



Theses and Dissertations

2011-07-11

Videogames and Friendships: Contextual Factors That Influence the Willingness to Aggress Following the Playing of a Violent Videogame

Jonathan Charles Edwin Rogers
Brigham Young University - Provo

Follow this and additional works at: <https://scholarsarchive.byu.edu/etd>



Part of the [Psychology Commons](#)

BYU ScholarsArchive Citation

Rogers, Jonathan Charles Edwin, "Videogames and Friendships: Contextual Factors That Influence the Willingness to Aggress Following the Playing of a Violent Videogame" (2011). *Theses and Dissertations*. 2805.

<https://scholarsarchive.byu.edu/etd/2805>

This Thesis is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.

Videogames and Friendships: Contextual Factors That Influence the Willingness to Aggress

Following the Playing of a Violent Videogame

Jonathan C. E. Rogers

A thesis submitted to the faculty of
Brigham Young University
in partial fulfilment of the requirements for the degree of

Master of Science

Robert Ridge, Chair
Sam Hardy
Dee Higley

Department of Psychology

Brigham Young University

August 2011

Copyright © Jonathan Rogers

All Rights Reserved

ABSTRACT

Videogames and Friendships: Contextual Factors That Influence the Willingness to Aggress Following the Playing of a Violent Videogame

Jonathan C. E. Rogers
Department of Psychology, BYU
Master of Science

Participants ($N = 73$) in the present research were assigned to play a violent videogame (*Super Smash Brothers*) with either a supportive or an ambivalent friend. Orthogonal to this manipulation, participants were assigned to play the game either competitively or cooperatively. Subsequent aggression toward their friend was assessed by measuring participants' competitive or cooperative behavior in a Prisoner's Dilemma game. Results revealed no differences in aggression as a function of friendship type or game strategy, although means were in predicted directions. The influence of context on exposure to violent media is discussed, as are issues of power and sample type as possible reasons for the nonsignificant findings.

Keywords: videogame, prisoner's dilemma, aggression

TABLE OF CONTENTS

Abstract.....	ii
Hypotheses.....	10
Method.....	12
Participants.....	12
Protocol.....	12
Experimental Design.....	13
Videogame	14
Conditions	16
Measures and procedure	17
Social Relationships Index (SRI).....	18
Prisoner's Dilemma	19
Statistical Analyses	20
Results.....	21
Discussion.....	24
References.....	30
Appendices.....	38
Appendix A: Dialogue and Research Assistant Protocol.....	38
Appendix B: Questionnaires	42
Social Relationships Index.....	50
Prisoner's Dilemma:	55
Appendix C: Consent and Debrief forms.....	57

Videogames and Friendships: Contextual Factors That Influence the Willingness to Aggress Following the Playing of a Violent Videogame

According to a recent Kaiser Family Foundation (2010) report, on any given day, approximately 60% of adolescents report playing videogames. About half of this game play involves playing on a console (e.g., Xbox, Wii, PS3). The amount of time that adolescents spend playing videogames has almost tripled in the last five years. Boys report spending substantially more time playing videogames than girls, especially on a console. Given these statistics, it is no surprise that the past few years have seen an explosion in videogame research. Videogame research, for example, might actually be a better agent in helping reduce negative behavior, such as societal aggression in adolescents, than television (Loftus & Loftus, 1983) because videogames with social themes expose the player to modelling, reinforcement and rehearsal of the theme where television does not (Chambers & Ascione, 2001; Barton, 1981).

According to Stone and Gentile (2008), there are five dimensions of videogames that researchers should examine. These are time, content, formal features, context, and mechanics. “Time” refers to the amount of time spent playing the game, whereas “content” is the specific content of the game (e.g., a war theme videogame where the player is a soldier killing the enemy). The “formal features” refers to specific attributes of the game that may influence responding (e.g., whether the game is first person or third person shooter). “Context” involves where the game is played, how it is played and who the game is played with. Finally, “mechanics” refers to the specific mechanics of the game, often involving the hand held devices. According to Stone and Gentile (2008), an understanding of all five dimensions is paramount in determining the true effects of playing videogames.

Most research has focused on the first two aspects, namely time and content. Several studies find that time spent playing videogames is associated with poorer achievement in

school. Other research has shown that videogame addiction (representing extreme time) is associated with a host of negative behaviours, including delinquency (Gentile, 2009). Still other research has focused on the content of videogames and reveals that the effects often correspond to the content of the game. For example, playing violent games often leads to increased short-term subsequent hostile or violent behavior as measured by the Multiple Affect Adjective Checklist (Anderson, 2004), playing prosocial or cooperatively themed games increases prosocial behavior (Chambers and Ascione, 2001; Gentile, et al., 2009) and playing educational games increases scholastic achievement (Murphy, Penuel, Means, Korbak, & Whaley, 2001). There might be little concern about the effects of playing video games if they were all equally popular and played equally often. But such is not the case. More than half of all videogames sold contain some level of violent content, and 98% of all teen rated videogames contain violence (Entertainment Software Association Report, 2008; Haninger, Ryan & Thompson, 2004; Haninger & Thompson, 2004; Thompson & Haninger, 2001). These data suggest that it is not the educational, cooperative games that are being played or that are the most or most favored among gamers (Anderson 2000; Bushman & Anderson, 2001; Buchman & Funk, 1996; Dietz, 1998; Weber, Ritterfield & Kostygina, 2009;).

Nevertheless, it is not uncommon for gamers, nor industry professionals, to claim that violent videogames do not affect people adversely (Anderson & Bushman, 2001; Delamere, 2004). For example, a common refrain is that playing violent videogames is a social activity that is carried out among one's friends and serves as a bonding experience. For the gamer, the chance to play with one's friends is a chance to become closer and share an enjoyable experience, and there may be some truth to this. Research has shown that engagement in shared activities is one way that friendships are created and maintained (Steinberg, 2007) and that adolescent boys specifically report that playing videogames are an important part of their

friendships (Way, 2004). Ravaja et al. (2006) found that playing videogames with a friend increased arousal and positive affect. This research suggests that playing videogames with friends may encourage bonding and increase levels of intimacy within a friendship. But the research on this videogame context factor is not uniformly positive, but rather mixed.

For example, in a month long study of different types of videogames and their effects on health, academic achievement and socialization, Smyth (2007) found that people who played massively multiplayer online role-playing style videogames (MMORPGs) as part of a team reported greater acquisition of friends due to the cooperative type of game play, but also reported more problems with real life socialization. Eastin (2007) found that individuals who were assigned to play MMOPRGs in large groups reported more postgame hostility as measured by the State Hostility Scale (Anderson, Deuser, & DeNeve, 1995) compared to playing single-player videogames. Yet other research found that when teams played cooperatively for a common goal, group cohesion increased (Anderson, 2010). What is interesting about this research is that Halo-3 (a well-known violent shooting videogame) was used as the means to build team cohesion. This increased cohesion served to reduce competition between intra-team members and raise the level of willingness to stick together and act cooperatively. Thus, the context factor of playing with other gamers merits further scrutiny, as interesting questions emerge from the research.

For example, it is well known that exposure to violent videogames can increase aggressive behavior (Anderson et al., 2004; Anderson, 2004). But it is also known that cooperative games can increase prosocial behavior (Gentile, et al., 2009; Chambers and Ascione, 2001). Is it possible that playing a violent videogame cooperatively with another person could produce a reduction in subsequent aggressive behavior that would be expected if the players were engaged in the same activity competitively? In other words, if two players combined forces in a violent videogame to defeat a common enemy, would the cooperative

element of the game temper any aggressive tendencies that might be aroused by exposure to the violence? Would any subsequent aggression be less than if the players had played against, rather than with, each other? To my knowledge, this question has been only indirectly addressed.

Anderson and Morrow (1995) placed 60 undergraduate (30 male) students into participant dyads to assess aggression *during* (as opposed to after) the playing of a videogame in a cooperative or competitive context. The videogame selected was *Super Smash Brothers*, a classic Nintendo videogame in which the objective is to complete the game level by moving across the screen avoiding or killing cute, but deadly, onscreen characters and moving objects. Participant dyads played a single-player mode of the game on separate screens and were separated by a partition for the duration of the videogame play. In the competitive condition, participants were told their individual scores would be pitted against each other and so to win they needed to beat their partner's score. In the cooperative condition, participants were instructed that their scores would be added together for an overall total. Results showed that those placed in a competitive condition killed a significantly higher number of characters than in a cooperative condition. According to Anderson and Morrow (1995), participants had viewed their videogame play more competitively than those placed in the cooperative condition with a 66% kill ratio compared to 41% respectively. The number of kills in each condition was used as the primary measure of aggression during videogame play.

The results of this study suggest that lower levels of aggression may be associated with playing a violent video game if there is a cooperative element in the game. But a more direct test is required to assess aggression following the playing of a violent videogame. Moreover, it is important to have players actually playing together side-to-side in the game. With recent technological advances individuals can play with up to four "real life" people in

a room, and thousands more online (Schiessel, 2005). The image of the solitary game player is disappearing. Therefore, one purpose of this research is to investigate the contextual effect of having videogame players play a violent videogame either cooperatively (together facing a common enemy) or competitively (against each other in a free for all format) in a side-to-side format to see how this affects their subsequent levels of aggression.

This will be done in the following ways: Firstly, participants will be in the same room for the duration of the experiment in each condition rather than being separated by a partition as with Anderson and Morrow's (1995) research. Secondly, participants will play the videogame together as a team in the cooperative condition rather than singly, and play against each other and the computer in the competitive condition rather than in isolation against the computer only. In this way, participants will be able to truly play the videogame together in a cooperative manner and play in a competitive manner against their friend. Thirdly, this study will assess aggression as a behavioral outcome by assessing post-game aggression. Thus, all else being equal, research suggests that cooperating with another person decreases one's willingness to aggress when provoked compared to participants competing against each other. A reasonable hypothesis based on this research would be that it is likely that two people playing violent videogames in a cooperative condition decreases the willingness to aggress when provoked.

The second factor to be assessed as part of this study is friendship type. Does friendship type alter willingness to aggress? Eaton and Struthers (2006) suggest that aggression, when provoked, might be lower as a function of forgiveness, in that close friends exhibit empathetic responses when provoked rather than aggressive ones. But what if the people involved aren't particularly close friends? What does videogame and wider research tell us about the effects of friendships? Could friendship type, such as supportive versus

ambivalent friendships, alter the willingness to aggress when provoked following the playing of violent videogames?

Williams and Clippinger (2002) found that aggression actually decreased if friendly conversations formed part of the videogame playing between two participants in the same room compared to individual participants playing the videogame in isolation against the computer. The humanizing of the situation through friendly conversation worked to reduce the aggression that was present in the isolation condition. Interestingly, all participants in this study were strangers. What would have been the outcome if participants knew each other as friends?

Ravaja et al. (2006) found that playing videogames with a friend, as opposed to a stranger, increased arousal and positive affect. Interestingly, they also found that anticipated threat was greater when playing a stranger as opposed to a friend. Now, while these findings with a friend/stranger dichotomy provide valuable insight into how a person reacts to a friend versus a complete stranger when playing videogames, the same outcomes may not be true when assessing different *types* of friends such as supportive or ambivalent friends. Ravaja et al., (2006) failed to address this question, which is a notable limitation in this study. Furthermore, Ravaja et al. (2006) failed to address whether their findings were associated with behavioral outcomes, such as increased competition (a measure of aggression). These important questions will be addressed in the present study.

Colwell and Kato (2005) state that many individuals play videogames with different types of friends, such as good (supportive) friends, and not so good (ambivalent) friends. Is anticipated threat or willingness to aggress greater when playing an ambivalent friend as opposed to a supportive friend? According to Fiske (2010), anticipating threat can result in impulsive aggressive reactions when provoked. Though research has found that playing against a stranger versus a friend leads to different affective outcomes, such as greater

anticipated threat and therefore a higher likelihood of an aggressive response when provoked, the type of friendship between players of videogames is under researched. Based on findings from the current literature, it appears that the friendship type is one variable that should be explored more fully.

Engagement in shared activities is one way that friendships are created and maintained (Steinberg, 2007). Indeed, research has found that adolescent boys specifically report that playing videogames are an important part of boys' friendships (Way, 2004). Accordingly, playing videogames with friends may encourage bonding and increase levels of intimacy within a friendship, and so it would appear that in these instances, willingness to aggress may actually decrease. Thus, one major aim of this study is to examine the effects of playing videogames on aggression between different types of friends. Existing wider research into friendships (how they should be categorized and in what types of friendship willingness to aggress is to be expected), may help predict an expected outcome to my second question of this study.

Behavior towards others, particularly relating to aggression, may depend upon the type of friendship that exists. Colwell and Kato (2005) state that individuals play videogames with different types of friends, but placing individuals on a "friend/not friend" dimension may not provide the best measurement of friendships. Indeed, this has been largely overlooked as a contextual factor in existing videogame research. Traditionally, friendships have been placed upon a positive-negative scale, but research shows that friendships can have both positive *and* negative aspects at the same time. Not only this, but the different positive and negative aspects of the friendship are statistically independent of each other and therefore should not co-exist on a single continuum (Finch, Okun, Barrera, & Zautra, 1989; Okun, Melichar, & Hill, 1990; Uchino, Holt-Lunstad, Smith, & Bloor, 2004). An example of this might be a friendship between two co-workers of equal status. They may work well together,

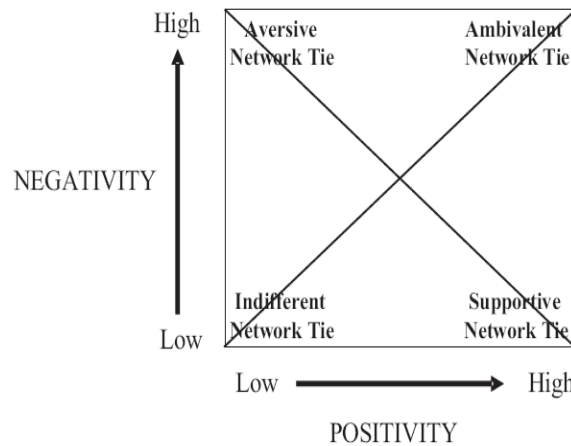
but it doesn't mean they associate outside of the work place. They may confide in each other about individual work-based issues, but not about team goals because one views the other as overly critical of their input to team activities. Conceptualizing relationships, such as friendships, therefore, should also include the possibility of co-existing positive and negative aspects.

Friendship may be defined as a relationship holding a shared history, strengthened by positive attachment, where each individual enjoys well being with a motivation to behave positively toward the other (McCullough, Worthington, & Rachal, 1997). Research shows that the occurrence of destructive behaviour by one partner can alter this sense of wellbeing (Gottman, 1994). If there are sufficient negative occurrences, motivation to behave positively toward the other can decrease. Even friendships where the initial response to offence is to be forgiving and constructive can change to a response of retaliation against the offending partner if repeated occurrences are salient (McCullough, Worthington, & Rachal, 1997). Is there a theoretical framework that can better categorize friendships than what has traditionally been used in videogame research? And can that framework help predict what type of friendship increases or decreases the willingness to aggress when provoked?

Uchino, Holt-Lunstad, Uno, and Flinders, (2001) developed a model of social relationships that can be applied to friendships. The Social Relationships Index, or SRI, introduces two new relational categories to the positive-negative typology to help better understand network ties between individuals. These new categories allow the joint study of both positive and negative aspects of a relationship (see Figure 1 below). The high positivity, low negativity quadrant is labelled as a positive or *supportive* relationship; high negativity, low positivity is as an *aversive* relationship. The two new types are categorized within the model as *ambivalent* relationships and *indifferent* relationships. Those exhibiting both high positivity and high negativity, such as the co-worker example given above, would fall into the

ambivalent category and those where people have neither good nor bad ties are labelled as relationships with feelings of indifference. It is the supportive and ambivalent friendship types that are of interest in this study.

Figure 1 –SRI categories



Uchino et al. (2004) report that people have almost the same number of ambivalent relationships as they do supportive ones, with a typical person having on average 9.40 supportive relationships to 9.39 ambivalent ones. These new categories are important when measuring behavior within a friendship because individuals can act differently with one friend compared to another. Though high in positivity, do the negative aspects of an ambivalent friendship produce an increased readiness to aggress following the playing of a violent videogame that would not emerge in a supportive friendship? What does the research into friendships show?

There is extensive research into why people in any kind of relationship behave prosocially or antisocially. Research shows that friendships between people with similar attitudes, between people from in-groups versus out-groups, and whether a person is liked versus disliked alter how one reacts when provoked (Berkowitz & Holmes, 1960; Byrne, 1971; ; Judd & Park, 1988; Marcus-Newhall, Lange & Verhallen, 1978; Pederson, Carlson, & Miller, 2000; Pederson et al. 2008;;; Rogers, 1983). In a study by Pederson et al. (2008) three experiments were carried out to test the influence of being in an in-group or an out-group,

being liked or disliked and having similar or dissimilar attitudes on aggression. In Experiments 1 and 2, answers to short essays were used to group participants with similar versus dissimilar attitudes and in-group versus out-group status before administering various provoking tasks followed by retaliation/noise-shock test measures. In Experiment 1, it was found that similar attitudes reduced the level of aggression between provoked individuals. In Experiment 2, it was found that out-group members were more likely to be aggressed against when they provoked subjects (especially in a competitive situation). Experiment 3 replicated most aspects of Experiments 1 and 2, with an additional personality inventory measure to help decipher whether the other person was either liked by participants, disliked, or whether participants had neutral feelings toward the person. Results showed that simply disliking a person increased aggression when subjects were provoked by that person. These findings build upon the research by Uchino et al. (2001) demonstrating that the type of friendship is important when considering the level of aggressive response when provoked. It appears that aggression decreases as a relationship approaches supportive status.

In sum, it is evident from the research that the type of friendship affects one's willingness to aggress when provoked and that this has not been fully researched as it relates to videogame media. The aim of the current study is to bridge this gap and assess whether the willingness to aggress following the playing of a violent videogame differs if friends are placed in a cooperative versus a competitive condition. This study also aims to assess whether the willingness to aggress following the playing of a violent videogame differs between supportive versus ambivalent friends.

Hypotheses

1. *It is hypothesized that individuals who play a violent videogame will exhibit less aggression towards their partner if playing the videogame cooperatively as a*

team versus playing the same videogame competitively against their partner and against the computer.

2. *It is hypothesized that individuals playing a violent videogame with a close or supportive friend will exhibit less aggression toward their friend after playing the videogame than if they play the same game with an ambivalent friend.*

From the research and theory, it is anticipated that there will be an interaction effect between how one plays the videogame (cooperatively versus competitively), and whom the videogame is played with (supportive friend versus ambivalent friend). It is likely that willingness to aggress will be at its lowest between supportive friends in the cooperative condition, and highest between ambivalent friends in the competitive condition. Willingness to aggress between supportive friends in the competitive condition, and ambivalent friends in the cooperative condition, therefore, should yield quite similar results. Thus a final hypothesis will be to assess this anticipated interaction.

3. *It is hypothesized that there will be an interaction between the videogame play condition and the type of friend with whom it is played. Willingness to aggress will be lowest between supportive friends in the cooperative condition and highest between ambivalent friends in competitive condition.*

In sum, this study adds to the research literature in a number of important ways. Firstly, it is focusing on videogaming in the under researched area of videogame context, specifically that of being in the cooperative versus competitive contexts. Secondly, it is examining whether the type of friendship, namely supportive versus ambivalent friendships, alters the willingness to aggress when provoked.

Method

Participants

Participants were 73 (25 female) undergraduate students attending Brigham Young University (BYU; $M_{\text{age}} = 20$ years, $SD = 2.22$). The primary source of recruiting was conducted through the use of the SONA subject management system in the Department of Psychology. Recruits were from introductory psychology classes who were asked to bring a friend (of their choice and of the same gender) to join them in participation for the study. Incentives were be twofold: 1) to receive extra credit in their classes and 2) to earn up to \$15 each for their time. There were no other incentives offered for participation.

Protocol. Participants began a portion of the study by completing a number of questionnaires online approximately one week prior to the lab portion. Participants were initially told they were taking part in a study on how personality influences behavior in group settings, such as with playing videogames, and how friends feel about each other with such activities. This was the cover story for the duration of the study until participants were debriefed at completion of the final lab portion. Pre-study questionnaires included the Social Relationships Index (SRI) (Uchino et al., 2001), several friendship stability measures (Crick & Nelson, 2002; Richardson & Green, 2003) and a personality measure (IPIP: Goldberg, 1999) as addendums in keeping with the cover story, but only the SRI was of primary importance for this study. The questionnaires also consisted of a thorough videogaming history, which included how often participants played videogames alone, with friends and what type of games they played most often.

Upon arrival to the lab portion of the study involving the playing of the videogame and the Prisoner's Dilemma, participants were greeted by two research assistants following a specific dialogue at the scheduled time and location. Each dyad was given the same welcome as follows:

“Are you here for the study? What is your name? Is this the friend you said would be participating in this study with you? Have you and your friend completed all of the prestudy questions?”

Participants had to answer ‘yes’ to each of these questions in order to participate in the videogame portion of the study.

Following this introduction, the dialogue changed dependent on which condition participants were assigned to (for the full dialogue by condition, see Appendix A). The research assistants then took each participant to the same room where the videogame was set up and presented the dyad with a set of videogame instructions. Participants were allowed 15 minutes to play with five minutes prior to the 15-minute time period in order to become familiar with the controls and dynamics of the videogame. Research assistants left the room and returned at the end of the allotted time. Following the finishing of the videogame portion of the study, the research assistants informed participant dyads that they were to then answer some questions and ushered them to separate rooms.

Participants were directed to follow the questionnaire instructions on the computer screen, which includes both the additional friendship measures and the Prisoner’s Dilemma game (discussed in more detail below). Following both the questions and the Prisoner’s Dilemma game, participants read a debrief informing them of the true purpose of the study as an experiment to measure aggression between friends following the playing a violent videogame. They were then awarded \$15 after signing a participation sheet. Research assistants then thanked each participant for their time and asked them not to tell others about the study in case they are to be participants as well.

Experimental Design

During the study, participant dyads were placed into one of two main conditions. The two main hypotheses tested were whether being in the same room playing a violent

videogame under a competitive or cooperative condition affects the willingness to aggress when provoked, and whether supportive versus ambivalent friendships affects willingness to aggress when provoked. Friendship type was measured using the SRI (Uchino et al., 2001) prior to participant dyads playing the videogame (Hypothesis 2), so post-study statistical analyses answered this question. Hypothesis 1 was a question of videogame context and so the two main conditions of the study for videogame play were: 1) participants being in the same room when playing a violent videogame under a cooperative condition, and 2) participants being in the same room when playing the same violent videogame under a competitive condition. Research shows that cooperatively themed videogames lead to prosocial behavior (Chambers & Ascione, 2001; Gentile, et al., 2009) and so a cooperative versus competitive condition may alter the willingness to aggress when provoked. Participants, then, were assigned to one of these conditions and then played the Prisoner's Dilemma game in separate rooms for a measure of aggression (Gallup, O'Brien, & Wilson, 2010). This study therefore followed a 2x2 factorial design with scores from the dependent measure of aggression being obtained for each of the activities and for each friendship type. In order to better understand the conditions, I will first explain the violent videogame and then explain each condition in the context of the game relating to my hypotheses.

Videogame. 'Super Smash Brothers' was selected as the videogame for use in this study. It is rated 'T' for teen, suitable for both teenagers and adults for its combat-like design. Participants played the game for 15 minutes engaging in combat battles using popular Nintendo characters to do so. The game play differs from traditional fighting games in that it does not focus on depleting 'life' bars of the opponent where a win is measured by the opponent having a life bar of zero. Instead, players fight to cause physical damage to each other by punching, kicking, throwing or hitting using the provided items throughout the battle (such as a baseball bat) and seek to knock opponents out of a suspended platform 'ring'

which doesn't have boundaries. Players can move around freely and also grab and throw opponents, meaning that overall, there are many ways to attack.

Each player has a damage total, which is represented by a total damage percentage (which can exceed 100%). Players can try to jump back into the ring once knocked out, but this will depend on the player chosen and the players' skill level. Heavier characters, for example, cannot jump as far as lighter ones, and characters with higher damage totals have less ability to jump back in. This creates a realistic feature to the game similar to how one would expect injured individuals to be less physically able than healthy ones. Each fight or battle has a timer and once the battle timer for the fight has reached zero, damage totals (the lower the better) show which player has won and which has lost.

Up to four people can play this game at any one time. Players can play on their own against the computer, or in a group of two either against the computer or against another group of two. Players can also play as individuals against two or three other individuals. An example of the diversity of game play modes might be the following: Player 1 chooses to play alone (without anyone else present) but does not want a single battle and so chooses to play a cooperative team battle against the computer. To do so, Player 1 selects their character as part of team A (represented by a chosen team color) and then assigns a second character under that same color to be Player 2 of the same team. Normally, the second player would be controlled by a second individual present, but this is not necessary. Because Player 1 is alone but wants to play the team battle mode against the computer, Player 1 can choose their teammate to be controlled by the computer. Though the computer is controlling the second member of team A, it will still play cooperatively with Player 1 against team B. In this way, single players can enjoy cooperative game play without having to have someone else present. Team B (represented by a different color) will then be represented by two additional characters controlled by the computer allowing Team A and team B to battle against each

other. For the purposes of this study, however, two players were always in the same room as each other and were assigned to either a competitive condition (playing against their friend and the computer) or a cooperative condition (playing with their friend against the computer).

Conditions. Condition one ($N = 35$) consisted of both friends together in the same room playing the videogame cooperatively, but against the computer. Condition two ($N = 38$) consisted of both friends in the same room playing the videogame competitively against each other and the computer. The research assistants made note of which condition was carried out after initially greeting participants when they arrive and marked each condition as follows:

1. Cooperative Videogame (VG)/Friend
2. Competitive VG/Friend

In condition one, participants arrived and were greeted then ushered into the same room where the videogame was set up and ready to be played. The research assistant gave the participants the videogame instructions and then selected from the game menu “brawl” to enable multiplayer or ‘team-mode’ game play. The research assistant asked which character each participant wished to be and then placed both participants on team A as players 1 and 2 (denoted by a red color). The research assistant then selected ‘computer’ as players 3 and 4 (denoted by a blue color) meaning four total players, two on team A in red, and two computer selected players on team B in blue. The research assistant then confirmed that both participants were comfortable with the instructions and ready to play the videogame before beginning the five minute allowance to be familiar with game play as a team against the computer. Following this initial five minutes, the research assistant informed the participants they were now about to begin the main portion of the study, start the 15-minute timer and then left the room. Following the end of videogame play, both participants were shown to separate rooms to complete additional questionnaires and play the Prisoner’s Dilemma game

(explained below), which was the main measure of aggression. Participants were told they were being connected to their friend in another room for this game, but this was not the case.

Condition two was similar to condition one with one change. Instead of being on the same team as each other, each participant was competing in a “free for all” battle against their friend and against the computer. In order to maintain consistency with condition one, the research assistants followed the same process of instruction to the participant dyad and made sure both controllers were plugged in for each participant. In this condition, participants played against each other and the computer rather than cooperating as a team. This was to assess whether competitive videogame play with participants in the same room would yield a different outcome to cooperative videogame play with participants in the same room. Each participant chose a character and the computer chose one at random prior to the same 15-minute time allowance for videogame play. Following this, participants were ushered into separate rooms to answer additional questions and play the Prisoner’s Dilemma as with condition one. Again, participants were told they are being connected to their friend in another room to play the Prisoner’s Dilemma, but this was not the case.

Participants were instructed to read all instructions thoroughly before completing all the videogame and subsequent online tasks. All questionnaires and the Prisoner’s Dilemma game for this study were accessible online and was formulated by Qualtrics™.

Measures and procedure

A number of measures were used as part of this study. Participants were initially told they were taking part in a study on how personality influences behavior in group settings, such as with playing videogames, and so several friendship stability measures (Richardson & Green, 2003; Crick & Nelson, 2002) and a personality measure (IPIP: Goldberg, 1999) were used as addendums to supplement the cover story. The questionnaires also consisted of a thorough videogaming history, which included how often they played videogames alone,

with friends and what type of games they played most often. Each questionnaire was completed approximately one week prior to participants arriving to the study. Additional friendship questions were also asked following the videogame portion of this study. Again this was in order to be consistent with the cover story but was not of primary importance to this study and as such was not assessed.

Pretesting for relationship type was conducted online approximately one week prior to participants arriving for the videogame portion of the study. The primary pretest measure to used was the Social Relationships Index (SRI) as a measure of relationship typology (Uchino, Holt-Lunstad, Uno, & Flinders, 2001). As described above, the Prisoner's Dilemma was completed following the videogame portion of the experiment as the main measure of aggression (Rapport & Chammah, 1965) (See Appendix B for measures included in this study).

Social Relationships Index (SRI). Uchino, Holt-Lunstad, Uno, and Flinders, (2001)

developed a model of social relationships that can be applied to friendships. The Social Relationships Index, or SRI, introduces two new relational categories to the positive-negative friendship typology to help better understand network ties between individuals (Uchino et al., 2001; Uchino, Holt-Lundstad, Smith, & Bloor, 2004). The SRI has been developed as a self-report version of the social support interview (Uchino et al, 2001). The SRI instructs individuals to list the initials of individuals of their social network. Individuals are then asked to rate the listed person in their social network on how helpful (positivity scale) or upsetting (negativity scale) they are in offering different types of support across different contexts such as informational and emotional support. The level of how helpful or upsetting they are in each type of support is rated on a 6-point scale (1 = not at all, 6= extremely).

A positive, or supportive, relationship is defined by an average score above 1 on positivity and only a 1 on negativity. A negative relationship is the opposite of a positive one, with the average score being above a 1 on negativity and only a 1 on positivity. Ambivalent

relationships are thus measured as ones in which scores are higher than 1 on both the positivity and negativity scales. Reported test-retest correlations for positive relationships were $r = 0.69$ ($p < 0.001$), for negative relationships were $r = 0.75$ ($p < 0.001$), and for ambivalent relationships were $r = 0.51$ ($p < 0.001$; Uchino et al., 2001). Additionally, discriminate and convergent validity was established with existing personality measures showing that the SRI exhibits external validity and can be used as a reliable measure of friendship assessment (Campo, Uchino, Vaughn, Reblin & Smith, 2009). Subsequent research has also employed the SRI in health studies into friendship type and used as a cursor for physical and psychological health issues (see Midei and Matthews, 2009; Holt-Lunstad, Uchino, Smith, Olsen-Cerny, & Nealey-Moore, 2003). In the present research, 43 relationships were defined as being supportive and 30 were defined as being ambivalent.

Prisoner's Dilemma. The Prisoner's Dilemma is nickname given to a well-known game used to illustrate introductory decision making in economics and has been shown to measure cooperative and competitive behavior (Rapport & Chammah, 1965). Research also suggests that the Prisoner's Dilemma may be a good surrogate measure of aggression in that aggressive individuals tend to value material resources over social resources and as such are more likely to exhibit that aggression by competing rather than cooperating in the Prisoner's Dilemma game (Gallup, O'Brien, & Wilson, 2010). In this game, each player has a choice to cooperate or to defect with varying monetary rewards based on a variation of Axelrod's payoff values (listed below). The cooperative choice helps the partner whereas the competitive choice hurts the partner (Fiske, 2010). Using a variation of Axelrod's (1984) payoff values, if each player cooperates, both participants will receive 3 points. If one player chooses to defect while the other cooperates, the competitor gains disproportionately and receives 5 points with the cooperating player receiving 0 points. If both players defect, each participant receives 1 point (Richards, 2001).

In each of the two conditions in this study, the Prisoner's Dilemma was used as the dependent measure of aggression following violent videogame play, albeit with a different scoring procedure. Participants were allotted 1 point each time they chose to cooperate and 2 points each time they chose to defect across five trials. Thus, scores on this measure could range from 5 (low aggression) to 10 (high aggression). Participants were told they were playing the Prisoner's Dilemma against their partner, but this was not the case. Instead, participants played against the computer. The computer always chose to compete on the first of the five trials. This portion of the study remained constant whether the participant dyad was categorized as a supportive or ambivalent friendship prior to arrival, or whether participants were playing in the cooperative or competitive condition.

Following completion of this portion of the study, participants were debriefed in keeping with ethical guidelines of the International Review Board (IRB) and paid the full \$15 for being part of the study.

Statistical Analyses

Participant scores on the Prisoner's Dilemma game were submitted to a 2 (condition: cooperative/competitive) x 2 (friendship type: supportive/ambivalent) between-subjects analysis of variance (ANOVA). The following were the expected results for each hypothesis.

Hypothesis 1:

It is hypothesized that individuals who play a violent videogame will exhibit less aggression towards their partner if playing the videogame cooperatively as a team versus playing the same videogame competitively against their partner and against the computer.

Hypothesis 2:

It is hypothesized that individuals playing a violent videogame with a close or supportive friend will exhibit less aggression toward their friend after playing the videogame than if they play the same game with an ambivalent friend.

Hypothesis 3:

It is hypothesized that there will be an interaction between the videogame play condition and the type of friend with whom it is played. Willingness to aggress will be lowest between supportive friends in the cooperative condition and highest between ambivalent friends in competitive condition.

Results

The purpose of this study was to ascertain the effects of videogame condition (cooperative/competitive) and friendship type (supportive/ambivalent) on aggression following the playing of a violent videogame (Super Smash Brothers). Specifically, three hypotheses were proposed. Hypothesis one proposed that aggression would be lower if participants played the violent videogame in a cooperative context compared to a competitive context. Hypothesis two proposed that aggression would be lower if participants played the violent videogame with a supportive friend compared to an ambivalent friend. Hypothesis three was aimed at the interaction effect between friendship type and videogame context. Each of these hypotheses can be assessed by a single analysis using a two-by-two factorial analysis of variance (ANOVA).¹ An alpha level of 0.05 was used for all statistical tests.

Hypothesis 1:

It is hypothesized that individuals who play a violent videogame will exhibit less aggression towards their partner if playing the videogame cooperatively as a team versus playing the same videogame competitively against their partner and against the computer.

The Prisoner's Dilemma was the dependent variable measure and was assessed as a continuous score ranging from 5 to 10, with a higher score showing increasing levels of competitive (aggressive) behavior. Results revealed that participants were no more aggressive after playing a violent videogame whether playing in the cooperative condition ($M = 6.20$, $SD = 1.11$) or competitive condition ($M = 6.50$, $SD = 1.35$), $F(1, 71) = 0.49$, $p = 0.49$, $\eta^2 = 0.01$, although the means were in the predicted direction. Thus there was no main effect found in support of hypothesis one.

Hypothesis 2:

It is hypothesized that individuals playing a violent videogame with a close or supportive friend will exhibit less aggression toward their friend after playing the videogame than if they play the same game with an ambivalent friend.

With the Prisoner's Dilemma as the dependent variable (assessed as a continuous score), results revealed that, for friendship type, participants were no more aggressive following the playing of the violent videogame with either a supportive ($M = 6.55$, $SD = 1.24$) or ambivalent ($M = 6.06$, $SD = 1.20$) friend, $F(1, 71) = 2.63$, $p = 0.11$, $\eta^2 = 0.04$. Thus there was no main effect found in support of hypothesis two.

Hypothesis 3:

It is hypothesized that there will be an interaction between the videogame play condition and the type of friend with whom it is played. Willingness to aggress will be lowest between supportive friends in the cooperative condition and highest between ambivalent friends in competitive condition.

With respect to hypothesis three, the interaction effect was not significant, $F(1, 71) = 2.63$, $p = 0.11$, $\eta^2 = 0.04$.

Ancillary Analysis

There is no one specific way to operationalize aggression. Aggression, in this study, was operationalized as a continuous score using the Prisoner's Dilemma as the measure of aggression. That being said, given the non-significant results, further exploration of the data using other means of operationalizing this measure of aggression was needed. Research suggests that aggression may increase following a distinct provocation (Coyne et. al., 2011), so perhaps another operationalization of the Prisoner's Dilemma as the dependent variable is needed. The Prisoner's Dilemma consisted of five trials where participants thought they were connected to their friend via the computer for the duration of the game. Participants were actually playing against the computer only. The computer *always* chose to compete on the first trial which could be construed by the participant as provocation, and so a reactive measure of aggression could be the participants' second choice during the game, i.e., whether they chose to retaliate to the provocation of their partner. The data were submitted to another two-by-two factorial analysis of variance to assess if reactive measures of aggression were affected by either videogame condition or friendship type following the playing of a violent videogame. Participants were coded with a 1 if they chose to cooperate after this initial provocation and a 2 if they chose to compete.

For hypothesis one, results revealed that participants were no more aggressive after playing a violent videogame whether playing in the competitive condition ($M = 1.21$, $SD = 0.41$) as compared to the cooperative condition ($M = 1.14$, $SD = 0.35$), $F(1, 71) = 0.48$, $p = 0.49$, $\eta^2 = 0.01$, although the means were again in the predicted direction. Thus there was no main effect found in support of hypothesis one. For hypothesis two, using this new operationalization of the Prisoner's Dilemma, results revealed no significant effects whether participants played the videogame with a supportive ($M = 1.23$, $SD = 0.42$) or an ambivalent

friend ($M = 1.10$, $SD = 0.30$), $F(1, 71) = 2.01$, $p = 0.16$, $\eta^2 = 0.03$. There were also no significant interaction effects, $F(1, 71) = 0.00$, $p = 0.98$, $\eta^2 = 0.00$.

Discussion

There is a large body of research that shows that violent content in videogames increases subsequent aggression, particularly in the short term (Anderson, 2004). Stone and Gentile (2008) suggest that videogame context is one area of videogame research that warrants further investigation and so the purpose of this study was to assess whether videogame context had an effect on subsequent aggression following violent-content videogame play. In the present study, as a whole, there were no significant main effects for each hypothesis with friendship type or videogame condition as moderators or predictors of resultant aggressive behaviour.

These findings don't mirror the results from existing videogame content research, suggesting that videogame context may not have an effect on aggression following violent videogame play. What can be observed from the results, however, is that the mean values for the competitive/cooperative conditions were consistently in the predicted direction. Even though the effect sizes were small in each case, this does not necessarily mean that there was no effect. In the present study, approximately 400 participants took part in the initial assessment stage, but only 73 participants provided useable data in the end because of technical problems matching people from time one to time two. Had I been able to make use of more data, it is possible that these results may have reached conventional levels of significance. Because of the substantial loss of power in my statistical analyses, I am reluctant to dismiss the theory that videogame context (particularly the gaming strategy [competitive or cooperative]) affects subsequent aggression following violent videogame play. I submit that such a dismissal is unwarranted at this point. My failure to obtain significant findings may actually be due to a number of methodological limitations, such as

how the dependent variable was operationalized, the dependent variable itself, as well as the participant sample used. These will be discussed in turn.

The Prisoner's Dilemma was used as the primary measure of aggression and participants completed this portion of the study *after* playing the violent videogame. Operationalizing the Prisoner's Dilemma as a continuous score using a variation of Axelrod's (1984) payoff values failed to reveal significant results in this study. Other statistical analyses using other means of scoring this variable then became necessary. Interestingly, though data from this study were initially observed as a sum of responses across all five trials, subsequent operationalizations, such as identifying a clear provocation by assessing the second choice of participants following the initial competitive response of the computer (Pederson et al., 2008; Coyne et al., in press), still failed to provide significant results. The Prisoner's Dilemma is a well-known reliable measure for cooperative and competitive behaviour (Axelrod, 1984; Rapport & Chammah, 1965), but has also been used as a measure of aggression in contemporary research (Gallup, O'Brien, & Wilson, 2010). But is it really a *good* measure of aggression? In other words, does it really measure a person's attempt to harm another individual who is motivated to avoid injury, or is it simply a measure of how much a person wants to win a game? If it is more of the latter, then perhaps I shouldn't have expected it to perform as well as other, perhaps better, measures.

For example, perhaps a more provocative measure such as the white noise physical aggression measure used by Pederson et al. (2008) would have provided a different result. With this measure, participants choose the intensity and duration of a static noise known as 'white noise' that participants select for their partner to receive should the partner lose in a competitive reaction-time test. Arguably, this measure might be of better use than the Prisoner's Dilemma for a number of reasons. Firstly, it provides more measures (intensity and duration) than the Prisoner's Dilemma allowing more ways to analyze the data.

Secondly, it is more physically punishing than the Prisoner's Dilemma game. Research suggests that people mimic (and tend to exhibit most frequently) the type of aggression they have been exposed to (Bushman & Baumeister, 1998; Chamove, 1980; Coyne et al., in press) and the white noise physical aggression measure of aggression punishes participants similar to the physical punishment participants have been exposed to during the playing of the violent videogame Super Smash Brothers. Perhaps re-administering this study with this measure of aggression as the dependent variable would provide significant results in support of each hypothesis.

Similarly, the use of an alternative measure may help protect against floor effects as seen in this study. Perhaps the Prisoner's Dilemma is not sensitive enough as a tool to measure appropriate levels of cooperation. The data show that BYU students do not follow this propensity to defect found in other research (Axelrod, 1984; Rapport & Chammah, 1965), with 34% of participants never choosing to defect. These floor effects suggest that there is a scale attenuation effect in that the Prisoner's Dilemma is not sensitive enough to measure the appropriate level of cooperation from the BYU sample used. Perhaps a normal distribution of responses would have revealed the predicted effects; unfortunately, the distribution of responses to the Prisoner's Dilemma was positively skewed.

With respect to the sample used, Brigham Young University is a private Christian university. The heavy Christian sample follows Christian teachings, one such teaching being forgiveness. According to Eaton and Struthers (2006), forgiveness between friends can act to lower aggressive responses when provoked. It is possible that irrespective of friendship type, for example, the lean of the sample towards being forgiving to one another based on religious conviction could have had a reductive effect general aggression.

Interestingly, research shows that there may be something to this claim about BYU students and their possible lower general aggression. In a study by Bushman, Ridge, Das,

Key and Busath (2007) on the effects of violent religious literature on subsequent aggression, it was found that BYU students had much lower levels of aggression than students from Vrije University in Amsterdam, the Netherlands. Though data showed the same general pattern of responses across both samples, the general levels of aggression in BYU student participants was substantially lower (Bushman et al., 2007). The tendency of BYU students to aggress less may account for the floor effects found in the data and provide explanation for the scale attenuation effect with the dependent measure of aggression used.

Research also suggests that individuals with lower levels of trait hostility are less affected by violent videogames than individuals with higher levels of trait hostility (Giumetti & Markey, 2007). Though unlikely, it is possible that the entire sample was low in this particular trait (perhaps due to religious conviction or levels of forgiveness) which could have acted to reduce otherwise aggressive responses to the Prisoner's Dilemma. This possible effect could have been identified with a simple administration of the aggression questionnaire at the outset of the study (AQ; Buss & Perry, 1992). Further research should take into account the additional tests and control measures not included in this study, along with a larger sample size from a less well-known heavily and openly Christian university.

The findings of this study fail to mirror results from some research into violence and videogames, such as that suggested by Anderson (2010), where cooperative context conditions using a violent videogame acted to increase team cohesion and cooperative behavior. Interestingly, a major difference between Anderson's research and the present findings is the length of time participants played the videogame. Participants in this study played the videogame once for a 15 minute time period as compared to several times, several hours a time over a several week period. The length of time difference that the participants played the violent videogame may account for the different results. However other research has shown that this may not be the case.

Williams and Clippinger (2002), for example, only allowed participants approximately 20 minutes of videogame play. The same is true of research conducted by Anderson and Morrow (1995), where participants played the videogame for a maximum of 30 minutes. Repeating the experiment with longer videogame play, then, may still yield the same null result. Similarly, these findings also fail to find significant difference between the types of friends that play videogames. Though research shows that aggression is lower between friends as compared to strangers when playing videogames (Revaja et al., 2006; Williams & Clippinger, 2002), perhaps being cognitively and actively engaged in the shared activity overcomes any friendship type moderator effects.

Lastly, existing research often focuses on affective aggression, such as anger, assessed by self-report Likert scales rather than behavioral aggression, which may account for the difference in results. Williams and Clippinger (2002), for example, used a self-report measure adapted from the State Hostility Scale (Anderson, Deuser, & DeNeve, 1995) to measure feelings of aggression and current mood states rather than specific behaviour. Participants reported how they felt such as “I feel irritated” by indicating how much they agreed with each statement from strongly agree to strongly disagree. In addition, Anderson and Morrow (1995) assessed aggression *during* videogame play rather than post videogame play by counting the number of ‘kills’ participants completed as part of the videogame itself. Though their studies provided significant results in affirming increased aggression following violent videogame play, other research has shown that simply playing videogames with friends can be a bonding experience (Anderson, 2010; Steinberg, 2007; Way 2004). Ravaja et al. (2006) found that playing videogames with a friend increased arousal and positive affect. This research suggests that playing videogames in general may negate the effect friendship type or videogame condition may have on behavioral outcomes. Further research incorporating some

of the changes that I have proposed above is warranted to corroborate or refute the current findings.

¹ Preliminary analysis revealed no significant difference between genders in how they responded across all variables and conditions and so participants were grouped together.

References

- Anderson, C. A., Berkowitz, L., Donnerstein, E., Huesmann, L. R., Johnson, J. D., Linz, D., Malamuth, N. M., & Wartella, E. (2003). The influence of media violence on youth. *Psychological Science in the Public Interest*, 4, 81-110.
- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53, 27–51.
- Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science*, 12, 353–359.
- Anderson, C. A., Carnagey, N. L., Flanagan, M., Benjamin, A. J., Jr., Eubanks, J., & Valentine, J. C. (2004). Violent video games: Specific effects of violent content on aggressive thoughts and behavior. *Advances in Experimental Social Psychology*, 36, 199–249.
- Anderson, C. A., Deuser, W.E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: tests of a general model of affective aggression. *Personality and Social Psychology Bulletin*, 21(5), 434-448.
- Anderson, C. A. (2004). An update on the effects of playing violent video games. *Journal of Adolescence*, 27, 113–122.
- Anderson, C. A., Gentile, D. A., & Buckley, K. A. (2007). *Violent videogame effects on children and adolescents: Theory, research, and public policy*. New York: Oxford University Press.

- Anderson, C.A., & Morrow, M. (1995). Competitive aggression without interaction: Effects of competitive versus cooperative instructions on aggressive behavior in videogames. *Personality and Social Psychology Bulletin*, 21, 1020-1030.
- Anderson, G. (2010). *The impact of cooperative video games on team cohesion*. Ph.D. dissertation, Indiana State University, United States -- Indiana. Retrieved March 28, 2011, from Dissertations & Theses: Full Text. (Publication No. AAT 3404430).
- Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.
- Barton, E. J. (1981). Developing sharing: An analysis of modelling and other behavioural techniques. *Behaviour Modification*, 5, 396-398.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York: McGraw Hill.
- Berkowitz, L., & Holmes, D. S. (1960). *A further investigation of hostility generalized to disliked objects*. University of Wisconsin. (Supported by the Institute of Mental Health, US Public Health Service).
- Buchman, D. D., & Funk, J. B. (1996). Video and computer games in the '90s: Children's time commitment and game preference. *Children Today*, 24, 12-16.
- Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology*, 75, 219-229.
- Bushman, B. J., & Anderson, C. A. (2001). Media violence and the American public: Scientific facts versus the media misinformation. *American Psychologist*, 56, 477-489.
- Bushman, B. J., Ridge, R. D., Das, E., Key, C. W., & Busath, G. M. (2007). When God sanctions killing: Effect of scriptural violence on aggression. *Psychological Science*, 18, 204-207.

- Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, 63, 452–459.
- Byrne, D. (1971). *The attraction paradigm*. New York: Academic Press.
- Campo, R. A., Uchino, B. N., Vaughn, A., Reblin, M. & Smith, T. W. (2009). The assessment of positivity and negativity in social networks: The reliability and validity of the social relationships index. *Journal of Community Psychology*, 37, 471-486.
- Chambers, J. H., & Ascione, F. R. (2001). The effects of prosocial and aggressive videogames on children's donating and helping. *Journal of Genetic Psychology*, 148(4), 499-505.
- Colwell, J. & Kato, M. (2005). Videogame play in British and Japanese adolescents. *Simulation & Gaming*, 36, 518-530.
- Coyne, S. M., Ridge, R., McKay, S., Callister, M., Stockdale, L. (in press). Backbiting and bloodshed in book: Short term effects of reading physical and relational aggression in literature. *British Journal of Social Psychology*.
- Crick, N. R., & Nelson, D. A. (2002). Relational and physical victimization within friendships: Nobody told me there'd be friends like these. *Journal of Abnormal Child Psychology*, 30, 599-607.
- Dietz, T. L. (1998). An examination of violence and gender role portrayals in video games: Implications for socialization and aggressive behaviour. *Sex Roles*, 38(5-6), 425-442.
- Delamere, F. M. (2004). *"It's just really fun to play"! A constructionist perspective on violence and gender representations in violent video games*. Ph.D. dissertation, University of Waterloo, Ontario, Canada. Retrieved March 28, 2011, from Dissertations & Theses: Full Text. (Publication No. AAT NQ94570).
- Eastin, M. S. (2006). Videogame violence and the female game player: Self and opponent

- gender effects on presence and aggressive thoughts. *Human Communication Research*, 32, 351-372.
- Eastin, M. S. (2007). The influence of competitive and cooperative group game play on state hostility. *Human Communication Research*, 33, 450-466.
- Eastin, M. S., & Griffiths, R. P. (2006). Beyond the shooter game: Examining presence and hostile outcomes among male game players. *Communication Research*, 33, 448-466.
- Eaton, J., & Struthers, C. W. (2006). The reduction of psychological aggression across varied interpersonal contexts through repentance and forgiveness. *Aggressive Behavior*, 32, 195-206.
- Finch, J. F., Okun, M. A. Barrera, M., & Zautra, A. J. (1989). Positive and negative social ties among older adults: Measurement models and the prediction of psychological distress and well-being. *American Journal of Community Psychology*, 17, 585-605.
- Fisk, S. T. (2010). *Social beings: Core motives in social psychology*, 2nd ed. Hoboken, NJ: John Wiley & Sons Inc.
- Gallup, A. C., O'Brien, T., & Wilson, D. S. (2010). The relationship between adolescent peer aggression and responses to a sequential prisoner's dilemma game during college: An explorative study. *Journal of Social, Evolutionary, and Cultural Psychology*, 4, 4.
- Gentile, D. A. (2009). Pathological videogame use among youth 8 to 18: A national study. *Psychological Science*, 20, 594-602.
- Gentile, D. A., Anderson, C. A., Yukawa, N., Saleem, M., Lim, K. M., Shibuya, A., Liao, A. K., Khoo, A., Bushman, B. J., Huesmann, L. R., & Sakamoto, A. (2009). The effects of prosocial videogames on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, 35, 752-763.

- Giumetti, G.W., & Markey, P.M. (2007). Violent videogames and anger as predictors of aggression. *Journal of Research in Personality*, 41, 1234-1243.
- Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe*, 7, 7-28. Tilburg, The Netherlands: Tilburg University Press.
- Gottman, J. M. (1994). *What predicts divorce?* Hillsdale, NJ: Erlbaum
- Haninger, K. Ryan, M. S. & Thompson, K. M. (2004, March 11). Violence in teen-rated video games. Medscape General Medicine. (Available at: <http://www.medscape.com/viewarticle/468087>).
- Haninger, K., & Thompson, K. M. (2004). Content and ratings of teen-rated video games. *Journal of the American Medical Association*, 291(7), 856-865.
- Holt-Lunstad, J., Uchino, B.N., Smith, T. W., Olsen-Cerny, c., & Nealey-Moore, J. B. (2003). Social relationships and ambulatory blood pressure structural and qualitative predictors of cardiovascular function during everyday social interactions. *Health Psychology*, 22, 388-397.
- Judd, C. M., & Park, B. (1988). Out-group homogeneity: Judgments of variability at the individual and group levels. *Journal of Personality and Social Psychology*, 54, 778-788.
- Kaiser Family Foundation (2010). *Generation M2: Media in the lives of 8- to 18- year olds*. Menlo Park, CA: Kaiser Family Foundation.
- Lange, A. & Verhallen, W. (1978) Similarity of attitudes and instrumentality as determinants of aggression by policemen. *European Journal of Social Psychology*, 8, 489-505.
- Loftus, G. R., & Loftus, E. F. (1983). *Mind at play: The psychology of videogames*. New York: Basic Books.

- Marcus - Newhall, A., Pedersen, W. C., Carlson, M., & Miller, N. (2000). Displaced aggression is alive and well: A meta - analytic review. *Journal of Personality and Social Psychology*, 78, 670 – 689.
- McCullough, M. E., Rachal, K. C., Sandage, S. J., Worthington, E. L. J., Brown, S. W., & Hight, T. L. (1998). Interpersonal forgiving in close relationships: II. Theoretical elaboration and measurement. *Journal of Personality and Social Psychology*, 75, 1586-1603.
- McCullough, M. E., Worthington, E. L. J., & Rachal, K. C. (1997). Interpersonal forgiving in close relationships. *Journal of Personality and Social Psychology*, 73, 321-336.
- Midei, A. J., & Matthews, K. A. (2009). The role of social relationships and negative emotional traits in predicting central adiposity and pulse wave velocity in healthy adolescents. *Health Psychology*, 28, 347-353.
- Murphy, R., Penuel, W., Means, B., Korbak, C., & Whaley, A. (2001). *E-DESK: A review of recent evidence on the effectiveness of discrete educational software*. Menlo Park, CA: SRI International.
- Nelson, M. K. (1993). A new theory of forgiveness. *Dissertation abstracts international*, 53, 4831.
- Okun, M. A., Melichar, J. F., & Hill, M. D. (1990). Negative daily events, positive and negative social ties, and psychological distress among older adults. *The Gerontologist*, 56, 219-227.
- Pedersen, W. C., Bushman, B. J., Vasquez, E. A., & Miller, N. (2008). Kicking the (barking) dog effect: The moderating role of target attributes on triggered displaced aggression. *Personality and Social Psychology Bulletin*, 34 (10), 1382 – 1395.
- Rapoport, A., & Chammah, A. M. (1965). *Prisoner's dilemma: A study in conflict and cooperation*. Ann Arbor, University of Michigan Press.

- Richards, D. (2001). Reciprocity and shared knowledge structures in the prisoner's dilemma game. *Journal of Conflict Resolution*, 45, 621-635.
- Ravaja, N., Saari, T., Turpeinen, M., Laarni, J., Salminen, M., & Kivikangas, M. (2006). Spatial presence and emotions during videogame playing: Does it matter with whom you play? *Presence*, 15, 381-392.
- Richardson, D. S., & Green, L. R. (2003). Defining direct and relational aggression: The richardson conflict response questionnaire. *International Review of Social Psychology*, 16, 11 - 30.
- Schiesel, S. (2005, September 6). Conqueror in a war of virtual worlds. *New York Times*, E1.
- Schmierbach, M. (2010). "Killing spree": exploring the connection between competitive game play and aggressive cognition. *Communication Research*, 37, 256-274.
- Smyth, J. M. (2007). Beyond self-selection in *videogame* play: An experimental examination of the consequences of massively multiplayer online role-playing *game* play. *Cyber Psychology & Behavior*, 10 (5), 717-721.
- Steinberg, L. (2007). *Adolescence*. 8th Ed. New York: McGraw Hill.
- Stone, W. & Gentile, D. A. (2008, August). *The five dimensions of videogame effects*. Paper presented at the annual convention of the American psychological association, Boston, MA.
- The Entertainment Software Association. (2008, February 18). Essential facts about games and violence. Retrieved from http://www.theesa.com/facts/pdfs/ESA_EF_2008.pdf
- Thompson, K.M, Haninger, K. (2001). Violence in E-rated video games. *Journal of the American Medical Association*, 286(5),591-59.

- Uchino, B. N., Holt-Lundstad, J., Smith, T. W., & Bloor, L. (2004). Heterogeneity in social networks: A comparison of different models linking relationships to psychological outcomes. *Journal of Social & Clinical Psychology, 25*, 448-472.
- Uchino, B. N., Holt-Lundstad, J., Uno, D., & Flinders, J. B. (2001). Heterogeneity in the social networks of young and older adults: Prediction of mental health and cardiovascular reactivity during acute stress. *Journal of Behavioral Medicine, 24*, 361-382.
- Way, N. (2004). Intimacy, desire, and distrust in the friendships of adolescent boys. In N. Way & J. Y. Chu (Eds.), *Adolescent boys: Exploring diverse cultures of boyhood*. (pp. 167-196). New York: New York University Press.
- Weber, R., Ritterfield, U., & Kostygina, A. (2009). Aggression and violence as effects of playing violent videogames? In Vorderer, P. & Bryant, J. (Eds.), *Playing video games: Motives responses, and consequences*. (pp 408-427). Oxford: Routledge.
- Williams, R. B., & Clippinger, C. A. (2002). Aggression, competition and computer games: Computer and human opponents. *Computers in Human Behavior, 18*, 495-506.

Appendices

Appendix A: Dialogue and Research Assistant Protocol

VG-Friend Protocol

Protocol for all RA's

Note: Participants will complete questionnaires and video game questionnaires before lab sessions. This is a requirement of the study, and participants will only be able to schedule a time session when this has been completed. **Participants will complete the Prisoner's Dilemma at the end of lab sessions in separate rooms.**

Setup (Please arrive 20-30 minutes early to ensure all is complete before the participants arrive)

- 1.) Setup
- 2.) Greet the participants
- 3.) Get informed consent
- 4.) Activity (videogame)
- 5.) Post-game questionnaires and the prisoner's dilemma
- 6.) Debriefing
- 7.) Put materials away

Get participant assignment information

Refer to the Participant Assignment Sheet on the left side of the main study folder

Write down the next available Participant I.D on the **Session Information** form. **Friends are always the number +a example: 1a, 2a, 3a, 4a—while the person in SONA is 1, 2, 3, etc.**

Write down the **Condition and PID** on the Session Information form **and the check they are set up for the PRISONER'S DILEMMA.**

Circle the correct condition:

Cooperative VG/friend

Competitive VG/friend

Dialogue

1.) Greet the participant

Say:

Are you here for a study? What is your name? Is this the friend you said would be participating in this study with you? Have you and your friend completed all of the prestudy questionnaires?

****If they say no to **EITHER** of these questions you will need to **say**: I am sorry, but you cannot participate in our study today.*****

Great, my name is _____ and I'm running the study today.

Today you will be participating in a variety of activities. You will play a game and then complete a few more questionnaires. In total, the study will take about an hour from start to finish. In summary, we are looking at how different activities influence friendship.

For VG together: You will first play a video game together. Then you will complete a few more questionnaires and one more online game.

Then: Do you have any questions? Your Participant ID for the study will be _____. If you ever forget this number please let me know as you will have to enter it several times throughout the study. Do you understand what you will be doing?

Great then follow me.

Record the start time on the Session Information Sheet now.

2.) Activity

For VG play (Cooperative friend)

Say: Now it is time to play a video game. These are the instructions for how to play, please read over them while I set up.

Make sure that both controllers are in the same room and restart the wii. One controller will be player 1 and one will be player 2. Move the hand on the wii main screen to Super Smash Brothers icon and press A. Move the highlight to group and press A. Then move the hand to the top left of the screen where it says "Brawl" and press A. This will change the condition to "team play" and two gray boxes will appear at the bottom of the screen. Move one hand to the bottom of the gray box and press A. This will make the box say Random. Do this on the last remaining box. To make players on the same team you need to change the color. This is done by pressing the small box (it has a letter in it that says R) in the top left corner of each player. Make sure that player one and two are both red (R). Then move to boxes three and four and click on the letter in the box on the top left until it says B. Now there are two teams: red and blue. **MAKE SURE THAT THE FRIENDS ARE THE SAME COLOR.**

Say: Are you comfortable with the instructions?

(Once P is comfortable with the instructions.....)

Say:

Before we begin which characters would you both like to be? (Move the hand to the character and press A). We are now going to give you five minutes to play the game and get used to the controllers. I will stand over here with the stopwatch and let you know when the five minutes are over.

For each Brawl location select "Random"

Start Stopwatch.

Say:

Do you feel ready to play? Great.

I'm going to start a timer for 15 minutes. I will open the door when it is time to continue on to the next part of the study. If you finish the game, just start again. Please feel free to talk and interact as you normally would.

Close the door and start the **stopwatch**.

For VG (Competitive friend)

Give the P the Game Play instructions for the video game

Say:

Now it is time to play a video game. These are instructions on how to play, please read over them while I setup.

Make sure both controllers are in the same room and are turned on. If not, please restart the wii when both controllers are in the room. Move the hand on the wii main screen to Super Smash Brothers icon and press A. Highlight group and press A. The two players will automatically appear on the bottom of the screen.

Say: Are you comfortable with the instructions?

(Once P is comfortable with the instructions.....)

Say:

Before we begin which characters would you both like to be? (Move the hand to the character and press A). We are now going to give you five minutes to play the game and get used to the controllers. I will stand over here with the stopwatch and let you know when the five minutes are over.

For each Brawl location select “Random”

Start Stopwatch.

Say:

Do you feel ready to play? Great.

I’m going to start the timer for 15 minutes. I will open the door when it is time to continue on to the next part of the study. If you finish the game, just start again. Please press the + key to begin play. Please feel free to talk to each other and interact as you normally would.

Close the door.

Start the **stopwatch**.

Now take the friends into different rooms at this time

Say:

Okay, great. We are now going to go into two separate rooms to do a few more tasks. You’ll want to bring all your stuff as we will not be coming back into this room.

3.) Post game questionnaire

Say:

Here are a few questionnaires for you to complete. Make sure you put your participant ID number here; if you have forgotten it please let me know. When you are done please let me know.

Make sure and check that the survey says “your responses have been recorded” or something like that. If it does not you need to press the arrow at the bottom right until it does. If you see an arrow at the bottom right, the answers have not been recorded and the survey is not complete.

4.) Prisoner’s Dilemma

Say: You are now going to play a game against your friend who is hooked up in the next room. Please put your Participant ID number here and read the screen which will give you all the instructions. When you are done, please click “next” and when your friend is ready, the game will start.

Make sure and check that the survey says “your responses have been recorded” or something like that. If it does not you need to press the arrow at the bottom right until it does. If you see an arrow at the bottom right, the answers have not been recorded and the survey is not complete.

5.) Debriefing

Read through the debrief with participant.

Say:

This concludes the study. Thank you so much for participating! We will give you \$15 cash as a thank you for participating. Please sign here and write your student ID here to say you have received the money. We ask that you don't talk to anyone about this study in case they participate in it as well.

Take money out of pocket and give money to the participant and make sure they sign the form.

6.) Put data and materials away.

Appendix B: Questionnaires

Biographical Information

Please provide the following details: (Circle or fill in the appropriate response)

1. Gender: Male Female

2. Age: _____

3. Ethnicity: _____

Friendship Activities

IMPORTANT: For all questions referring to a "friend" please answer only in respect to the friend who will be doing the study with you.

Videogames

How often do you play videogames?

- ☐ Everyday ☐ About 2-3 times a week ☐ About once a month
☐ Almost everyday ☐ About once a week ☐ Less than once a month
☐ About 4-5 times a week ☐ A couple times a month ☐ Never

If you answered "never", you do not have to answer the remaining questions.

How often do you play multiplayer online videogames?

- ☐ Everyday ☐ About 2-3 times a week ☐ About once a month
☐ Almost every day ☐ About once a week ☐ Less than once a month
☐ About 4-5 times a week ☐ A couple times a month ☐ Never

3. For how many years have you been playing videogames? _____ years

4. When you play videogames, for how long do you usually play at one sitting? _____ minutes

5. What are your three favorite videogames?

a. Title #1: _____

How often do you play this game ALONE?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with your friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with friends online?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each other in this game?	Never: 1 2 3 4 5 6 7 :Often

b. Title #2: _____

How often do you play this game ALONE?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with a friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with friends online?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each other in this game?	Never: 1 2 3 4 5 6 7 :Often

c. Title #3: _____

How often do you play this game ALONE?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with a friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How often do you play this game with friends online?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each other in this game?	Never: 1 2 3 4 5 6 7 :Often

On a typical weekday, for how many hours do you play videogames during the following times? (Please write numbers in the spaces below.)

6 am- Noon	Noon- 6 pm	6 pm- Midnight	Midnight- 6 am
_____ hours	_____ hours	_____ hours	_____ hours

On a typical weekend day (Saturday or Sunday), for how many hours do you play videogames during the following times? (Please write numbers in the spaces below.)

6 am- Noon	Noon- 6 pm	6 pm- Midnight	Midnight- 6 am
_____ hours	_____ hours	_____ hours	_____ hours

Board games

How often do you play board or card games?

- | | | |
|---|---|---|
| <input type="checkbox"/> Everyday | <input type="checkbox"/> About 2-3 times a week | <input type="checkbox"/> About once a month |
| <input type="checkbox"/> Almost everyday | <input type="checkbox"/> About once a week | <input type="checkbox"/> Less than once a month |
| <input type="checkbox"/> About 4-5 times a week | <input type="checkbox"/> A couple times a month | <input type="checkbox"/> Never |

If you answered "never", you do not have to answer the remaining questions.

5. What are your three favorite board/card games?

a. Title #1: _____

How often do you play this game with a friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each other in this game?	Never: 1 2 3 4 5 6 7 :Often

b. Title #2: _____

How often do you play this game with a friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each	Never: 1 2 3 4 5 6 7 :Often

other in this game?	
---------------------	--

c. Title #3: _____

How often do you play this game with a friend (in the same room)?	Rarely: 1 2 3 4 5 6 7 : Often
How violent is this game?	No violence: 1 2 3 4 5 6 7: Extremely violent
How often do players/characters help each other in this game?	Never: 1 2 3 4 5 6 7 :Often

Other activities

Think of the friend who will be doing the study with you. How often do you engage in the following activities with this particular person?

Play sports	Rarely: 1 2 3 4 5 6 7 : Often
Go out to dinner	Rarely: 1 2 3 4 5 6 7 : Often
Watch TV/movies	Rarely: 1 2 3 4 5 6 7 : Often
Just talk	Rarely: 1 2 3 4 5 6 7 : Often
Study	Rarely: 1 2 3 4 5 6 7 : Often

Besides what is listed above, what else do you do with your friend?

RCRQ

Here is a list of things you might do when angry with someone. Please think of what you usually do when you have a conflict or disagreement with someone. How often have you made each of these responses when angry or upset with someone? Use the following code:

1 = Never 2 = Seldom 3 = Sometimes 4 = Often 5 = Very Often

- _____ 1. Yelled or screamed at them.
- _____ 2. Did things to irritate them.
- _____ 3. Threatened to hit or throw something at them.
- _____ 4. Made up stories to get them in trouble.
- _____ 5. Did not show that I was angry.
- _____ 6. Cursed at them.
- _____ 7. Threw something at them.
- _____ 8. Tried to make them look stupid.
- _____ 9. Stomped out of the room.
- _____ 10. Made negative comments about their appearance to someone else.
- _____ 11. Hit (or tried to hit) them with something hard.
- _____ 12. Insulted them or called them names to their face.
- _____ 13. Talked the matter over.
- _____ 14. Spread rumors about them.
- _____ 15. Sulked and refused to talk about it.
- _____ 16. Kicked (or tried to kick) the other person.
- _____ 17. Dropped the matter entirely.
- _____ 18. Took something that belonged to them.
- _____ 19. Hit (or tried to hit) the other person but not with anything.
- _____ 20. Gossiped about them behind their back.
- _____ 21. Pushed, grabbed or shoved them.
- _____ 22. Called them names behind their back.
- _____ 23. Told others not to associate with them.
- _____ 24. Waited until I calmed down and then discussed the problem.
- _____ 25. Told others about the matter.

- ____ 26. Threw something (but not at the other) or smashed something.
 ____ 27. Destroyed or damaged something that belonged to them.
 ____ 28. Gathered other friends to my side.

IPIP

On the following pages, there are phrases describing people's behaviours. Please use the rating scale below to describe how accurately each statement describes **you**. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then circle the number that corresponds to the number on the scale.

Response Options

- 1: Very Inaccurate
 2: Moderately Inaccurate
 3: Neither Inaccurate nor Accurate
 4: Moderately Accurate
 5: Very Accurate

1. Am the life of the party.	1-----2-----3-----4-----5
2. Feel little concern for others.	1-----2-----3-----4-----5
3. Am always prepared.	1-----2-----3-----4-----5
4. Get stressed out easily.	1-----2-----3-----4-----5
5. Have a rich vocabulary.	1-----2-----3-----4-----5
6. Don't talk a lot.	1-----2-----3-----4-----5
7. Am interested in people.	1-----2-----3-----4-----5
8. Leave my belongings around.	1-----2-----3-----4-----5
9. Am relaxed most of the time.	1-----2-----3-----4-----5
10. Have difficulty understanding abstract ideas.	1-----2-----3-----4-----5
11. Feel comfortable around people.	1-----2-----3-----4-----5
12. Insult people.	1-----2-----3-----4-----5
13. Pay attention to details.	1-----2-----3-----4-----5
14. Worry about things.	1-----2-----3-----4-----5
15. Have a vivid imagination.	1-----2-----3-----4-----5
16. Keep in the background.	1-----2-----3-----4-----5
17. Sympathize with others' feelings.	1-----2-----3-----4-----5
18. Make a mess of things.	1-----2-----3-----4-----5
19. Seldom feel blue.	1-----2-----3-----4-----5
20. Am not interested in abstract ideas.	1-----2-----3-----4-----5
21. Start conversations.	1-----2-----3-----4-----5
22. Am not interested in other people's problems.	1-----2-----3-----4-----5
23. Get chores done right away.	1-----2-----3-----4-----5
24. Am easily disturbed.	1-----2-----3-----4-----5
25. Have excellent ideas.	1-----2-----3-----4-----5
26. Have little to say.	1-----2-----3-----4-----5

27. Have a soft heart.	1-----2-----3-----4-----5
28. Often forget to put things back in their proper place.	1-----2-----3-----4-----5
29. Get upset easily.	1-----2-----3-----4-----5
30. Do not have a good imagination.	1-----2-----3-----4-----5
31. Talk to a lot of different people at parties.	1-----2-----3-----4-----5
32. Am not really interested in others.	1-----2-----3-----4-----5
33. Like order.	1-----2-----3-----4-----5
34. Change my mood a lot.	1-----2-----3-----4-----5
35. Am quick to understand things.	1-----2-----3-----4-----5
36. Don't like to draw attention to myself.	1-----2-----3-----4-----5
37. Take time out for others	1-----2-----3-----4-----5
38. Shirk my duties.	1-----2-----3-----4-----5
39. Have frequent mood swings.	1-----2-----3-----4-----5
40. Use difficult words.	1-----2-----3-----4-----5
41. Don't mind being the center of attention.	1-----2-----3-----4-----5
42. Feel others' emotions.	1-----2-----3-----4-----5
43. Follow a schedule.	1-----2-----3-----4-----5
44. Get irritated easily.	1-----2-----3-----4-----5
45. Spend time reflecting on things.	1-----2-----3-----4-----5
46. Am quiet around strangers.	1-----2-----3-----4-----5
47. Make people feel at ease.	1-----2-----3-----4-----5
48. Am exacting in my work.	1-----2-----3-----4-----5
49. Often feel blue.	1-----2-----3-----4-----5
50. Am full of ideas.	1-----2-----3-----4-----5

Friendship quality measure
Things I Do With My Friend

Below are statements about friendships. Please circle the number that tells how true each statement is about your very best friendship.

1 Not At All True	2 Hardly Ever True	3 Sometimes True	4 Most Of The Time True	5 Always True
-------------------------	--------------------------	------------------------	-------------------------------	---------------------

-
1. My friend ignores me when s/he is mad at me. 1 2 3 4 5
2. It is easy to make up quickly with my friend if we have a fight. 1 2 3 4 5
3. I can tell my friend about my problems. 1 2 3 4 5
4. I feel jealous if I see my friend hanging out with another person. 1 2 3 4 5

5. My friend hits and kicks me when s/he is mad at me. 1 2 3 4 5

6. My friend can tell me his/her secrets. 1 2 3 4 5

7. My friend makes me feel important and special. 1 2 3 4 5

8. I get mad at my friend a lot. 1 2 3 4 5

9. When my friend and I don't like someone, we won't let them hang out with us. 1 2 3 4 5

10. My friend and I threaten to beat others up if they don't do what we tell them to do. 1 2 3 4 5

11. My friend would rather hang out alone with me, rather than having others hang out with us as well. 1 2 3 4 5

12. My friend gets mad at me a lot. 1 2 3 4 5

13. My friend tells my secrets to other kids when s/he is mad at me. 1 2 3 4 5

14. It is easy to get over arguments with my friend. 1 2 3 4 5

15. I can tell my friend my secrets. 1 2 3 4 5

1 Not At All True	2 Hardly Ever True	3 Sometimes True	4 Most Of The Time True	5 Always True
-------------------------	--------------------------	------------------------	-------------------------------	---------------------

16. It bothers me if my friend hangs out with others, even when I am busy. 1 2 3 4 5

17. My friend says s/he will beat me up unless I do what s/he says. 1 2 3 4 5

18. My friend can talk with me about the things that make him/her sad. 1 2 3 4 5

19. My friend tells me I am good at things. 1 2 3 4 5

20. I disagree with my friend a lot. 1 2 3 4 5

21. When my friend and I are mad at someone, we ignore them or don't talk to them. 1 2 3 4 5

22. My friend and I hit and kick others we are mad at. 1 2 3 4 5

23. My friend gets jealous if s/he sees me hanging out with another person. 1 2 3 4 5

24. My friend gets annoyed with me a lot. 1 2 3 4 5

25. My friend tells me s/he won't like me anymore unless I do what s/he says. 1 2 3 4 5

26. My friend gets mad or upset if s/he sees me hanging out with another person. 1 2 3 4 5

27. My friend pushes and shoves me when s/he is mad at me. 1 2 3 4 5

28. When one of us hears a rumor about someone we don't like, we tell each other and pass it on. 1 2 3 4 5

29. I can talk with my friend about the things that make me sad. 1 2 3 4 5

30. It bothers my friend if I hang out with others, even when s/he is busy. 1 2 3 4 5

31. It is easy to talk with my friend about how to get over being mad at each other. 1 2 3 4 5

32. My friend and I push and shove others when we are mad at them. 1 2 3 4 5

1 Not At All True	2 Hardly Ever True	3 Sometimes True	4 Most Of The Time True	5 Always True
-------------------------	--------------------------	------------------------	-------------------------------	---------------------

33. I get mad or upset if I see my friend hanging out with another person. 1 2 3 4 5

34. My friend can tell me about his/her problems. 1 2 3 4 5

35. My friend annoys me a lot. 1 2 3 4 5

36. My friend gets upset when I want to be good friends with another person. 1 2 3 4 5

37. My friend says, "I'm sorry" if s/he hurts my feelings. 1 2 3 4 5

38. My friend won't let me hang out with him/her and his/her other friends when s/he is mad at me. 1 2 3 4 5

39. I would rather hang out alone with my friend, rather than having others hang out with us as well. 1 2 3 4 5

40. My friend disagrees with me a lot. 1 2 3 4 5

41. When my friend is mad at someone and ignoring them, I will ignore that person too. 1 2 3 4 5

42. I get upset when my friend wants to be good friends with another person. 1 2 3 4 5

43. How is this friendship going?

It's Going Really Badly	It's Going Kind of Badly	It's Going OK	It's Going Pretty Well	It's Going Really Well
-------------------------	--------------------------	---------------	------------------------	------------------------

44. How happy are you with this friendship?

Very Unhappy	A Little Unhappy	Not Really Happy Or Unhappy	Kind of Happy	Very Happy
--------------	------------------	-----------------------------	---------------	------------

Social Relationships Index

This questionnaire is the first part of a two-part study being conducted by Dr. Julianne Holt-Lunstad, an associate professor in the Psychology Department at Brigham Young University. During the second part of this study you will be required to bring in a friend with you to the experiment. This questionnaire is used for two purposes: (1) to give us a broad understanding of your network of friends, and (2) help us determine a friend that meets our criteria for participation.

This questionnaire asks to you rate up to 10 of your friends on five dimensions during 3 different contexts. It is estimated that this will take 10-15 minutes to complete. **PLEASE note participants are only rating one friend, the friend they are playing the videogame with.**

Social Relationships Index (SRI) – Friendships

Instructions: Our relationships with other people may or may not have both positive and upsetting aspects. For the following questionnaire, please list the initials of friends in your life with whom you have contact.

For each person you list, complete the following:

- Specify the gender of this friend
- Provide an estimate of the length of time you have known the person and the average number of times per week you have contact with the person
- Specify any additional relationship (e.g., coworker) you may have with the friend.
- Rate how generally important the person is to you, using the scale titled “HOW IMPORTANT?”
- Rate each person according to how this person is during 3 aspects of relationships:
 1. When you need support such as advice, understanding or a favor:
 2. When you are really excited, happy, or proud of something:
 3. During routine daily interactions, conversations, or activities.
 - For each aspect rate:
 - how generally positive or helpful this person is to you (using the scale titled “HOW HELPFUL?”),
 - how generally upsetting this person is to you (using the scale titled “HOW UPSETTING?”),
 - how generally mixed or conflicted your thoughts and feelings are for this person (using the scale titled “HOW MIXED OR CONFLICTED?”).

(Note: When asked to rate the extent the individual is HELPFUL or POSITIVE, you should ignore any upsetting aspects of the relationship. When asked to rate the extent this individual is UPSETTING, you should ignore any helpful or positive aspects of your relationship.)
- how predictable the person is when you go to this person in that situation.
- For the final rating, indicate how likely you are to go to this person in that situation.

Remember that your responses are confidential and that there are no right or wrong answers.

The return of this survey is your consent to participate in this portion of the research

Date: _____

Your **Gender:** Male / Female (Circle one)

(1) List up to 10 Friends

Initials of friend:	Gender of friend: (circle one)	Approximate length of time you have known the friend: (years or months)	Average number of days per week you have contact with the friend:	RELATIONSHIP with you: Please indicate any additional relationship you may have with this friend (e.g., room-mate, coworker, cousin). If none, leave blank.	How IMPORTANT is the friend to you? 1=Not at all important 2=A little important 3=Somewhat important 4=Moderately important 5=Very important 6=Extremely important (circle one number)
1.	M F				1 2 3 4 5 6
2.	M F				1 2 3 4 5 6
3.	M F				1 2 3 4 5 6
4.	M F				1 2 3 4 5 6
5.	M F				1 2 3 4 5 6
6.	M F				1 2 3 4 5 6
7.	M F				1 2 3 4 5 6
8.	M F				1 2 3 4 5 6
9.	M F				1 2 3 4 5 6
10.	M F				1 2 3 4 5 6

(2) List and rate the SAME 10 Friends

Initials of friend:	When you need support such as Advice, Understanding, or a Favor...				
	how HELPFUL is this person to you?	how UPSETTING is this person to you?	how MIXED OR CONFLICTED are your thoughts and feelings for the person?	how UNPREDICTABLE is this person to you?	how LIKELY are you to go to this person?
	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)
1.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
2.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
3.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
4.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
5.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
6.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
7.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
8.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
9.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
10.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6

(3) List and rate the SAME 10 Friends

Initials of friend:	When you are really... Excited, Happy, or Proud of Something . . .				
	how POSITIVE is this person to you?	how UPSETTING is this person to you?	how MIXED OR CONFLICTED are your thoughts and feelings for the person?	how UNPREDICTABLE is this person to you?	how LIKELY are you to go to this person?
	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)
1.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
2.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
3.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
4.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
5.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
6.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
7.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
8.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
9.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
10.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6

(4) List and rate the SAME 10 Friends

Initials of friend:	During routine daily Interactions, Conversations, or Activities . . .				
	how POSITIVE is this person to you? 1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	how UPSETTING is this person to you? 1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	how MIXED OR CONFLICTED are your thoughts and feelings for the person? 1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	how UNPREDICTABLE is this person to you? 1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)	how LIKELY are you to go to this person? 1=Not at all 2=A little 3=Somewhat 4=Moderately 5=Very 6=Extremely (circle one number)
1.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
2.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
3.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
4.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
5.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
6.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
7.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
8.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
9.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
10.	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6

Prisoner's Dilemma:

The example Prisoner's Dilemma, illustrated below is one of the best-known models in game theory. It illustrates the paradoxical nature of interaction between mutually suspicious participants with opposing interests.

The diagram below shows the possible outcomes for the prisoner's dilemma. The number in the upper triangle of each pair indicates the payoff for Player B; the lower triangle, Player A. Higher numbers represent greater payoff for the individual. The corresponding order of preference for these options decreases from 5 (most preferred) to 0 (least preferred).

		Player A	
		Compete	Cooperate
Player B	Cooperate	<div>3</div> <div>3</div>	<div>0</div> <div>5</div>
	Compete	<div>5</div> <div>0</div>	<div>1</div> <div>1</div>

The most common hypothetical explanation of this model is the following:

Two accomplices to a crime are imprisoned, they forge a pact to not betray one another and not confess to the crime. The severity of the punishment that each receives is determined not only by his or her behavior, but also by the behavior of his or her accomplice. The two prisoners are separated and cannot communicate with each other. Each is told that there are four possible outcomes:

- If one confesses to the crime and turns in the accomplice (*defecting* from a pact with the accomplice), his sentence will be reduced.

- If one confesses while the accomplice does not (i.e. the accomplice *cooperates* with the pact to not betray each other), the first can strike a deal with the police, and will be set free. But the information he provides will be used to incriminate his accomplice, who will receive the maximum sentence.
- If both prisoners confess to the crime (i.e. both *defect* from their pact), then each receives a reduced sentence, but neither is set free.
- If neither confesses to the crime (i.e. they *cooperate*), then each receives the minimum sentence because of the lack of evidence. This option may not be as attractive to either individual as the option of striking a deal with the police and being set free at the expense of one's partner. Since the prisoners cannot communicate with each other, the question of whether to "trust" the other not to confess is the critical aspect of this game.

Appendix C: Consent and Debrief forms

INFORMED CONSENT DOCUMENT

Title of Study: Friendship activities in emerging adulthood

Investigators: Jonathan Rogers, graduate student (BYU), Robert Ridge, PhD (BYU).

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

This study involves how friends feel when doing certain activities together. You are participating because you voluntarily responded to an invitation to participate via the Sona experiment management system in the psychology department. Alternatively, you may have been recruited by a friend (from the psychology dept).

DESCRIPTION OF PROCEDURES

There are two parts to this research.

During the first part, you will complete a number of online questionnaires. The questionnaires will focus on personality, feelings of friendship, and activities that you do by yourself and with your friends. Completion of the questionnaires should take about 30 minutes.

In the second part of the research, you will come to the laboratory with your friend. You will play a few games (either alone or with your friend) and then will fill out a few final questionnaires. One of the games may or may not be a videogame (rated T). This may contain low levels of violence. Participation in this part of the research should take around an hour.

RISKS

There are minimal risks for participation in this study. You may feel some discomfort when playing the videogame, as some of the images may be aggressive, though none of them are graphic. All the videogames used in the study will be from the Super Mario Brothers line. If you do feel uncomfortable at any point, please let us know, and you will be excused from the study.

BENEFITS

If you decide to participate in this study there will be no direct benefit to you. It is hoped that the information gained in this study will benefit society by helping us understand how friendships work.

COSTS AND COMPENSATION

You will not have any costs from participating in this study. You will receive course credit in your psychology class if you are currently taking a psychology class. Additionally, you (and your friend) will receive \$15. This will not be pro-rated.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

To ensure confidentiality to the extent permitted by law, all information provided will remain confidential and will be reported only as group data with no identifying information. Your responses to the questionnaires will be stored on a secure computer server that may be accessed only using a pass code. Any other data will be stored in a locked filing cabinet in the

primary researcher's office. Only the supervising professors and their approved employees will be permitted to access the data. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study.

For further information about the study contact Jonathan Rogers – 801 422 4636, jcer1982@byu.net.

If you have questions you do not feel comfortable asking the researcher, you may contact the BYU IRB administrator, at (801) 422-1461, irb@byu.edu.

Please tick the box below to show you have read the above information and give your consent to participate

☐

Debrief

Now that you have finished your participation in this research, we have some final explaining to do. PLEASE READ WHAT FOLLOWS CAREFULLY.

What we told you at the beginning of the experiment was not the whole story. Sometimes in psychology, the true purpose of a study must be kept secret until the end to ensure that individuals' answers are honest. If we explained the true purpose of this study at the beginning, some individuals might respond to questions in the manner they think we want, thinking that they are helping us out. Others might respond in an opposite manner, just to show us that we can't figure them out. When people are trying to respond in a certain way to please or displease the experimenter, the results are not reflective of how people truly behave and feel in the real world.

In this study, we were specifically examining how playing videogames (compared to board games) influenced your feelings and behavior towards your friend. The second game you played actually measured how cooperative or competitive you were towards your friend. We were also interested in the gaming context. Some participants played games alone and some played with their friends. We were wondering whether playing games in a friendship context influenced responses.

There are no correct responses in this study; we are interested in people's natural responses. Your responses will be confidential and will only be used as a part of the aggregated sample. There will be no personal information linked to your responses.

SO WHAT NOW?

Now that you know the true purpose of the study, you have a choice to make. Because we didn't disclose the true purpose of the study at the beginning, you were misinformed about your participation. You may feel that you wouldn't have participated had you known the true purpose of the study. Therefore, we are giving you the opportunity to withdraw your

information if you would not like us to analyze it. Please let the RA know should you wish to withdraw your data.

Regardless of what you decide, it is important that you do not disclose the true purpose of this research to anyone else. If you were to tell others about the true purpose of experiment and those individuals then participated in the study, our results might be skewed to misrepresent people's true reactions. Your participation and our research would be wasted and we could not gain an understanding of how exposure to violent videogames influences aggressive behavior. Therefore, it would be greatly appreciated if you maintained the confidentiality of what you did today. If someone asks you what this study is about, we suggest that you share what you did (the tasks) without telling him or her the purpose of the research.

Although this research required that we conceal our true purpose, not all psychological research does so. Only under certain circumstances (as described above) does it become necessary to mask the purpose of a study. We wish to remind you of this fact because we don't want you to worry about trying to guess the "hidden" purpose in other psychological research you may participate in. Typically, the rationale you are given for the research is, in fact, true.

Thank you for your participation and your assistance in maintaining confidentiality.