primary subscales; masculine characteristics and feminine characteristics. These subscales were investigated to understand whether the manipulation would affect perceptions of the partner and whether or not those perceptions affected the aggression or abstraction variables.

A two-way game type by environment type ANCOVA with partner masculinity as the dependent variable and player's score as a significant covariate, $F(1, 134) = 5.19$, $p = .024$, $\eta_p^2 = .038$ revealed a significant main effect for game type, $F(1, 134) = 7.30$, $p = .008$, $\eta_p^2 = .053$, where those in the competitive condition ascribed fewer masculine traits to their partner than those in cooperative conditions. There was also a significant main effect for environment type, $F(3, 134) = 5.57$, $p = .020$, $\eta_p^2 = .041$. Those in the direct conditions claimed their partner had fewer masculine traits than those in the indirect conditions. It is important to note that this effect was not moderated by gender of the participant.

Means and Standard Deviations for POP Masculine

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	3.16 (.60)	3.51 (.80)	3.33 (.73)
Cooperative	3.54 (.80)	3.76 (.77)	3.66 (.79)
Total	3.34 (.72)	3.64 (.79)	3.50 (.77)

The regular control condition was also compared on masculinity (those in the yoked control did not complete this measure). A one-way ANCOVA for game type with player's score as a significant covariate, $F(1, 167) = 9.39$, $p = .003$, $\eta_p^2 = .054$ revealed that those in the competitive condition said their opponent had significantly fewer masculine traits than those in the regular control condition. There was no difference between the cooperative and control groups. There was also a significant one-way ANCOVA for environment type where player's score was a significant covariate, $F(1, 167) = 8.05$, $p = .005$, $\eta_p^2 = .047$. Those in the direct condition ascribed fewer masculine traits to their partner than those in the control condition, $p = .071$. There was no difference between the indirect group and the control group.

Means and standard deviations for masculine and feminine vs control.

	Group 1	Group 2	Group 3
Dependent Variables	M (SD)	M (SD)	M (SD)
Game Type			
	Competitive	Cooperative	Regular Control
Masculine	3.34[ab] (.73)	3.66[a] (.79)	3.61[b] (.82)
Feminine	2.72[a] (.72)	2.62[a] (.78)	2.59 (.74)
Environment type			
	Direct	Indirect	Regular Control
Masculine	3.34[a] (.72)	3.64[a] (.79)	3.61 (.82)
Positive Affect	2.72 (.63)	2.63 (.85)	2.59 (.74)

Letters indicate significant differences between groups.

Even though perceived masculinity was affected by the experimental manipulation, it was not correlated with any of the aggression variables as seen in the correlation matrix (Table 4).

There were no observed differences between groups in the game type by environment type ANOVA, $p = .716$, for feminine characteristics.

Means and Standard Deviations for POP Feminine

	Direct	Indirect	Total
	M (SD)	M (SD)	M (SD)
Competitive	2.79 (.60)	2.65 (.82)	2.72 (.72)
Cooperative	2.64 (.66)	2.61 (.88)	2.62 (.85)
Total	2.72 (.63)	2.63 (.85)	2.67 (.75)

.

Additionally, there was no significant difference between the control group and those in the game type, $p = .539$, or environment type groups, $p = .495$.

In Study 2, I once again examined the personality of partner scale to understand if experimental conditions altered how the participant viewed their partner and also if those perceptions of their partner effected the aggression variables. The personality of partner measure was once again divided into two subscales for analysis. Neither perceived feminine attributes nor, $F(7, 180) = 1.29$, $p = .260$, nor perceived masculine attributes, $F(7, 180) = 1.63$, $p = .130$, yielded significant models.

Means and Standard Deviations for POP scale for Study 2.

	Expert		Novice		
	Normal	Abnormal	Normal	Abnormal	Total
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Masculine					
Competitive	3.36 (.63)	3.21 (.66)	3.21 (.69)	3.55 (.59)	3.34 (.65)
Cooperative	3.55 (.59)	3.24 (.73)	3.64 (.67)	3.51 (.77)	3.57 (.72)
Total	3.46 (.61)	3.22 (.68)	3.41 (.71)	3.53 (.67)	3.41 (.67)
Feminine					
Competitive	3.05 (.50)	2.97 (.33)	3.13 (.58)	2.91 (.62)	3.01 (.52)
Cooperative	3.10 (.62)	2.93 (.51)	2.88 (.59)	2.71 (.73)	2.91 (.64)
Total	3.08 (.56)	2.95 (.41)	3.01 (.59)	2.82 (.68)	2.96 (.57)

Oneness Scale

The Oneness Scale (Maner, et al., 2002) was also included. It is a 2 item measure in which a participant assesses how close they felt to their partner, first via Likert scale questions and second via a Venn diagram display. Participants view several sets of Venn diagrams of varying distance from each other and choose the one they think best describes the relationship between them and their partner. In Study 1, there were no significant effects of the experimental conditions on the oneness scale based in the game type by environment type ANOVA, $F(3, 145) = 1.84$, $p = .142$.

The oneness variable was investigated to see if the experimental manipulation effected how closely a partner felt with the other participant they played with. An ANCOVA with oneness as the dependent variable and player's score as a significant covariate, $F(1, 172) = 7.26$, $p = .008$, $\eta_p^2 = .042$ yielded no significant main effects, however, there was a significant game type by experience type interaction, $F(1, 172) = 3.81$, $p = .053$, $\eta_p^2 = .023$. Simple effects confirmed that experts in the cooperative condition experienced much higher oneness with their partner than those in any other condition.

Personal Attributes Questionnaire
(Spence, Helmreich, & Stapp, 1974)

Instructions: Please rate the player you just competed against on the following attributes from 0 (Not at all) to 5 (very).

Not at all aggressive	1……..2……..3……...4……5	Very aggressive
Not at all independent	1……..2……..3……...4……5	Very independent
Not at all emotional	1……..2……..3……...4……5	Very emotional
Very submissive	1……..2……..3……...4……5	Very dominant
Not at all excitable in a major crisis	1……..2……..3……...4……5	Very excitable in a major crisis

Very passive	1……..2……..3……...4……5	Very active
Not at all able to devote self completely to others	1……..2……..3……...4……5	Able to devote self completely to others
Very rough	1……..2……..3……...4……5	Very gentle
Not at all helpful to others	1……..2……..3……...4……5	Very helpful to others
Not at all competitive	1……..2……..3……...4……5	Very competitive
Very home oriented	1……..2……..3……...4……5	Very worldly
Not at all kind	1……..2……..3……...4……5	Very kind
Indifferent to other's approval	1……..2……..3……...4……5	Highly needful of other's approval
Feelings not easily hurt	1……..2……..3……...4……5	Feelings easily hurt
Not at all aware of other's feelings	1……..2……..3……...4……5	Very aware of other's other's feelings
Can make decisions easily	1……..2……..3……...4……5	Has difficulty making decisions
Gives up very easily	1……..2……..3……...4……5	Never gives up easily
Never cries	1……..2……..3……...4……5	Cries very easily
Not at all self-confident	1……..2……..3……...4……5	Very self-confident
Feels very inferior	1……..2……..3……...4……5	Feels very superior
Not at all understanding of others	1……..2……..3……...4……5	very understanding of others
Very cold in relations with others	1……..2……..3……...4……5	Very warm in relations with others
Very little need for security	1……..2……..3……...4……5	Very strong need for security
Goes to pieces under	1……..2……..3……...4……5	Stands up well under

pressure pressure

ONENESS
Maner, et al., 2002

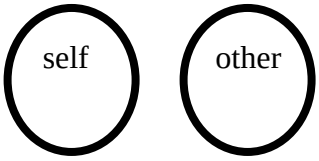
Please indicate to what extent you would use the term “WE” to characterize you and the person you played with by circling the appropriate number.

1 2 3 4 5 6 7

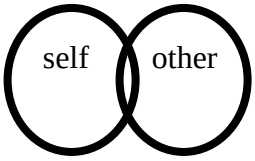
not at all extremely

By circling the appropriate figures below, please indicate to what extent you and this person are connected.

A.



B.



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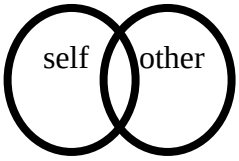

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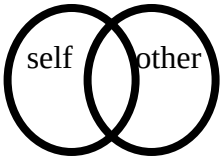

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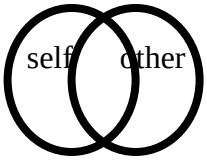
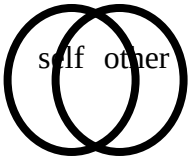


F.



G.

APPENDIX K

Primary Analysis for Study 1 with Extreme Suspicion Included

Correlation Matrix of Primary Variables for Study 1.

	1	2	3	4	5	6	7	8	9	10	11
SHS %Agg	.11										
%Pro	-.01	-.14*									
BIF-G	-.07	-.06	.06								
BIF	-.10	-.08	-.03	.42**							
Pos Affect	-.26**	.05	.05	.24**	.04						
Neg Affect	.74**	.11	.06	-.06	-.18**	-.02					
Score	-.35**	-.14	-.01	.21**	.03	.42**	-.26**				
Game hours	-.17*	-.10	.06	.22**	-.03	.41**	-.10	.51**			
Masculine	.10	.07	.02	.04	.01	.02	.10	-.23*	-.12		
Feminine	-.17*	-.17*	-.03	.09	-.02	.17*	-.03	.13	.12	-.15*	
Oneness	-.24**	-.04	-.02	.12	-.02	.30**	.14*	.11	.15*	-.18**	.33**

* *Denote significance at < .05*

** *Denotes significant at < .01*

Means and Standard Deviations for Aggression Variables.

	Direct	Indirect	IV	Test Statistic	Effect Size
	M (SD)	M (SD)		F (P value)	η_p^2
SHS			Overall	6.81 (.001)	.152
Competitive	2.18 (.68)	2.34 (.70)	Score	19.73 (.001)	.115
Cooperative	2.13 (.73)	1.96 (.56)	Game Type	3.29 (.072)	.021
			Environment	.164 (.686)	.001
			Interaction	1.66 (.200)	.011
Agg. Stems			Overall	1.46 (.229)	.025
Competitive	.182 (.07)	.190 (.06)	Game Type	2.97 (.086)	.017
Cooperative	.164 (.05)	.177 (.06)	Environment	1.49 (.229)	.009
			Interaction	.105 (.746)	.001
Pos. Stems			Overall	1.15 (.330)	.020
Competitive	.087 (.03)	.091 (.04)	Game Type	2.11 (.148)	.012
Cooperative	.102 (.04)	.093 (.04)	Environment	.220 (.640)	.001
			Interaction	1.41 (.237)	.008
BIF-G			Overall	3.84 (.005)	.092
Competitive	13.05 (3.93)	11.32 (3.60)	Score	8.18 (.005)	.051
Cooperative	11.09 (3.73)	12.30 (3.56)	Game Type	1.08 (.300)	.007
			Environment	.518 (.473)	.003
			Interaction	5.38 (.022)	.034

APPENDIX L

Primary Analysis for Study 2 with Extreme Suspicion Excluded

Correlation Matrix of Primary Variables for Study 2.

	1	2	3	4	5	6	7	8	9	10
SHS										
%Neg	.11									
%Pos	-.13	-.24**								
BIF-G	-.23*	-.08	.04							
BIF	-.03	-.11	.08	.47**						
Pos Affect	-.20*	-.06	.08	.22**	-.01					
Neg Affect	.62**	.10	-.15	-.30**	-.09	-.09				
Score	-.27**	.02	-.02	.25**	.01	.55**	-.23**			
Masculine	-.02	-.06	.05	-.12	.08	-.05	.03	-.08*		
Feminine	-.10	-.01	.10	.06	-.05	.19*	-.07	.17*	-.21**	
Oneness	-.08	.12	-.04	.09	.04	.26**	.01	.24**	.07	.27**

* *Denote significance at < .05*

** *Denotes significant at < .01*

Means and Standard Deviations for Aggression Variables.

	Expert		Novice	
	Normal	Abnormal	Normal	Abnormal
	M (SD)	M (SD)	M (SD)	M (SD)
SHS				
Competitive	1.91 (.49)	2.07 (.59)	2.00 (.48)	1.96 (.58)
Cooperative	1.89 (.58)	1.93 (.68)	1.98 (.50)	2.04 (.66)
Agg. Stems				
Competitive	.172 (.07)	.170 (.06)	.161 (.06)	.157 (.05)
Cooperative	.180 (.05)	.188 (.06)	.167 (.04)	.188 (.04)
Pos. Stems				
Competitive	.098 (.05)	.105 (.03)	.103 (.04)	.112 (.06)
Cooperative	.104 (.04)	.100 (.04)	.081 (.03)	.098 (.05)
BIF-G				
Competitive	13.40 (3.50)	12.79 (2.78)	13.65 (2.89)	11.86 (4.17)
Cooperative	13.13 (3.77)	12.82 (3.23)	10.00 (3.30)	10.70 (2.60)

ANOVA Table for Primary Analysis in Study 2.

IV	Test Statistic	Effect Size	Interaction Term	Test Statistic	Effect Size
	F (P value)	η_p^2		F (P value)	η_p^2
SHS					
Overall	1.66 (.113)	.084	G x E	.006 (.939)	.000
Score	11.51 (.001)	.074	G x C	.014 (.905)	.000
Game Type	.009 (.924)	.000	E x C	.063 (.802)	.000
Expertise Type	.810 (.370)	.006	G x E x C	.379 (.539)	.003
Controller Type	.516 (.474)	.004			
Aggressive Stems					
Overall	.949 (.471)	.040	G x E	.105 (.746)	.001
Game Type	3.58 (.060)	.022	G x C	1.09 (.297)	.007
Expertise Type	1.17 (.280)	.007	E x C	.074 (.785)	.000
Controller Type	.519 (.472)	.003	G x E x C	.204 (.652)	.001
Positive Stems					
Overall	.979 (.448)	.041	G x E	1.99 (.160)	.012
Game Type	1.76 (.187)	.011	G x C	.024 (.877)	.000
Expertise Type	.234 (.630)	.001	E x C	.752 (.387)	.005
Controller Type	1.26 (.263)	.008	G x E x C	.569 (.452)	.004
BIF-G					
Overall	3.21 (.002)	.151	G x E	2.79 (.097)	.019
Score	4.48 (.036)	.030	G x C	1.79 (.183)	.012
Game Type	6.46 (.012)	.043	E x C	.063 (.801)	.000
Expertise Type	2.79 (.097)	.019	G x E x C	1.02 (.313)	.007
Controller Type	.004 (.949)	.000			

APPENDIX M

Primary Analysis for Study 1 with Gender Included

Means and Standard Deviations for Aggression Variables including gender.

	Direct		Indirect	
	Female	Male	Female	Male
	M (SD)	M (SD)	M (SD)	M (SD)
SHS				
Competitive	2.10 (.57)	2.21 (.75)	2.48 (.68)	2.21 (.66)
Cooperative	2.18 (.55)	1.93 (.64)	2.15 (.66)	1.65 (.25)
Agg. Stems				
Competitive	.192 (.08)	.171 (.06)	.199 (.07)	.167 (.03)
Cooperative	.174 (.05)	.150 (.04)	.184 (.06)	.181 (.05)
Pos. Stems				
Competitive	.078 (.03)	.093 (.03)	.090 (.04)	.093 (.04)
Cooperative	.109 (.04)	.099 (.04)	.085 (.04)	.090 (.04)
BIF-G				
Competitive	12.38 (4.77)	12.86 (2.96)	9.77 (4.04)	12.89 (3.30)
Cooperative	10.88 (3.92)	11.58 (3.23)	11.50 (3.46)	12.69 (3.64)

ANOVA Table for Primary Analysis including gender in Study 1.

IV	Test Statistic	Effect Size	Interaction Term	Test Statistic	Effect Size
	F (P value)	η_p^2		F (P value)	η_p^2
SHS					
Overall	3.57 (.001)	.171	GT x E	1.73 (.190)	.012
Score	8.35 (.004)	.057	GT x G	1.46 (.229)	.010
Game Type	4.20 (.042)	.000	E x G	1.71 (.193)	.012
Environment Type	.382 (.538)	.003	GT x E x G	.097 (.756)	.001
Gender	.434. (.276)	.009			
Aggressive Stems					
Overall	1.31 (.251)	.056	GT x E	.939 (.334)	.006
Game Type	1.03 (.310)	.007	GT x G	.429 (.514)	.003
Environment Type	1.23 (.269)	.008	E x G	.060 (.807)	.000
Gender	4.14 (.044)	.026	GT x E x G	.591 (.443)	.004
Positive Stems					
Overall	1.43 (.197)	.061	GT x E	3.17 (.077)	.020
Game Type	1.32 (.253)	.009	GT x G	.939 (.334)	.006
Environment Type	.716 (.399)	.005	E x G	.002 (.965)	.000
Gender	.224 (.637)	.001	GT x E x G	1.23 (.270)	.008
BIF-G					
Overall	2.34 (.022)	.120	GT x E	1.88 (.172)	.013
Score	6.14 (.014)	.043	GT x G	.609 (.437)	.004
Game Type	.768 (.382)	.006	E x G	1.07 (.303)	.008
Environment Type	.472 (.493)	.003	GT x E x G	.656 (.419)	.005
Gender	.645 (.423)	.005			