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**The Effect of Gender on Aggressive and Prosocial Behavior with Gaming
Technology**

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Trinity College
Fall 2013 – Spring 2014

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Abstract

The relationship between different types of video games and male and female adolescent behavior has been widely speculated in the recent past. Research has suggested that violent video games may increase aggressive behavior, and prosocial video games may enhance altruistic behavior (Willoughby, Adachi & Good, 2012; Greitemeyer, Osswald, & Brauer, 2010). Bartholow and Anderson (2002) suggested that men may be more influenced by violent video games than women. Interestingly, past research on prosocial video games has not found any gender differences (Gentile et al, 2009). The current study examined the effect of gender on aggressive and prosocial behavior in relation to gaming technology. Participants were given the Buss-Perry Aggression Questionnaire and Self-Report Altruism Scale and randomly assigned to one of the following three games: Monster Shooter 2: Back to Earth, Ants: Mission of Salvation or Super Monkey Ball 2. After playing the designated game, participants engaged in a Prisoner's Dilemma task in order to determine the game's influence on their competitive or cooperative behaviors. A total of forty undergraduate students at Trinity College participated in this research. It was hypothesized that students assigned to Monster Shooter 2: Back to Earth would display more aggressive behavior in the Prisoner's Dilemma task and students assigned to Ants: Mission of Salvation would exhibit more prosocial behavior in the task. I predicted that men would generally display more aggression than women in the Prisoner's Dilemma task, and specifically that men would be more aggressive than women after aggressive game exposure. Additionally, I predicted that there would be no gender difference after altruistic game exposure. Results indicated that exposure to one of the three games did not influence subsequent behavior. Moreover, regardless of game exposure, there were no significant gender differences in behavior in the task. Lastly, there were no significant gender differences in the aggressive game condition or the prosocial game condition.

Introduction

After the shooting at Sandy Hook Elementary School, perpetrator Adam Lanza was found to have in his possession a violent video game called “School Shooting.” In the game, the player is the main character that enters a school and murders children and teachers within a span of five minutes, before killing himself (Makuch, 2013). Lanza created a real-life version of this video game at Sandy Hook Elementary School. While it would be impossible to know if there is a direct correlation between Lanza’s possession of “School Shooting” and his subsequent actions, there is research to indicate that those involved with violent video games have displayed similar forms of aggressive tendencies. This suggests that aggressive video games may be related to a specific type of antisocial behavior, dangerous to adolescents and society as a whole (Anderson & Murphy, 2003).

Students involved in school shootings, such as the incidents in Bethel (AL), Jonesboro (AR), and Littleton (CO) all had a past of playing violent video games (Anderson & Murphy, 2003). The fact that these individuals had a close connection with violent video games left researchers to wonder if this entertainment medium may not be safe. Due to real world implications of violent gaming technology, research on the effect of video games on aggressive and prosocial behavior has become prevalent in the last decade.

The sphere of this research has been limited in two ways. First, research on this topic is more often conducted among populations of men than women. Due to the fact that violent incidents are commonly related to men, research has neglected to call attention to the area of gender differences within the realm of gaming technology. It is important to note that this may be an important area of study as there have been at least two documented cases of female shootings in the United States (Lovett, 2012). Laura L. Lovett wrote an essay for CNN explaining that these

incidents are often overlooked due to the singular fact that the perpetrators were women.

Although those cases were unrelated to gaming technology, it is critical to understand that both men and women have aggressive tendencies that need to be further explored. The percentage of women using gaming technology has risen significantly and women presently consist of forty-five percent of the entire gaming population in America (Entertainment Software Association, 2013). The second limitation of the current research is the issue that most of the research focuses on aggressive video games, while ignoring the potential positive effects of prosocial media.

While there is an ongoing debate about the negative effects of violent video games to the field of gaming technology as a whole, there are a significant number of video games genres that are nonviolent such as adventure, sports and strategy and we know very little about the consequences of playing these type of games. Additionally, many games are played with partners and have a cooperative aspect to them, which may produce positive rather than negative behavior. The present study aimed to fill in the gaps in the past research to provide insight about the effect of both aggressive and prosocial gaming technology on men and women in present day society.

Who Plays Video Games?

Michael D. Gallagher, president and CEO of the Entertainment Software Association stated, “No other sector has experienced the same explosive growth as the computer and video game industry” (Entertainment Software Association, 2013). As of 2013 in the United States, fifty-eight percent of Americans play video games, fifty-five percent of whom are male (Entertainment Software Association, 2013). The current study was conducted with games available on smartphones due to the fact that thirty-six percent of the gaming community engages in game-playing on the go (Entertainment Software Association, 2013). The social

aspect of gaming is important to take into account as sixty-two percent of gamers play with other people either in-person or online (Entertainment Software Association, 2013). Lastly, it is interesting to note that the current best-selling genres of video games include action, shooting and sport (Entertainment Software Association, 2013). These statistics are important to consider in a discussion about gaming technology, as the stereotypical view of gamers as aggressive and antisocial do not necessarily apply to the entire population.

Models of Aggressive and Prosocial Behavior

One of the most comprehensive and widely used models to explain aggressive and prosocial behavior in young boys and girls is social learning theory developed by Bandura (1977). Social learning theory explains the constant effect of cognitive, behavioral and environmental influences on an individual. The key component of this theory is the concept of modeling that depicts how children learn by imitating others in a given social environment. As children observe the actions of siblings, parents or teachers, they establish schemas regarding the ways in which to behave. Social learning theory is essential to consider when understanding gender differences in aggressive and prosocial behavior, as men and women develop differing knowledge schemas from one another, even though they may be raised in similar environments.

The general aggression model (GAM) can be considered a variant of social learning theory. This model was developed to explain the consequences of violent media on short and long-term aggression. The GAM suggests that we possess social knowledge structures that develop as we learn to recognize, interpret and react to our surroundings (Bushman & Anderson, 2002). These social knowledge structures have been shown to affect short-term aggression in the case of violent media, as exposure can repress positive affective and cognitive states, while increasing antagonistic states such as anger in the immediate moment (Bushman & Anderson, 2002).

Furthermore, the model claims that repeated exposure to aggression has the potential to create hostile knowledge structures that may become difficult to alter later in life. With the continual use and strengthening of these hostile knowledge structures, individuals may assimilate trait aggressiveness into their personality, causing a long-term change in dispositional characteristics (Bushman & Anderson, 2002; Anderson & Murphy, 2003). Television is a widely researched medium related to the GAM, as it has been linked to both short-term and long-term aggression. Findings indicate that those watching violent movies or television at an early age may demonstrate an immediate increase, along with an additive increase in the following years (Bushman & Anderson, 2002). If the theoretical basis of the GAM is correct, exposure to prosocial media should promote altruistic and helping behavior. Therefore, games in which characters support one another in nonviolent ways should increase both short-term and long-term prosocial behaviors. This concept is referred to as the general learning model (GLM), which is considered an extension to the GAM (Gentile et al, 2009). These models are relevant to the current research study, which focused on participants' short-term aggressive and prosocial behavior in response to playing different types of video games.

Aggression

Definition of Aggression

Aggression has been defined and categorized in a multitude of ways. A common definition for aggression is the intentional behavior of a person to harm another (Frieze & Li, 2010). This implies a potential linkage between aggression and physical violence. This association is easily assumed as there are a number of offenses including aggravated assault, murder and rape that are classified as aggressive and physically violent conduct (Frieze & Li, 2010). Additionally, we are continuously presented displays of aggressive violence by means of advertisements, television

shows and video games. Although aggression and violence are related in certain instances, it is incorrect to assume that the two concepts must go together, as aggression does not need to be violent. We see nonviolent aggression – such as relational aggression – regularly in interactions with family members, peers and teachers. Additionally, nonviolent aggression includes indirect aggression, which consists of behaviors such as gossiping, hostility or withdrawal. Indirect aggression is typically used in environments or situations where the aggressive individual does not feel comfortable outwardly expressing his or her negative thoughts, while direct aggression occurs in domains where the individual has no qualms about sharing his or her agitation (Frieze & Li, 2010).

Effect of Gender on Aggression

When discussing aggression in terms of gender, it is important to recognize that biological factors may help explain some aspects of the perceived gender differences between men and women in terms of behavior. Frieze & Li (2010) have speculated that boys learn and display aggressive behaviors due to specific hormonal changes that are different from those that girls experience. While the hormonal aspect of behavior is important to consider, the current study focused on the effect of the social environment on men and women's aggression. Campbell (1994) explained that gender schemas develop early on, due to the ways in which boys and girls are reared in gender-specific social environments. Due to this phenomenon, children are implicitly aware of their own sex by the age of two. Therefore, beginning as early as the toddler years, young boys and girls grow up attaching meanings to the notion of aggression that are different from the meanings attached by a child of the opposite gender (Campbell, 1994). Consequently, the way men and women understand and demonstrate aggression as adults varies greatly. Consistent with social learning theory, research has indicated that there are qualitative

rather than quantitative differences between male and female aggressive behaviors (Bjorkqvist, Osterman & Lagerspetz, 1994). In order to tease out these discrepancies, it is necessary to delve beneath the surface to understand the ways in which society has specific definitions of masculinity and femininity, and accordingly, separate expectations for men and women.

In a discussion of gender and aggression, it is important to point out the prevalent stereotype that exists in society: men are more aggressive than women. Signorella & Frieze (1989) conducted a study to understand the meaning college students derived from the words “masculinity” and “femininity,” asking students to give examples of their own masculine or feminine mannerisms. As expected, they found that both male and female students associated masculinity with aggression, while femininity was associated with nonassertive behaviors and weakness (Signorella & Frieze, 1989). This research, along with a myriad of additional studies, has indicated that men are typically viewed as more aggressive than women. Social learning theory and the general aggression model can help explain how men come to be associated more often with aggression than women.

In the culture we live in today, men’s aggressive behavior is encouraged due to the fact that media and the social environment glorifies it, displaying the trait as one that all men should possess in order to live up to group expectations (Campbell, 1994). When boys are young, they engage in behaviors such as hitting and pushing other male peers. Empirical data indicates that over seventy percent of the time, these actions provoke a peer response (Campbell, 1994). Young boys learn from these early experiences that aggressive behavior is a successful way to gain the attention of others, and often ends in possession of material rewards, which encourages them to repeat this behavior in the future. Aggression for men is a way to obtain control over others, a behavior that is learned through implicit societal messages. Because men grow up in

surroundings that reinforce this type of behavior, it is not surprising that they engage in direct aggression more often than women. Direct aggression is more explicit than indirect aggression, and includes fighting for possessions, competing with others and performing other types of activities that are related to power and strength (Campbell, 1994). Due to the fact that men are associated with the aggressive trait, they have the freedom to display it in public domains. In an array of sampled cultures, men have been involved in an aggressive act in public environments (e.g., sports bar) more often than women (Frieze & Li, 2010). This could be because women are not as comfortable displaying this behavior out in the community when it violates a strong gender norm (Frieze & Li, 2010). Domain is therefore an important variable to keep in mind when considering potential gender differences in aggression.

In contrast with men, women typically display relational aggression, which is similar to indirect aggression because it is more passive (Rhys & Bear, 1997). However, it does have parallels to direct aggression in that it has the same intent of weakening others. Bjorkqvist, Osterman & Lagerspetz (1994) lent support to this speculation in their research. Seven hundred male and female employees at a university in Finland were given a survey regarding aggression in the workplace, to see if the indirect aggressive behavior of young girls continued in adult life. They found that women continued to use this type of aggression, engaging in acts such as exclusion, gossip, and social manipulation more frequently than men did. By using this type of aggression, women were able to attack a person while remaining anonymous, keeping themselves safe from the dangers of being outwardly aggressive. The reason that women persist in displaying aggression in this way can be understood in the context of the GAM.

It is critical to recognize the societal expectations of women to understand the reason behind their use of indirect aggression. Throughout childhood and early adolescence, young girls tend to

model their behaviors after their mothers, who attempt to display little or no signs of overt aggression through censorship (Campbell, 1994). Because of this modeling, young girls disassociate femininity with overt aggression. Young boys, in contrast, move away from their mothers as role models through adolescence, and therefore look to others who may pose as models for aggression (Campbell, 1994). By the time girls have entered elementary school, they have already formed schemas about aggression. They have previously seen that explicitly aggressive women in fairytales are often cast in a negative light, such as evil stepmothers and witches who use their powers – or in other words, aggressive behavior – to conquer their rivals (Campbell, 1994). Next, as adolescents enter high school, subjects such as history and politics omit examples of female aggression. Adolescents learn narratives of male command and violent behavior.

Due to the unspoken subject of female aggression, many societal forces reinforce the idea that women are not permitted to be explicitly angry, powerful or violent (Campbell, 1994). White & Kowalski (1994) explain that the stereotype of men being more aggressive than women is incorrect, arguing that women's aggression simply occurs in interpersonal situations, with family members or significant others. Since society does not allow women to display aggressive qualities publicly, women tend to be more aggressive in private environments, such as at home and with close family and friends (Frieze & Li, 2010). This is an important factor to consider when designing empirical research, as we may assume that men receive and display more aggression than women simply because a woman's aggressive behavior likely occurs in locations out of the public eye. A supplementary problem related to the lack of exposure to aggression is that women have fewer opportunities to learn how to control their aggressive tendencies (White

& Humphrey, 1994). It is more difficult for women to learn suitable ways to use aggression and the ways in which to protect themselves from it.

Effect of Gender in Aggressive Video Games

To begin, it is important to understand the effect of aggressive video games on behavior without considering gender as a variable. Sheese & Graziano (2005) investigated the effect of video-game violence on participant's intentional decisions to act cooperatively or competitively in a Prisoner's Dilemma task. In the study, the researchers used a violent and non-violent version of the game "Doom." They anticipated that participants playing the violent version of "Doom" would be more competitive in the subsequent Prisoner's Dilemma task than those playing the non-violent version of "Doom." The study provided evidence that violent video games challenge and destabilize altruistic behavior, encouraging deliberate competitive behavior.

In the past decade, a number of empirical studies have been conducted on gender and gaming technology. Anderson & Dill (2000) conducted a two-part study to understand the short and long-term effects of violent video games on aggressive and reckless behavior of male and female college students. The first study was a longitudinal design that measured violent video game exposure over time, finding that male participants and those characterized as having aggressive personalities, were significantly affected by long-term exposure (Anderson & Dill, 2000). For those participants, violent video games and trait aggressiveness affected both aggressive and reckless behavior. In the second study, male and female college participants were randomly assigned to a violent or nonviolent game, which they played three times (Anderson & Dill, 2000). In order to test short-term aggression, the researchers engaged participants in a competitive reaction time task in which participants could deliver blasts of noise to their partners as punishment (Anderson & Dill, 2000). Interestingly, women were found to report more

hostility and deliver longer blasts than men after losing the game. Researchers hypothesized two reasons for this result. First, women did not enjoy playing the game, and were expressing their discontent through the aggressive task. Second, the setting affected aggression. Therefore, the issue of the effect of domain on male and female behavior arises once again (Anderson & Dill, 2000).

Anderson & Dill's (2000) research is one example of many empirical studies considering the relationship between gaming technology and gender. In the past, young women spent less time playing computer and video games. However, there now seems to be a shift in the number of females involved in the gaming world. The number of women interested in playing video games has greatly increased from the past (Anderson & Murphy, 2003). Anderson & Murphy (2003) studied the short-term effect of violent video game exposure on a population of undergraduate women. Participants were randomly assigned to play a violent video game, "Street Fighter," or a neutral game, "Lemmings." Following the game, participants engaged in a competitive reaction time task in which they delivered noise blasts to their opponents. Findings indicated that the violent video game caused significantly elevated aggressive behavior, as young women in the "Street Fighter" condition exposed their opponent to more noise blasts than those in the "Lemmings" condition (Anderson & Murphy, 2003). Empirical studies in which men are exposed to violent video games have provided similar evidence, indicating that this form of gaming technology has the potential to influence both men and women, suggesting that it is vital to include women as subjects in studies of video games and consequent behavior.

The implications of these numerous research findings are threefold. To begin, due to the increase in the number of female players in the gaming world, it is essential to include them in the study of behavior. The few studies of the female population have indicated a significant

short-term effect of this technology on behavior, and details of this finding need to be fleshed out in terms of potential gender differences. Next, it is important to have an approach to measuring aggression that encompasses the different ways that men and women may display it. The summarized studies were each designed very similarly, in which aggression and competitiveness was measured by administering a loud noise to the opponent. It is important to consider the empirical research that points out that men typically display direct aggression, while women generally display indirect aggression. With this in mind, the task measuring aggression in studies of gaming technology should be geared to measure both men and women's potential aggressive behavior. Lastly, it is necessary to consider domain and situation when testing men versus women, as environmental and societal cues influence and alter behavior. With the present research, it is difficult to postulate which environments may be ideal to study both male and female aggression. This topic may be a point of interest for future studies.

Prosocial Behavior

Definition of Prosocial Behavior

Prosocial thought and behavior is defined as empathic or helping behavior with the primary intent of benefiting others. It can be verbal or nonverbal, ranging from understanding another person's situation and consequent emotions and feelings, to a general display of care or concern for others (Frieze & Li, 2010). Concrete examples of prosocial thought include being aware and mindful of others in the surroundings, feeling and displaying sympathy for those in less fortunate circumstances, and/or being emotionally affected by traumatic events that may have affected others. People with these altruistic feelings display tenderness for others and are often described as loving, sensitive and soft-hearted (Frieze & Li, 2010).

The development of prosocial behavior is mediated by the dual effect of self-processes and social interactions with parents and peers. To begin, dispositional characteristics of children based on their nature are correlated with the progressive or regressive development of prosocial behavior (Hastings, Rubin & DeRose, 2005). As an addition to personality characteristics, there are self-processes associated with prosocial behavior such as the ability to take the perspective of others, compassion and moral reasoning (Wentzel, Filisetti & Looney, 2007). In terms of social interactions, quality relationships with parents, peers and teachers appear to impact empathic behavior. This is observed in social environments such as the classroom where children are taught skills from a young age, such as helping each other, sharing and taking turns (Wentzel, Filisetti, & Looney, 2007). When children fail to master these skills, teachers act as social influences, encouraging cooperation and explaining the importance of caring for others. Since only a few studies have focused on the moderating factor between self-processes and interactions with others, it is difficult to pinpoint which plays a greater role in the development of empathy (Wentzel, Filisetti, & Looney, 2007).

Effect of Gender on Prosocial Behavior

A prosocial individual is one who is able to perceive another individual's internal state, providing empathy for him or her. Hall & Matsumoto (2004) conducted a study where men and women were asked to judge emotions based on the facial expression prototypes presented to them in flashes. The stimuli included feelings such as anger, fear, and happiness. Women were found to be more accurate judges than men in choosing the correct emotion of the prototype. The study suggested that women's cognitive processing abilities are different from that of men in terms of recognizing and identifying nonverbal emotional stimuli correctly (Hall & Matsumoto, 2004). Miller, Perlman & Brehm (2007) criticized this study, labeling the task of identifying

facial expression prototypes as a “feminine prosocial task.” Hall & Mast (2008) therefore continued this research, designing an additional study on “feminine prosocial tasks” versus “masculine prosocial tasks.” Feminine tasks were defined as those involving emotions of other individuals and masculine tasks as those involving the power and status of other individuals. The results of this research indicated that although men did perform better with the male-stereotypic tasks, women still gave more accurate answers regardless of the type of task. This research suggested that women might be more aware of circumstances and situations in which to use empathy than men. A potential reasoning for this finding is socialization. Due to the ways girls are raised, they learn to respond to environmental stimuli differently than men.

From a young age, men and women are exposed to the traditional gender roles in society. These models indicate that men should be ambitious, assertive and self-confident, while women should be warm, caring and sensitive to other’s feelings (Hastings, Rubins & DeRose, 2005). The effects of this socialization are seen in college environments and general society. First, studies of university students have indicated that when given stereotypical descriptors, female roommates are perceived as more helpful and supportive than male roommates. However, these qualities produce a more drastic gender gap once students transition from the college environment to the working world. Women in college environments acknowledge “helping others” as a goal in their future career more often than men do. This becomes a perpetual cycle, as the way men and women are socialized simply reinforces the implicitly taught gender roles causing men to end up in higher-paying jobs associated with power (e.g., finance) and women in lower-paying positions related to empathic concern (e.g., social work). Secondly, outside of a college context, women have been observed to engage in more eye contact, smiling and friendly behavior in group settings than men, who are often more preoccupied with independent

responsibilities (Frieze & Li, 2010). Similar to aggressive behavior, it is important to take into account domain, and recognize that prosocial behavior occurs in public and private societal contexts.

Effect of Gender in Prosocial Video Games

The topic of gender in relation to prosocial video games has only begun to be the focus of research as most studies have concentrated in the effect of prosocial video games on general behavior. This is a difficult topic for researchers to delve into, as the number of released prosocial video games is considerably fewer than the number of released aggressive games. On this topic, Comedian Demetri Martin joked, “I like video games, but they’re really violent. I’d like to play a video game where you help the people who were shot in all the other games. It’d be called ‘Really Busy Hospital’ ” (Gentile et al, 2009, p.753).

In accordance with the GLM, recent research has found that prosocial video games have the ability to increase accessibility of prosocial thoughts. Gentile et al (2009) conducted three studies in separate countries and with different age participants. The first study, conducted with secondary school children in Singapore, determined that children spending a longer amount of time playing prosocial games displayed more prosocial behavior in a classroom environment. Their second study was longitudinal, assessing the effect of prosocial video games, three to four months after exposure. Results indicated a bidirectional association between altruistic gaming and behavior, causing an “upward spiral” for participants in contrast with the “downward spiral” seen by the effect of violent video games. The third study was an experimental design, testing short-term exposure of prosocial gaming technology on undergraduate college students. Once again, results supported prosocial video games influence on participant’s behavior. Each of the samples in Gentile et al’s (2009) study included male and female participants. However, only the

third study noted that participant sex had no significant effects on results. Gentile et al (2009) provided staggering evidence of a prominent effect of prosocial video games on behavior. Research, such as that by Greitemeyer, Osswald & Brauer (2010) has since supported Gentile et al's (2009) findings, indicating that there is more research to be conducted in this field. Therefore, a next step is to take into account gender differences in this phenomenon.

Implications of Research

The research presented generates complexity due to the number of potential influences involved in the study of gender and aggressive and prosocial behavior. Therefore, it is important to systematically study gender effects in aggressive and prosocial behavior. When studying the variable of gender, it is essential to take into account the socialization of men and women and to realize that behaviors may differ based on situation. Studies on the effect of prosocial video games on behavior are limited and more research needs to be done to better understand the implications of gender on behavior (Frieze & Li, 2010; Hastings, Rubin & DeRose, 2005). For that reason, it is necessary to add to the current research literature to understand if prosocial games have the potential to enhance cooperating and helping behavior in men and women. This investigation was beneficial for psychological research on behavior, as it aimed to discover if aggressive gaming technology should be an area of concern and if prosocial gaming technology should be used as a tool with which to improve behavior of individuals in present-day society.

Current Study

The present study tested whether exposure to aggressive or prosocial games influenced competitive and cooperative behavior differently for men and women. The aim was to find out if men and women differed in their self-reports of aggressive and prosocial behavior, and to measure behavior in a Prisoner's Dilemma task after exposure to different video games.

Hypotheses

I hypothesized that men would report higher mean scores in the Buss-Perry Aggression Scale than women; men would have higher scores in the subscales of anger, physical aggression and verbal aggression and women would have higher scores in the subscale of hostility (Frieze & Li, 2010; Anderson & Dill, 2010). Further, I predicted that women would report higher mean scores of prosocial behavior through the Self-Report Altruism scale than men (Hastings, Rubins & DeRose, 2005).

I hypothesized that participants assigned to the aggressive game would act more competitively in the Prisoner's Dilemma task, and participants assigned to the prosocial game would act more cooperatively in the task (Sheese & Graziano, 2005). Regardless of game exposure, I hypothesized that men would act more aggressively in the Prisoner's Dilemma task than women (Bartholow & Anderson, 2002). Lastly, in relation to game exposure, I predicted that men would be more aggressive than women after violent game exposure; I additionally predicted that there would be no gender difference after prosocial game exposure (Gentile et al, 2009).

Method

Participants

Participants in this study were undergraduate students from Trinity College in Hartford, Connecticut. The students ($N = 40$) were 37.5 percent male and 62.5 percent female. The procedure was conducted identically with each participant: One experimenter consistently explained the iPad games and the other experimenter demonstrated the Prisoner's Dilemma task. Each participant received an informed consent form prior to partaking in the study (see Appendix A).

Procedure

Session 1: Questionnaire

Prior to the game-playing part of the study, participants were sent a brief survey of demographic questions, video game use, and two self-report measures to assess aggressive and prosocial behavior.

Session 2: iPad Games in Laboratory and Prisoner's Dilemma Task

Participants were tested in pairs; participants were not familiar with each other. Participants were randomly assigned to one of the three games. After entering the room, participants were given a brief description of the game that they would be playing. The competitive game was "Monster Shooter 2: Back to Earth," the cooperative game was "Ants: Mission of Salvation," and the control was "Super Monkey Ball 2." The descriptions were as followed:

Monster Shooter 2

This game is called Monster Shooter 2: Back to Earth. In this game, you will be in control of your character by moving your finger around the blue circle on the bottom left-hand corner. You will be able to shoot by pressing down on the red circle on the bottom right-hand corner. The goal is to kill as many monsters as possible. If you are having trouble, please feel free to ask us any questions.

Ants: Mission of Salvation

This game is called Ants. In this game, you will tap an item along the bottom to help the ants get back home. Once you tap an item, it will turn red and stay activated until you choose another action. In early levels, certain items will be locked based off of what is necessary to help the ants. You may need to zoom in and zoom out in order to see the entire area that the ants are moving through. Remember that you can always restart a level by pressing the arrow in the upper middle part of the screen. If you are having trouble, please feel free to ask us any questions.

Super Monkey Ball 2

This game is called Super Monkey Ball 2. In this game, you need to tilt the screen to make the monkey reach the goal. To begin, orient yourself by looking at the bottom left hand corner and make sure the red dot is in the center of the axis. After each round, your actions will be replayed for you, and you can tap the screen to continue. Also, if you fall a certain number of times, the game may ask you if you want to continue. Please click yes until your time is up. If you are having trouble, please feel free to ask us any questions.

At the end of each description, participants were informed that the goal of the study was not to assess game-playing abilities to keep them from feeling unduly stress while playing.

Participants played the assigned game for ten minutes in separate rooms. After they finished, they were presented with a pay-off matrix and a diagram on which they would be able to flip over coins. They were read the following explanation for the final task:

For this task, you will be playing a game with a partner. We will explain the task to both of you out here and then you can go back into the room you were in for the previous game. We ask you not to speak to each other during this time.

This is a pay-off matrix. On the left side is the number of coins that you can choose to flip over, and on the top is the number of coins that your partner could flip over. You will flip over coins in factors of five, so you can flip over zero, five, ten, fifteen or twenty. In each square, the top triangle shows the number of points that you could gain, and the bottom triangle shows the number of points that your partner could gain. You do not know what your partner is going to flip over, so you will have to make that choice independently.

An easier way to understand this task is to think of the number of coins you are flipping over as the number of points you are giving your partner. For example, if you both choose to flip over twenty coins, you are each giving each other twenty points. If you both choose to flip over zero coins, neither of you are giving each other any points. If one of you chooses to flip over ten coins, and the other chooses to flip over twenty coins, the person who flips over twenty is giving the partner more than he/she is receiving.

You both will only play the game once. Whoever wins this game will have the chance to win a \$25 gift card. If you beat your partner, we will put two tickets with your name into the

lottery. If you tie with your partner, we will put in a ticket for each of you. If both of you get zero points, no one will be entered into the lottery.

Do you have any questions?

Then we are ready to begin. Once you have flipped over the number of you coins that you choose to, please wait quietly until we determine the score. We will give you two minutes to make your decision.

The Prisoner's Dilemma task was adapted from Pilisuk, Potter, Rapoport & Winter's (1965). The task was used to measure competitive and cooperative behavior. The meaning of the pay-off matrix was explained to participants (See Appendix B). The more coins participants flipped over, the more cooperative they were towards their partners. The fewer coins participants flipped over, the more competitive they were with their partners. Therefore, a score of 0 was the most aggressive move and a score of 20 was the most prosocial move. Before analyzing the results, the scores were recoded from 0, 5, 10, 15, and 20 to 1, 2, 3, 4, and 5 respectfully.

Measures

Demographic Information

Participants were asked general demographic questions about gender, year of graduation and cumulative GPA (See Appendix C).

Video Game Use

Participants were questioned about the amount of time spend playing video games, the type of games that they frequently play and the typical reason for engaging in game playing (See Appendix D).

Buss-Perry Aggression Questionnaire

The Buss-Perry Aggression Questionnaire was created by Buss & Perry (1992) to measure four dimensions of aggression: physical aggression, anger, hostility and verbal aggression. Participants reported how characteristic the items on the scale were of them. The survey consists

of twenty-nine items on a seven-point Likert scale ranging from “Extremely Uncharacteristic of Me” to “Extremely Characteristic of Me.” The sum of the scores is the value of total aggression and the sum of the subscales is the value for each subtype of aggression (See Appendix E). The Cronbach’s alpha for total aggression was 0.88; Physical aggression was 0.78, verbal aggression was 0.69, anger was 0.48 and hostility was 0.55.

Self-Report Altruism Scale

The Self-Report Altruism Scale was developed by Rushton, Chrisjohn & Fekken (1991) to assess the frequency in which participants engage in prosocial acts. The survey consists of twenty items on a five-point scale from “Never” to “Very Often.” The sum of the scores indicates the amount of prosocial behavior (See Appendix F). The Cronbach’s alpha for this is scale is 0.90.

Results

I conducted an independent sample T-test to compare aggression among men and women. There was no significant difference in the BPAQ scores for women, ($M = 73.16$, $SD = 23.03$) and men ($M = 86.13$, $SD = 21.58$) (See Figure 1). The BPAQ had four subscales: Physical aggression, verbal aggression, anger and hostility. I performed an additional independent sample T-test to compare the type of aggression commonly used among men and women (See Figure 2). For physical aggression, there was no significant difference in scores for women, ($M = 19.04$, $SD = 8.37$) and men ($M = 23.13$, $SD = 11.01$). As predicted for verbal aggression, there was a significant difference in scores for women ($M = 15.48$, $SD = 6.18$) and men ($M = 21.33$, $SD = 5.75$), indicating that men engaged in more verbally aggressive acts than women; $t(38) = 2.97$, $p = .005$. For anger, there was no significant difference between women ($M = 17.28$, $SD = 6.02$) and men ($M = 20.20$, $SD = 5.89$). For hostility, there was no significant difference between women ($M = 20.48$, $SD = 8.82$) and men ($M = 20.93$, $SD = 7.89$).

I conducted an independent sample T-test to compare altruistic behavior of men and women. There was no significant difference in the SRA scores for women ($M = 55.35$, $SD = 10.14$) and men ($M = 57.93$, $SD = 8.35$), indicating that men and women engaged in a similar number of prosocial acts (See Figure 3).

I performed a univariate ANOVA to test the hypotheses of the effect of game type and gender on behavior. There was no significant relationship between the game participants played and their behavior during the Prisoner's Dilemma task, $F(2,34) = 2.23$, ns , $MSw = 3.90$, $R^2 = 0.12$ (See Figure 4). This finding suggests that brief exposure to an aggressive or prosocial video game did not have any consequence on behavior. Overall, there were no significant gender differences in terms of behavior in the Prisoner's Dilemma task, $F(1,34) = 0.35$, ns , $MSw = 0.61$,

$R^2 = 0.01$, meaning that men and women performed similarly in the task (See Figure 5). Lastly, there was no significant interaction between gender and game type, $F(2,34) = 1.94$, *ns*, $MS_w = 3.40$, $R^2 = 0.10$, suggesting that there are no gender differences in behavior after exposure to the aggressive game or exposure to the prosocial game (See Figure 6).

Discussion

The current study did not find any significant effects for gender. The BPAQ was used to measure overall aggression. I hypothesized that men would report higher levels of aggressive behavior than women, as past research indicated that men are socialized towards more competitive behaviors than are women (Hastings, Rubin, & DeRose, 2005). Surprisingly, results indicated that there were no significant differences between men and women's self-reports of aggression. This is an interesting finding, as it shows that men and women do not differ vastly from one another in terms of aggressive tendencies.

Further, the BPAQ contained four subscales of specific types of aggression. These included physical aggression, verbal aggression, anger and hostility. Verbal aggression was the only subscale with a significant gender difference, with men reporting higher instances of the behavior than women. This correlates with the hypothesis, as verbal aggression is a type of direct aggression and past research has indicated that direct aggression is more often associated with men than with women (Campbell, 1994). Questions from the BPAQ illustrate this such as, "When people annoy me, I may tell them what I think of them" and "I tell my friends openly when I disagree with them." Due to the differential socialization of men and women, it is likely that men can engage in verbal aggression without feeling concern about the consequences of doing so.

The second scale used to measure gender differences was the Self-Report Altruism Scale (SRA). There were no significant differences in the reported answers of male and female participants. This was unexpected since past research indicated that women have more prosocial tendencies than men (Hall & Matsumoto, 2004; Hall & Mast, 2008). However, it is important to note that the scale specifically measured altruism. The terms "altruism" and "prosocial" have

slightly different definitions: Altruism is helping another person without expecting to receive anything in return, while prosocial behavior is a broader concept that encompasses altruism. This distinction is important to recognize because the SRA may have contained questions about characteristically altruistic behaviors rather than general prosocial behaviors. Prosocial tasks, such as identifying facial prototypes, are not necessarily altruistic (Hall & Matsumoto, 2004). Therefore, it is interesting to postulate whether the trait of altruism could be similar among men and women even if the all-inclusive category of prosocial behavior is more prevalent among women.

The results of the Prisoner's Dilemma task indicated that type of game – aggressive, prosocial, or neutral – did not have an effect on behavior on that task. Although this finding is not what I predicted, it does raise important questions for future research. In terms of aggressive video games in particular, Ferguson & Kilburn (2010) explained that there is not necessarily an association between violent video games and aggressive behavior, indicating that if one does exist, it is between violent video games and mild aggression rather than serious aggression. Even further, Ferguson & Kilburn (2010) stated a fact often overlooked by other studies: Over the span of the last two decades, the use of first-person shooter games has increased while youth violence has been dramatically decreasing. Due to the fact that research on prosocial games is limited, it is impossible to attain any current trends on the effect of these types of games.

Male and female participants were exposed to an aggressive, prosocial or neutral game, and then engaged in a Prisoner's Dilemma task. Findings indicated that across all three games, there was no significant difference between the scores of men and women. Further, there was no significant difference among men and women after aggressive game exposure or after prosocial game exposure. It is important to recognize, however, that there was a nonsignificant trend

among men in the prosocial game condition. After exposure to *Ants: Mission of Salvation* for ten minutes, men in the prosocial condition were more cooperative than men in other conditions.

Due to the fact that the numbers of participants in each of the conditions were very low, this was not a generalizable finding. However, it is worthy to note that even with such a small sample size, the beginning of a trend could have been possible. With additional participants, this trend could potentially suggest a correlation between prosocial video games and prosocial behavior in men.

Methodological Limitations

First and foremost, the most significant limitation of the study was the small sample size of college students. Considering that most of the students had taken psychology courses, it is very possible that many had learned about the Prisoner's Dilemma task ahead of time, and had already decided the best way to approach it. Therefore, in reality, the sample of participants may not have been random enough.

There were a number of methodological issues in the second part of the study. In Session 2, participants came to the laboratory to play the assigned video game for ten minutes. This length of time may have been too short for any strong effect to occur on behavior. Further, the games may not have been as influential as games used in previous studies. The chosen games had to be from the App Store, and therefore the selection was limited and the games were not ideal. Since the variable of gender was being tested, games with animals or non-human characters were used to control for potential confounding variables. Therefore, the aggressive game may not have been violent enough to elicit profound responses in college-aged students, as it involved monsters shooting other monsters. It did, however, have a warning at the beginning of the game, asking the player to indicate whether or not they are thirteen years of age, which may have been

due to the fact that the game contained bloody scenery when the player killed others.

Nevertheless, this game may be more of interest to younger children. College students may have responded differently if the game was more age appropriate, captivating and explicitly aggressive. Similarly, the prosocial video game may not have tapped into the player's helping tendencies as it simply involved ants making their way through the environment. This game was not very relatable for college students, and may have been a little monotonous to play.

One last issue that may have affected various aspects of the study was that the terms "prosocial" and "cooperative," and "aggressive" and "competitive" were used interchangeably throughout the study. This may have been a problem as cooperation is only a single dimension of prosocial behavior and competition is not necessarily aggressive. Therefore, it is important to recognize that the use of the Prisoner's Dilemma task may not have been ideal to measure aggressive and prosocial behavior, as it was designed to measure competitive and cooperative behavior. Additionally, Prisoner's Dilemma responses may simply have been a product of impulsivity or intelligence.

Future Research

It is recommended that future studies use a task other than the Prisoner's Dilemma to measure aggressive and prosocial behavior. It may be beneficial to design a task that firstly, accurately measures the broad aspects of these behaviors, and secondly is gender neutral and therefore applicable to both men and women's display of behaviors. Additionally, it is important to expose participants to games that are more often played in the real world. Although many engage in game-playing on their smartphones, there are still a wide number of individuals who play video games on computers or gaming systems. Future research may also consider testing prosocial behavior through games in which participants directly help one another, rather than

helping an animated character. This may have a stronger effect on the prosocial behaviors of participants.

Conclusions

While taking into account the methodological limitations of the study, I continue to urge rising seniors to take note of this research and to add to the current data set. It is challenging to understand the present results without a larger sample size.

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Figures

Figure 1. Effect of Gender on Aggressive Behavior

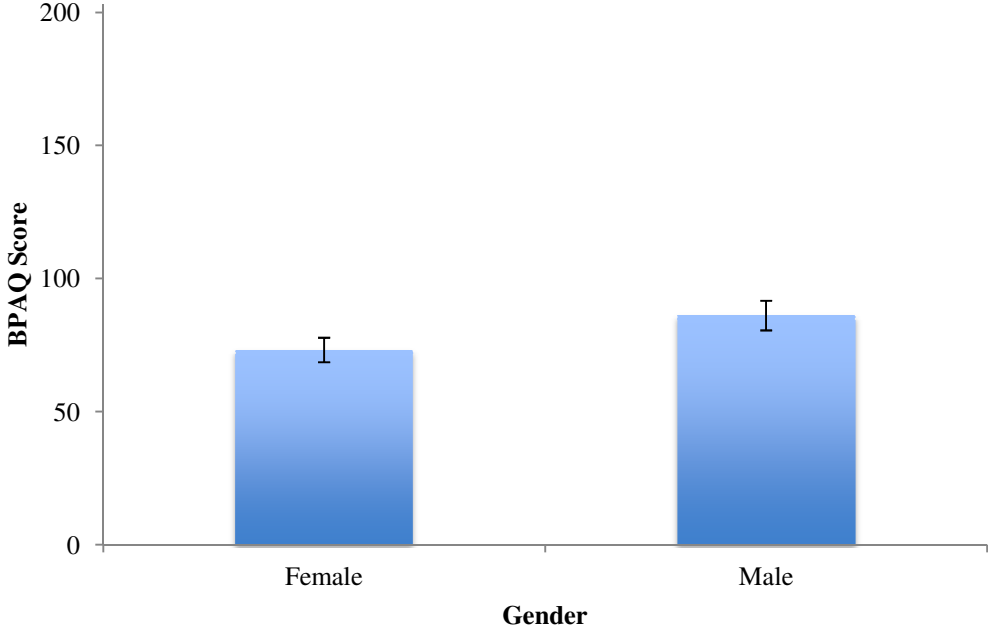


Figure 2. Effect of Gender on Aggressive Behavior (Subscales)

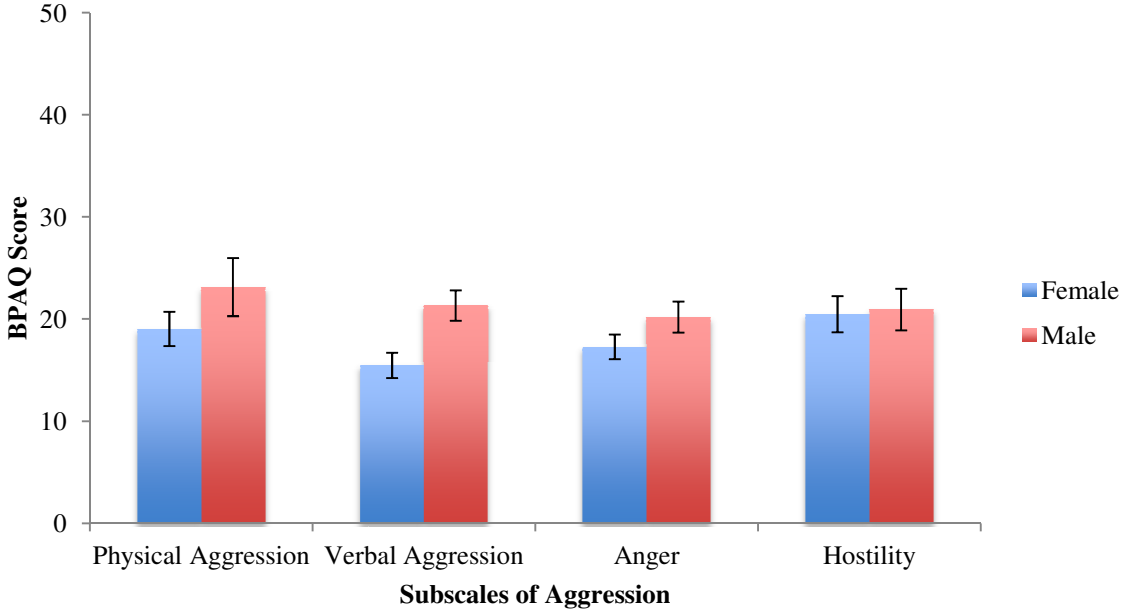


Figure 3. Effect of Gender on Prosocial Behavior

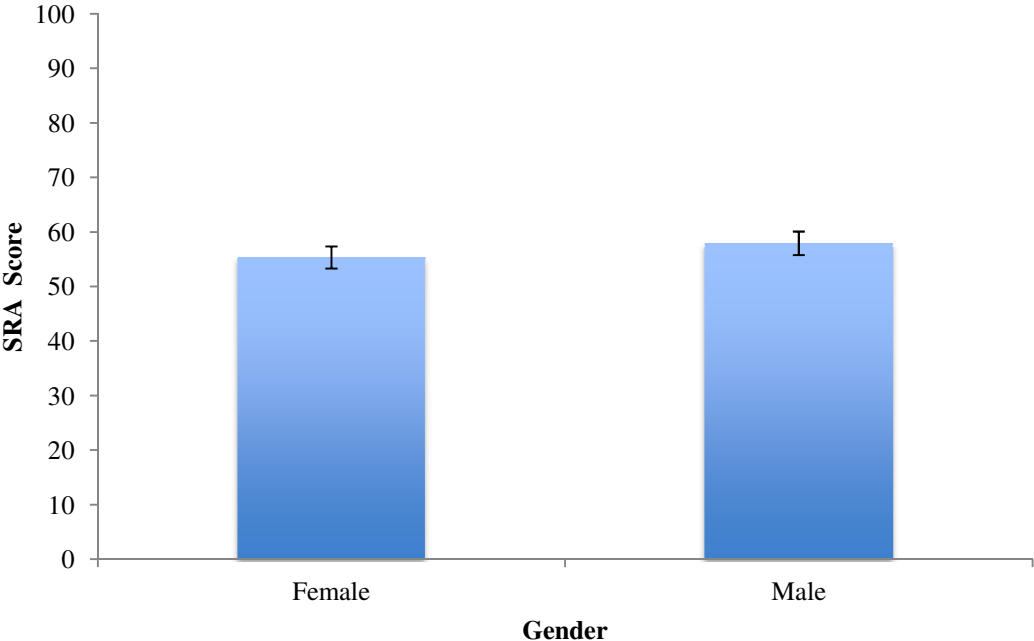


Figure 4. Main Effect of Game Type in Prisoner's Dilemma Task

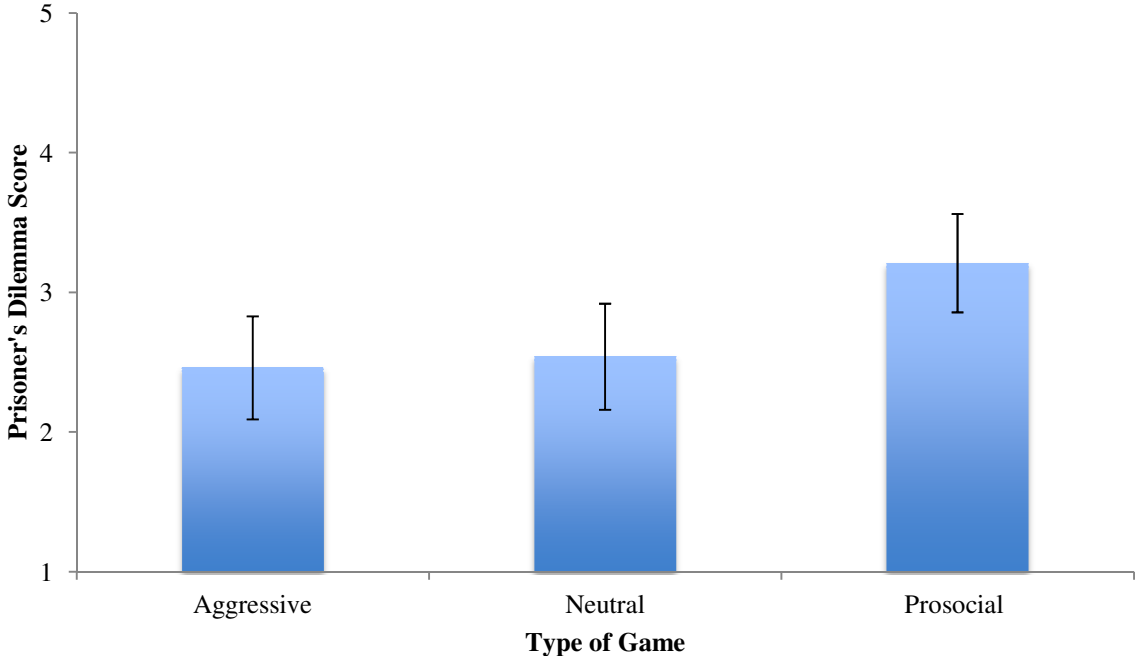


Figure 5. Main Effect of Gender in Prisoner's Dilemma Task

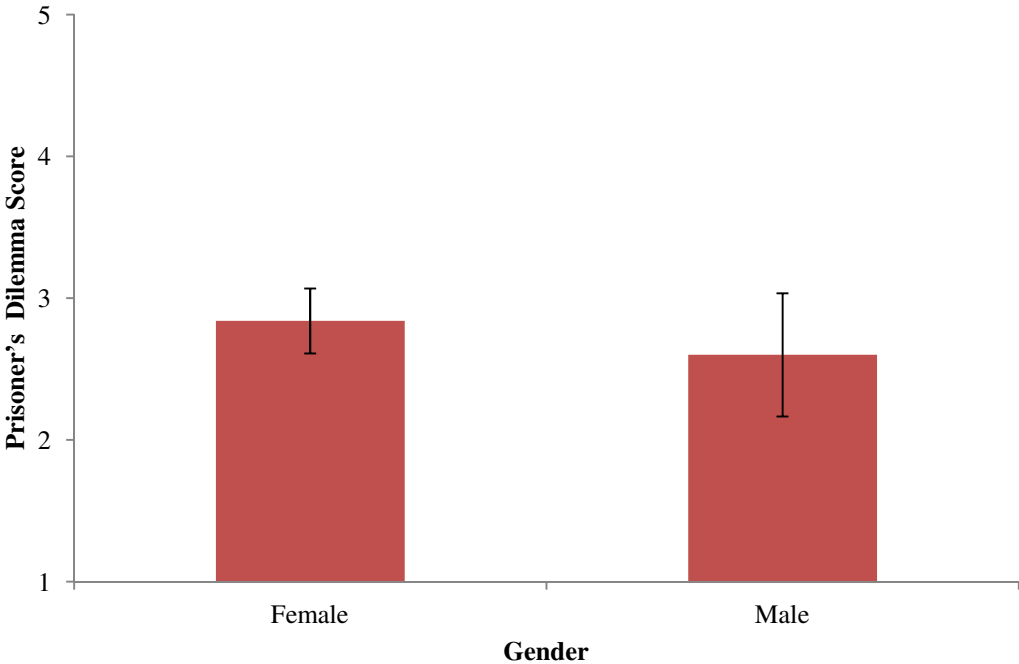
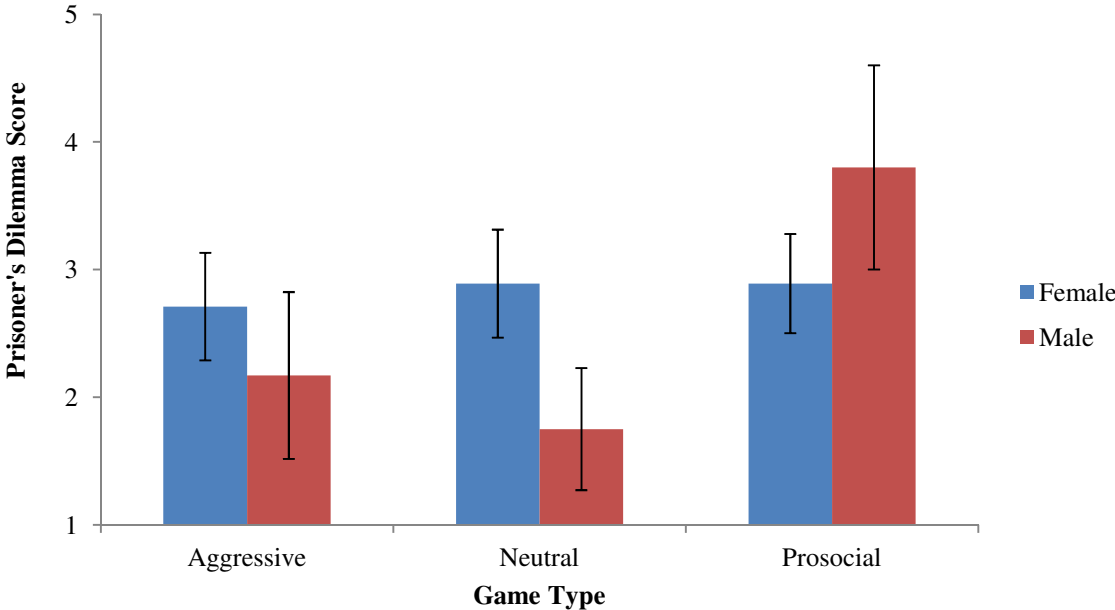


Figure 6. Interaction Effect of Gender and Game Type



Appendices

Appendix A

You are being asked to take part in a research study focusing on the effect of gaming technology on psychological phenomena. This study will be conducted by Valerie Scelsa and Nikita Singhal for their senior thesis at Trinity College. It will take forty-five minutes of your time over a span of two sessions. We will initially send out a questionnaire by e-mail with general questions, and then will ask you to come in for a session of thirty minutes to participate in game-playing on an iPad in the psychological laboratory. At that time you will play a game independently, and will be asked to participate in a short subsequent task.

You will be asked to share confidential information about yourself in the questionnaire. This information will only be seen by the principal investigators. As soon as possible, names will be coded and classified information will be kept in a strictly private area.

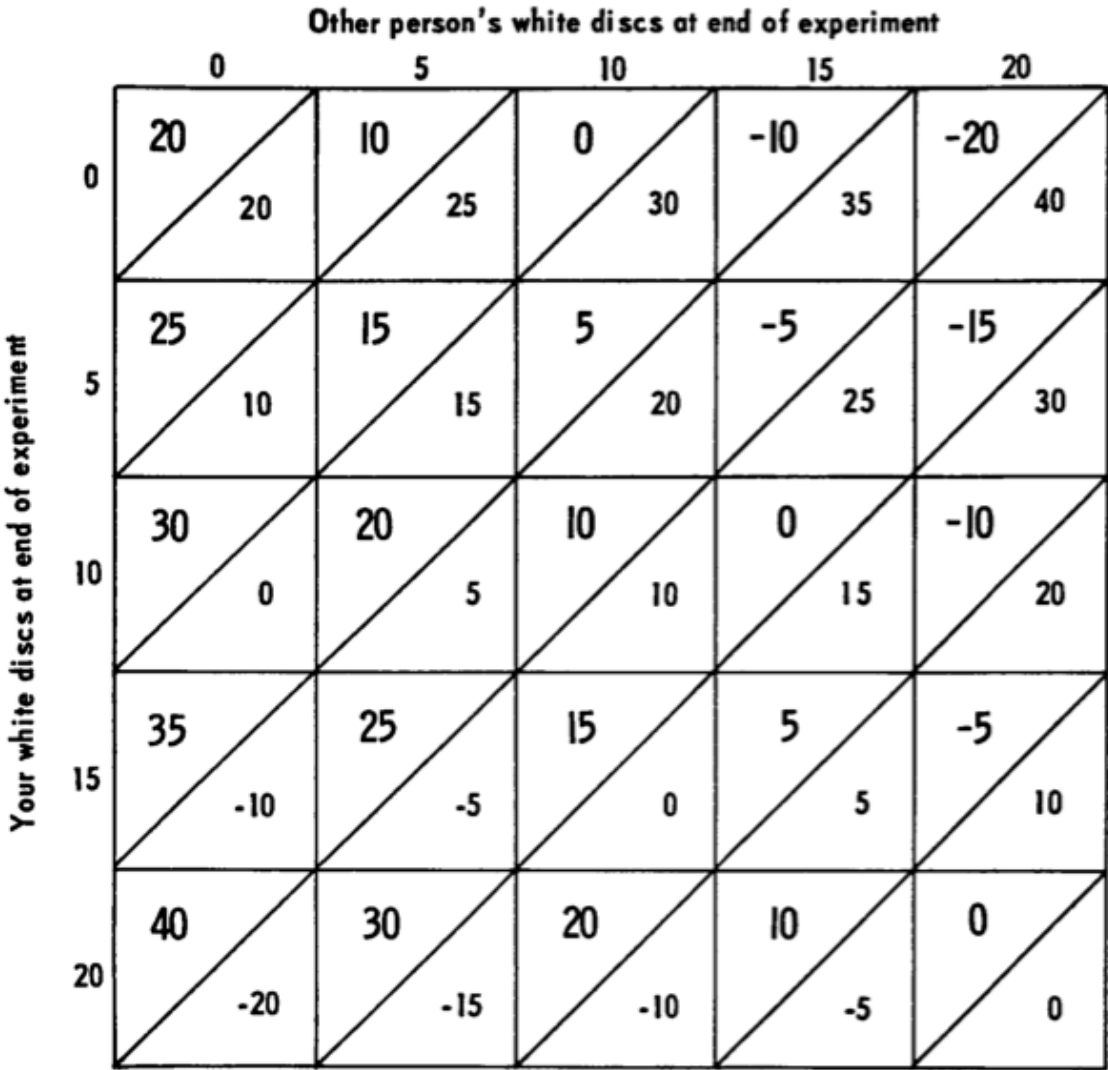
In the game-playing session, participants will be playing games on the iPad that may have uncomfortable imagery. If this does not suit you, you may approach the administrator and withdraw from the study.

Participation in this study is voluntary, thus all research participants have the right to withdraw at any time during the course of the study. Detailed rationale regarding the objective of the study will be given to you in the debriefing. At that time you will have the opportunity to learn about the research in depth, furthering your understanding in the field of psychology. For your time, you will potentially have the chance to be entered into a lottery to win a \$25 VISA gift card. Additionally, if you are taking General Psychology this semester, you may receive research credit for participating in this study.

If you have any questions or concerns, please contact Valerie Scelsa (Valerie.Scelsa@trincoll.edu) or Nikita Singhal (Nikita.Singhal@trincoll.edu)

This study has been approved by the Institutional Review Board at Trinity College.

Appendix B



Appendix C

Demographic Questions

Please indicate your gender.

Choice 1. Male

Choice 2. Female

Choice 3. Other

Please indicate the year you are expecting to graduate.

Choice 1. 2014

Choice 2. 2015

Choice 3. 2016

Choice 4. 2017

Please indicate your cumulative GPA.

Appendix D

Video Games Usage

How much time do you typically spend playing video games each week? (Including games on a gaming system, computer, smartphone or iPad)

Choice 1. 0-2 hours

Choice 2. 3-6 hours

Choice 3. 7-12 hours

Choice 4. 13 or more hours

What types of video games do you play? (You may choose more than one answer.)

Choice 1. Action

Choice 2. Adventure

Choice 3. Strategy

Choice 4. Sports

Choice 5. Other (please specify)

Please list three video games you play most often.

When did you start playing video games?

Choice 1. Elementary School

Choice 2. Middle School

Choice 3. High School

Choice 4. College

Why do you play video games? (You may choose more than one answer).

Choice 1. As a hobby

Choice 2. To pass time

Choice 3. To connect with other people

Choice 4. As an escape from problems/stress

Choice 5. Other (please specify)

Appendix E

Buss-Perry Aggression Questionnaire (BPAQ)

Instructions: Please rate each of the following items in terms of how characteristic they are of us. Use the following scale for answering these items:

Extremely uncharacteristic of me (1) – Extremely characteristic of me (7)

1. Once in a while I can't control the urge to strike another person.
2. Given enough provocation, I may hit another person.
3. If someone hits me, I hit back.
4. I get into fights a little more than the average person.
5. If I have to resort to violence to protect my rights, I will.
6. There are people who pushed me so far that we came to blows.
7. I can think of no good reason for ever hitting a person.
8. I have threatened people I know.
9. I have become so mad that I have broken things.
10. I tell my friends openly when I disagree with them.
11. I often find myself disagreeing with people.
12. When people annoy me, I may tell them what I think of them.
13. I can't help getting into arguments when people disagree with me.
14. My friends say that I am somewhat argumentative.
15. I flare up quickly but get over it quickly.
16. When frustrated, I let my irritation show.
17. I sometimes feel like a powder keg ready to explode.
18. I am an even-tempered person.
19. Some of my friends think I'm a hothead.
20. Sometimes I fly off the handle for no good reason.
21. I have trouble controlling my temper.
22. I am sometimes eaten up with jealousy.
23. At time I feel I have gotten a raw deal out of life.
24. Other people always seem to get the breaks.
25. I wonder why sometimes I feel so bitter about things.
26. I know that "friends" talk about me behind my back.
27. I am suspicious of overly friendly strangers.
28. I sometimes feel that people are laughing at me behind my back.
29. When people are especially nice, I wonder what they want.

Appendix F

Self-Report Altruism Scale (SRA)

Instructions: Please tick the category below that conforms to the frequency with which you have carried out the following acts.

	Never	Once	More than once	Often	Very often
1. I have helped push a stranger's car out of the snow.					
2. I have given directions to a stranger.					
3. I have made change for a stranger.					
4. I have given money to a charity.					
5. I have given money to a stranger who needed it (or asked me for it).					
6. I have donated goods or clothes to a charity.					
7. I have done volunteer work for a charity.					
8. I have donated blood.					
9. I have helped carry a stranger's belongings (books, parcels, etc.).					
10. I have delayed an elevator and held the door open for a stranger.					
11. I have allowed someone to go ahead of me in a lineup (at photocopy machine, in the supermarket).					
12. I have given a stranger a lift in my car.					
13. I have pointed out a clerk's error (in a bank, at the supermarket) in undercharging me for an item.					
14. I have let a neighbor whom I didn't know too					

well borrow an item of some value to me (e.g., a dish, tools, etc.)					
15. I have bought 'charity' Christmas cards deliberately because I knew it was a good cause.					
16. I have helped a classmate who I did not know that well with a homework assignment when my knowledge was greater than his or hers.					
17. I have before being asked, voluntarily looked after a neighbor's pets or children without being paid for it.					
18. I have offered to help a handicapped or elderly stranger across a street.					
19. I have offered my seat on a bus or train to a stranger who was standing.					
20. I have helped an acquaintance to move households.					