

Investigating Prosocial Gameplay and Prosocial Self-Concept

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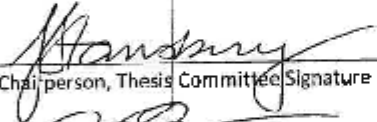
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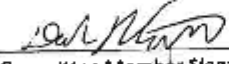
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Abstract

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Michael W. Andrews

Video games are an increasingly popular form of entertainment media, with the hardware and software more now than ever finding their way into the homes of youths. The present study sought to expand on prior research concerning video game play and self-concept, while also adding to the prosocial video game literature generally. Specifically, this research tested whether playing a prosocial video game encouraged individuals to automatically associate themselves with prosocial ideas, that is, prosocial self-concept. An implicit association test (IAT) was developed to investigate this research question. A measure of helping behavior was also implemented via a tangram help/hurt task, with the idea that self-concept is a contributing factor in determining behavioral outcomes. One hundred student participants played two sessions (10 minutes each) of either a prosocial or a neutral video game, followed by measures of prosocial self-concept and helping behavior. Results indicated that those who played the prosocial video game more readily associated themselves with prosocial ideas as compared to those who played the neutral game, though there was no effect on helping behavior. Interpretation and implications of these findings are discussed, as are possible future directions for this line of research.

Keywords: GLM, IAT, prosocial, self-concept, video game

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Chapter I

Introduction

Background and Statement of Purpose

Videogame play has been a popular topic of study among media researchers since the technology's popularization, and subsequent controversies, as a pastime for children and teenagers. Much of this body of research has demonstrated video games' negative impact on social behavior, as well as thoughts (Anderson & Dill, 2000; Anderson et al., 2004) and affect (Anderson & Ford, 1986). For example, Anderson and Dill (2000) determined that playing the first-person shooter game *Wolfenstein 3D* influenced people to have more aggressive thoughts, and respond more violently in a competitive task. However, the extent to which violent videogames encourage aggressive behavior in its players is up for debate, as the majority of literature on violent video games suggests that violent gameplay can lead to benign acts of aggression (e.g., exposing an opponent to a loud noise), while a similar link between violent gameplay and criminal behavior is less convincing (Markey, Markey, & French, 2014). Nevertheless, the evidence supports that violent video games, to some extent, increase aggressive behavior, cognition, and negative affect in their players (see Anderson et al., 2010, for a review).

Violent games, like other media such as movies and television before it, have faced public criticism for the medium's ability to negatively impact the behavior of children and adolescents. For instance, video games were implicated by popular press after the Sandy Hook elementary-school shooting, where the gunman Adam Lanza was purportedly an avid gamer (Greene & Golding, 2013). The press emphasized that the shooter had prepared for the attack by playing a game called *School Shooting*, but official

reports concerning the gunman's activities leading up to the massacre indicated that Lanza spent most of his time playing *Dance Dance Revolution*, a music game where players move their feet in time with on-screen directions (Office of Sedensky, 2013). The sensationalization of video games as training simulations for violent behavior has fostered a social bias against video games in the public mind, and limits the receptiveness of arguments for the possible advantages that can be found in videogame play. The present study attempts to shed light on positive social outcomes following prosocial (or helpful/helping) videogame play, a topic that has been overshadowed by the violent media research. Beneficial outcomes of prosocial video game play shares theoretical support with the same ideas that justify aggressive outcomes of violent video game play, such as priming and learning theories such as the General Learning Model (Gentile et al., 2009).

Additionally, this study attempted to not only examine the possible beneficial behavioral outcomes of prosocial videogame play, but also give critical attention to the mechanisms that might underlie that behavior. Experts agree that harmful behavioral changes brought on by violent media is caused by subtle and unintentional changes in an individual's cognition (Huesmann, 1986; Berkowitz, 1990; Bushman, 1998; Anderson & Bushman, 2002), such as the priming of violent thoughts and feelings, thus leading to aggressive action (Anderson, Benjamin, & Bartholow, 1998; Berkowitz, 1990; Todorov & Bargh, 2002). Additionally and more critical to the present study, violent media has been shown to impact automatic associations of concepts with the self, or self-concept (Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998; Todorov & Bargh, 2002), which may mediate how one behaves in a given circumstance (Bargh &

Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002). The present study thus applies the past history of violent media and video game research to the context of prosocial video game play, arguing that the same automatic self-association processes that account for aggressive behavior after violent media exposure can similarly account for helping behavior after prosocial media exposure. In short, the arguments presented here posit that prosocial video game play can encourage a change in self-concept towards prosocial concepts, and thus encourage prosocial behavior.

Though much attention has been directed towards the negative effects of video game play, not all video games contain violence. Video games can be associated with positive effects depending on the content of that game, including, as the present study aims to show, prosocial video games' ability to increase one's prosociality (see Greitemeyer & Mügge, 2014 for a review). Due to the mediating effect of self associations with behavior (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002), considering oneself as a helpful individual will encourage future helpful behavior, which in itself is beneficial to society. There is a precedent that high prosociality, or the predisposition to enact sharing, helping, and caring behaviors (Caprara et al., 2012; Eisenberg, Fabes, & Spinrad, 2006), contributes to increased school performance (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000), decreased risk factors related to depression (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999), and improved peer relationships in adolescents. Prosociality, or specifically volunteerism, has also been linked to higher feelings of self-esteem (Johnson et al., 1998; Yates & Youniss, 1996), though the direct effect of prosociality generally on self-esteem appears to be small (Zuffianò et al., 2014).

Chapter II

Literature Review

This chapter expands on the past research relevant to the present study's proceedings, including a review of research of the behavioral effect of prosocial video game play, the cognitive-behavioral models used to explain these effects, and how changes in self-concept might be produced. The chapter concludes with an integrated explanation of the present study.

Prosocial Video Game Play

Research on prosocial video games, or video games where the objectives are to aid or help other game characters, has demonstrated that prosocial behavior performed in the game context carries over to prosocial behavior in real life. Greitemeyer and Osswald (2010) conducted a set of four experiments to address this question. For each experiment, the participants played a prosocial game (*City Crisis* or *Lemmings*), a neutral game (*Tetris*), or an aggressive game (*Lamers*; study one only), followed by a measure of prosocial behavior. In studies one and four, researchers measured spontaneous, unrequested prosocial behavior by “accidentally” spilling pencils onto the floor to provide participants with the opportunity to assist (a common means of measuring spontaneous helping behavior; Macrae & Johnston, 1998). As predicted, participants who played the prosocial game were significantly more likely to assist in picking the pencils up than those who played neutral or aggressive games.

In Greitemeyer and Osswald's (2010) second study, participants were unexpectedly requested to participate in future follow up studies, and were asked how much time they would be willing to devote to them. Not only did participants who played

the prosocial game agree to take part in more additional studies than those who played a neutral game, they were willing to devote more time as well. Study three was designed to test if prosocial behavior would persist when the “cost” for helping was high; in studies one and two, the amount of effort the participants would have needed to invest for helping was relatively low, thus these behaviors were low “cost.” Past studies indicate that the decision to engage in low- and high-cost helping behaviors are impacted differently (Greitemeyer, Fischer, Kastenmüller, & Frey, 2006; Weyant, 1978). For instance, the amount of bystanders influences the choice to initiate low-cost helping behavior but not high-cost helping behavior (Fischer, Greitemeyer, Pollozek, & Frey, 2006). To test if helping persisted after prosocial gameplay even when the cost was potentially high, Greitemeyer and Osswald (2010) interrupted participant’s gameplay with the sudden appearance of a confederate, who pretended to be an “ex-boyfriend” to one of the female experimenters, and began harassing the experimenter. Helping the female experimenter by intervening would be considered a high cost behavior, but nevertheless, significantly more participants who were playing the prosocial game aided the harassed woman than those who were playing the neutral game. Notably, this effect remained significant even after controlling for participants' mood, how much they liked the game, and their sex (Greitemeyer & Osswald, 2010).

Though Greitemeyer and Osswald (2010) clearly suggest that prosocial video game play is capable of impacting prosocial behavior across multiple levels (e.g., unrequested and requested helping, as well as low-cost and high-cost helping), these findings are limited in that they only reveal the short-term effects of prosocial video game play. However, in an examination of different age groups from a variety of countries,

Gentile et al. (2009) provides evidence for prosocial video games' positive long-term effects. The researchers conducted a cross-sectional correlational study of secondary school children from Singapore, correlating video game habits and habitual prosocial behaviors. The children self-reported their top three favorite video games and how many hours per week they spent playing those games, as well as how much violent or prosocial content those games included. Prosocial behavior and attitudes were measured across several levels (e.g., helping behavior, cooperation and sharing, trait empathy), and results showed a strong positive relationship between prosocial video game play and prosocial behaviors and traits, while violent video game play was negatively related to prosocial behaviors and traits.

Though Gentile et al.'s (2009) results support the notion that prosocial video games and prosocial behaviors and traits are positively related, they recognize that a more direct investigation of the theory is needed due to the limited scope a cross-sectional correlational study alone may yield, in that one cannot determine if prosocial video game play increases prosocial behavior or vice-versa. To better show the effect of prosocial videogames on prosocial behavior, a second, longitudinal study was conducted. Two samples of Japanese students, one consisting of fifth graders and a second of eighth and eleventh graders, were surveyed to assess their habitual prosocial video game play and prosocial behavior at two separate instances, three to four months apart. Analysis of these data revealed not only that prosocial game playing predicted the amount of prosocial behavior at three to four months later, but also that prosocial behavior predicted prosocial game playing later in time as well. This bidirectional relationship suggests an upward spiral of prosocial gaming and behavior, similar to the contrasting downward spiral of

violent video game play and aggressive behavior (Slater, Henry, Swaim, & Anderson, 2003).

The two aforementioned collections of studies contrast in not only their designs and conclusions, but also in their populations. The majority of video game research argues that video gaming has an effect on children and teenagers, but laboratory experiments with video games are usually conducted on young adults, as is the case with much lab experimentation. Video game researchers are thus in an awkward position of having great access to a ready population of video game players (i.e., young adult undergraduates), but having to generalize their findings to a younger demographic. It is reasonable to then be concerned for the validity of drawing conclusions about video games' effect on children from an older sample.

To alleviate this concern, Saleem, Anderson, and Gentile (2012) replicated a laboratory experiment originally sampling college-aged students ($M_{age} = 19.2$ years; Gentile et al., 2009, study 3) with children ranging from ages 9 to 14. They sought to determine if video game play would affect children's helping or hurting behavior. Participants played either one of two violent games (*Ty2* and *Crash Twinsanity*), one of two neutral games (*Pure Pinball* and *Super Monkey Ball Deluxe*), or a prosocial game (*Chibi Robo* and *Super Mario Sunshine*). Participants were led to believe that the researchers were investigating video game players' ability in solving tangram puzzles. Tangram puzzles are a set of plastic shapes that, when put together correctly, creates an outline of a specified shape. To measure helping or hurting behavior, participants were instructed to assign a number of easy, medium, or hard tangram puzzles to a "partner," who would win a 10 dollar gift certificate if they completed the assigned puzzles in under

10 minutes. Because hard puzzles take longer to solve than easy puzzles, assigning easy puzzles would be considered helping behavior while assigning hard puzzles would be hurting behavior. As expected, those who played the prosocial games were significantly more helpful than those who played violent games, and violent games yielded more hurtful behavior than the prosocial game. Players of the neutral games fell somewhere in between. This pattern of results was consistent with the original study conducted on college students (Gentile et al., 2009, study 3).

Cognitive-Behavioral Models of Interpersonal Learning

The collection of studies just discussed clearly suggests that prosocial video game play, at least to some extent, motivates prosocial action. As previously noted however, action is caused by the subtle influences of implicit cognitions (Huesmann, 1986; Berkowitz, 1990; Bushman, 1998; Anderson & Bushman, 2002). Much research has supported the idea that behavior is the result of unconscious and automatic processes; indeed, investigating these subtle mechanisms has been one of social psychology's most prominent domains of research since the late twentieth century (Todorov & Bargh, 2002). Studies of aggressive behavior and violent video games have most prominently utilized the General Affective Aggression Model (GAAM), which suggests that violent game play leads to increased aggressive thoughts, feelings, and behaviors in the short term, which then reinforces aggressive scripts, perceptual schemata, aggressive attitudes, and aggression desensitization in the long term (Anderson & Bushman, 2002; Anderson, Gentile, & Buckley, 2007).

The GAAM has hence been expanded to not only predict violent media's impact on aggressive behavior and cognitions, but to any stimuli's short term and long term

effect on an individual, video games included, called the General Learning Model (GLM; Buckley & Anderson, 2006; Swing, Gentile, & Anderson, 2008). The GLM still accounts for violent video games' negative influence on thoughts, feelings and behaviors, but it can also recognize the potential positive influence of prosocial video games on thought, feelings and behaviors. Note, however, that aggressive and prosocial effects are not mutually exclusive; one can be prone to aggressive thoughts and behavior, but also to prosocial thoughts and behavior, such as being aggressive towards foes but helpful towards allies (Gentile et al., 2009). Aggression and prosociality are not two sides of the same coin, even though studies have shown some violent video games' ability to decrease prosocial behavior (Anderson & Bushman, 2001; Anderson et al., 2007, Study 3).

The GLM is broken into two components, accounting for short term effects and long term effects. The short term portion of the GLM is identical to the GAAM, and states that any and all social or learning encounters are defined by personality (e.g., aggressive personality) and situational factors (e.g., video game play and provocation) of the individual and the circumstance at hand. The combination of these two factors then influences a trio of internal states: affect (e.g., state hostility), cognition (e.g., aggression scripts), and arousal (e.g., heart rate). Of most interest for the present study are the cognitive effects, which include the activation of existing knowledge structures (i.e., priming), the products of learning and memory. Past research has shown that aggressive scripts are triggered by video games with aggressive content (Bushman & Anderson, 2002), and the same argument has been made of prosocial scripts and video games with prosocial content (Gentile et al., 2009); playing a prosocial game primes and rehearses prosocial scripts. Notably, all three of these internal states influence and can reinforce

one another, such that, for example, the activation of aggressive scripts (cognitive) brings about a rise in state hostility (affect) and heart rate (arousal), and vice versa. These internal effects then help determine how an individual responds to the encounter, in terms of both automatic appraisal (e.g., feeling threatened) and controlled appraisal (e.g., wanting revenge) level, as well as in behavioral response (e.g., violent action), if any.

Furthermore, operant and classical learning mechanisms play a large role in the GLM, as the outcome of any learning encounter may be reinforced or punished, which will be taken into consideration as a situational factor that impacts future cognitions, feelings, and arousal. The GLM therefore represents a continuous cycle of learning, reinforcement, and punishment; if presented with a situation in which one could either help or harm someone after gameplay, the decision will be influenced by what scripts the game triggered and by what behaviors the game reinforced. Prosocial video games reward prosocial behavior, therefore the decision to help should follow an encounter with a prosocial video game (Gentile et al., 2009).

Notably, past research has relied on this model to determine the most appropriate games for comparison when studying prosocial content. Greitemeyer and Osswald (2010), in their pilot study, determined that the would-be prosocial games *City Crisis* and *Lemmings* differed significantly from the neutral game *Tetris*, and *Tetris* from the aggressive game *Lamers*, in terms of the different internal states of the GLM. They determined that these games were similar on the affective and arousal dimensions, while also determining that these games differed in perceived prosocial content, or the cognitive dimension. The measures they used in their pilot to measure affect and arousal were the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen,

1988) and the Perceived Arousal Scale (Anderson, Deuser, & DeNeve, 1995), respectively. They evaluated the cognitive component using a questionnaire transposed from Anderson and Dill (2000).

In addition to positing the immediate behavioral outcomes after a social or learning encounter, the GLM offers an explanation for how repeated encounters, or practice, produces long term effects in an individual's cognitive and emotional constructs, or their personality (Gentile et al., 2009). It posits that repeated short-term learning encounters will create or change in (1) precognitive and cognitive constructs, such as schemata, beliefs, and scripts for perception and expectation; (2) cognitive-emotional constructs, such as attitudes and stereotypes; and (3) affective traits, such as conditioned emotional responses. Certain changes may simply result from repeated exposure to a stimulus, such as forming stereotypes when a specific social group is consistently similarly portrayed, while others are the result of reinforcement, such as beliefs about the acceptability of aggressive actions due to violent behavior being rewarded in video games.

In terms of video games as teaching devices, they are very apt for the task; one of the most effective ways for transferring learned cognition and behavior to the real world is by presenting problems in multiple contexts with similar solutions (Gentile & Gentile, 2008). Commonly, this is exactly what video games tend to achieve; for example, a shooter video game might have the player encounter enemies in a corridor or on an open plane, have enemies engage the player with a variety of attacks, or provide the player a number of weapons by which with to defeat the enemies. Furthermore, video games span a vast array of different settings and yet share similar mechanics; a shooter game may

take place in historical times, modern day, be set in the future, have a realistic or cartoonish visual style, and so on. As researchers Gentile and Gentile (2008) specify:

Violent video games are set in many contexts... The common feature among all of these different games and contexts is that violence is the solution to whatever problem the gamer/student faces. This is exactly the best way to teach so that the student will be able to transfer the underlying concept to new situations. (p. 130)

Though many shooter games include additional gameplay challenges that do not involve violence, such as logic or dexterity puzzles, the most prominent component of shooter games is violence. Indeed, in a longitudinal study of children, adolescents, and young adults, Gentile and Gentile (2008) found that participants who played a larger variety of violent video games were more likely to transfer aggressive cognitions and behaviors, even after controlling for total amount of time playing all video games. By the same principle that different contexts in violent video games condition aggressiveness, nonviolent games can also be utilized to benefit their players (Gentile & Gentile, 2008; Buckley & Anderson, 2006). For instance, educational software has been used to teach algebra, geometry and programming to children (Corbett, Koedinger, & Hadley, 2001; Kahn, 1999), as well as math, reading, English fluency, and critical thinking skills to children of migrant families (Winograd, 2001). Though researchers argue in terms of transferring learned information and skill from video games to the real world or classroom contexts (see Lieberman, Biely, Thai, & Peinado, 2014; Barnett, 2014), such claims are debated and are not the focus of the present research.

Self-Concept

Among the innumerable influences that exist to impact behavior, including relatively deliberate ones like learned values (Bandura, 1978; Bandura, Ross, & Ross, 1963), self-concept is particularly impactful. Beliefs one has about oneself has an important effect on behavior (Brown, 1998). For instance, if one believes themselves to be an aficionado of Coppola films, they are more likely to impress friends at parties with their keen understanding of the American classic *The Godfather*. Self-concept may have more subtle influences as well: consider the previously discussed Greitemeyer and Osswald's (2010) study where helpful behavior was measured by participants' assistance with picking up spilled pencils. It might have been the case that those participants who behaved the most helpful, that is, those who played a prosocial video game, regarded themselves as a helpful person, and thus behaved helpfully. Also consider Gentile et al.'s (2009) longitudinal study that revealed that prosocial video game play and prosocial behavior predicted each other three to four months later; the presence of long-term effects of behavior from video game play suggests that there exists some underlying factor that relates the two, such as self-concept.

However, self-concept is seldom included in studies investigating video games' impact on behavior. One rare example of a study to have explicitly examined video games and self-concept is by Uhlmann and Swanson (2004), who investigated the relationship between violent video games and automatic aggressive self-concept, or the extent to which the self is spontaneously associated with aggressive traits and actions. Uhlmann and Swanson (2004) argued that violent media, and specifically violent video games, caused increased automatic association with aggressive self-ideas among their

players, such that aggressive words like *Combat* are automatically related to the self. They thus had participants play either the violent game *Doom* or the violent-neutral game *Mahjongg: Clicks*, but instead of measuring behavior, they had a combination of implicit and explicit measures including an implicit association test (IAT), three custom surveys for aggressive perceptions of others and self, and Buss and Perry's (1992) Aggression Questionnaire. The IAT they used was designed to evaluate participant's automatic self associations with aggressive traits and actions, or aggressive self-concept, and their results showed that aggressive self associations were more readily accessible to those who played *Doom* instead of *Mahjongg: Clicks*.

In review, past studies of prosocial video game play have been nearly entirely focused on their behavioral effects. These behaviors may reasonably be suggested to stem from a change in self-concept, though the most popular explanation for behavior augmentation is through the GLM, a comprehensive theory of learning. Included in the GLM is the proposition that repeated behavioral responses result in lasting change of personality constructs, which may account for change in self-concept on the long term as well. Self-concept can be defined as the individual's beliefs of him or herself, including his or her attributes and who and what the self is (Baumeister, 1999), so if one's personality can be changed in the long term, then so can one's beliefs regarding it. However, the present study's focus is on whether short-term change of self-concept is possible, rather than lasting change. The following discusses how short term self-concept change may be achieved and recognizes the challenges inherent to the task.

Self-concept can be thought of as self-perceptions, such that individuals know themselves by simply observing themselves (Brown, 1998). People may behave in a

manner congruent with how they regard themselves as being, but the opposite is also true, as self-perception theory (Bem, 1967) suggests that one determines their own attitudes and beliefs by observing their own behavior as though from a third person. For instance, if someone performs an intrinsically motivated activity, but nevertheless receives an extrinsic reward for doing it, then they are more likely to evaluate their behavior as more extrinsically motivated than intrinsically motivated because that is how an observer would likely evaluate the situation.

With self-perception theory in mind, social psychologists have invented a methodological paradigm for self-concept change and analysis: If one is induced to behave in a way indicative of a certain trait, people then indicate that they regard themselves as possessing the implied trait in subsequent self-reports (Fazio, Effrein, & Falender, 1981; Gergen, 1965; Jones, Rhodewalt, Berglas, & Skelton, 1981; Kulik, Sledge, & Mahler, 1986; Rhodewalt & Agustsdottir, 1986; Schlenker & Trudeau, 1990). For example, in a study concerning self-perceptions of introversion and extraversion (Fazio, et al., 1981), participants read aloud the answers to leading questions that either implied an introverted or an extraverted personality (e.g., "what things do you dislike about loud parties?" and "What would you do if you wanted to liven things up at a party?" p. 235). These biased questions induced introverted or extraverted behavior in the participants, which they then internalized to result in not only continued behavior in line with the manipulation during subsequent behavioral measures, but also reported higher self-ratings of trait introversion or extraversion.

Self-concept appears to be dual natured, as repeatedly comprehensive theories of the self have recognized the construct's contradictory status as both consistent and fluid

(Rogers, 1951), or stable yet variable (Turner, 1999). The stability of the self can be demonstrated in studies where individuals are observed actively seeking out information that verifies their current view of their self-concept, while actively avoiding information that would lead them to reject that view (Swann, 1985; Swann & Hill, 1982; Swann & Read, 1981). These phenomena suggest that people crave stability and are resistant to change, but the self becomes much more variable when forced into different social environments. Indeed, it is well known that one puts on a different face depending on whose company they are in, a phenomena so established that even William James, father of American Psychology (Pajares, 2003), wrote that a person has "as many different social selves as there are distinct groups of persons about whose opinion he cares" (James, 1910, p. 294). However, the evidence for a variable self pales in comparison to the magnitude of evidence for a stable self.

The incongruent evidence reporting the self as being both stable and variable can be reconciled by dividing self-concept from one all-encompassing construct into many smaller constructs. Individuals possess an array of different self-conceptions, including the good selves, the bad selves, the hoped-for selves, the feared selves, the not-me selves, the ideal selves, the possible selves, and the ought selves (Greenwald & Pratkanis, 1984; Jones & Pittman, 1982; McGuire, 1984; Sullivan, 1953; Tesser & Campbell, 1983). Although an individual will have thoughts and feelings about the self that will remain consistent, they can simultaneously hold any one of these other self-conceptions. The currently held self-conception at any given instant is called the working self-concept (Markus & Kunda, 1986).

Markus and Kunda (1986) show that the stability of self-concept tends to mask smaller variations in working self-concept, and thus create the illusion that self-concept is completely stable. In actuality, working self-concept undergoes constant change dependent upon (1) what other subset of the self has recently been activated, (2) what has been evoked by the individual's recent experiences, and most importantly, (3) elicitations from the social situation at hand. The context-dependent variation in working self-concept is limited to fairly subtle alterations of the more stable self-conceptions, and do not involve major readjustments of well-established self-thoughts and feelings. Typical assessments of self-concept, such as self-report adjective check-lists, only elicit salient self-conceptions and are unlikely to register the delicate changes in working self-concept. Measurements of the subtle changes of working self-concept must be similarly subtle, such that they measure the availability of self-conceptions or reveal changes in the meaning or interpretation of various self-descriptions (Markus & Kunda, 1986). For instance, IATs have long been used to assess self-concept, as well as the similarly enigmatic construct of self-esteem, as the authors of the test assumed that distinct implicit and explicit constructs required discrete measurement strategies (Greenwald & Farnham, 2000).

Present Study

Although there is an established paradigm that indicates that self-report measures reveal changes in self-concept after one is induced to behave in a manner indicative of a target trait (Fazio et al., 1981; Gergen, 1965; Jones et al., 1981; Kulik et al., 1986; Rhodewalt & Agustsdottir, 1986; Schlenker & Trudeau, 1990), other sources suggest that such instruments are not delicate enough to reveal the minute variations in working self-

concept, the variable aspect of self-concept (Markus & Kunda, 1986), or changes in goals and intentions (Anderson et al., 2010). The present study thus invests in the adaption of an array of past measures, repurposed to assess self-concept on multiple different levels. Notably, despite the success of self-reports in revealing self-concept change, that paradigm has not seen much use in the study of video games as most video game research has focused on behavioral outcomes rather than directly evaluating self-concept change. However, most agree that the mechanisms underlying the behavioral effects of video games, and indeed media in general, are automatic (i.e., spontaneous and unintentional; Huesmann, 1986; Berkowitz, 1990; Bushman, 1998; Anderson & Bushman, 2002), such as trait accessibility (Anderson & Dill, 2000; Bushman, 1998; Uhlmann & Swanson, 2004).

The present study investigated video games' capacity to induce self-concept change, and is unique in that it used prosocial video game content in the attempt. Evaluating a possible short-term causal relationship between prosocial video game play and prosocial self-concept has, to the author's knowledge, not been done before. This study implements a self-report (explicit) measure of self-concept, in which participants simply rate themselves on a list of prosocial trait concepts, but also has participants perform an implicit association test (IAT; Greenwald & Farnham, 2000; Greenwald et al., 1998) to measure implicit prosocial self-concept. An IAT was successfully utilized by Uhlmann and Swanson (2004) to similarly discern automatic aggressive self-concept after violent video game play, so applying the same kind of measure in the context of prosocial gaming is not so unusual. A third and final measure this study implements is the tangram assignment task designed by Gentile et al. (2009); though not a measure of self-

concept, the tangram assignment task may reveal observable behaviors that will help verify this study's self-concept oriented measures. This is because, according to research concerning automatic social-cognition, one's behavior in their environment is often mediated by their cognitive associations with the self (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002). If this study replicates Gentile et al.'s (2009) results in the tangram assignment task, there would then be correlational evidence to support the prosocial self-concept and prosocial-behavior link.

There is reason to expect that the two self-concept measures, the explicit and implicit measures, will produce results indicative of similar conclusions. Essentially, when participants complete self-report measures by self-evaluating the strength of a trait, as they did in this study's explicit measure of self-concept, they presumably introspectively assess the association between their self and the traits in question. An IAT aims to evaluate these self-associations as well, but may yield divergent results compared to an explicit measure as the implicit measure controls for a number of interferences known to impact self-report results, such as demand characteristics (Orne, 1962), evaluation apprehension (Rosenberg, 1969), impression management (Tedeschi, Schlenker, & Bonoma, 1971), self-deception (Gur & Sackeim, 1979), and self-enhancement (Greenwald, 1980; Taylor & Brown, 1984). This study incorporates both explicit and implicit measures, as well as a behavioral measure, for verification purposes; if all three measures indicate similar conclusions, then claims of the results can be made with much more certainty.

This study incorporates two conditions: a prosocial gameplay condition where participants play a game involving helping (prosocial) behavior, and a neutral/control

gameplay condition where participants play a game that does not include prosocial behavior. Because this research is only considering the effect of prosocial game play on individuals' self-concept, there is no need to include an additional experimental group examining violent video game play where "antisocial" gameplay is performed. Prosocial video gameplay is considered a behavior that implies positive, prosocial traits, and thus should impact prosocial self-concept above and beyond what would be expected if any non-prosocial video game is played.

Although there are a number of separate measures being utilized in this study, both the explicit and implicit tests assess self-concept and thus a single broad hypothesis ought to encompass both of these instruments. Because it is posited that prosocial video game play is in itself a prosocial behavior indicative of prosocial traits, hypothesis one states:

H1: Those who play a prosocial video game will report stronger prosocial self-conception and automatically associate themselves more with "helpful" concepts immediately following gameplay compared to those who play a neutral game.

The behavioral measure warrants its own hypothesis as it evaluates an independent element from the self-concept measures, namely prosocial behavior. Though the two factors are separate, an individual's behavior is mediated by his or her self-concept or self associations (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002); their self-concept and behavior ought to coincide as to avoid cognitive dissonance (Festinger, 1962). Therefore it is expected that prosocial behavior will follow prosocial video game play, as has been demonstrated in the past (Gentile et al., 2009; Greitemeyer & Osswald, 2010). Therefore, hypothesis two states:

H2: Those who play a prosocial video game will be more helpful in a tangram assignment task immediately following gameplay than those who play a neutral game.

Chapter III

Methodology

The following chapter provides a thorough description of this study's materials such as the games and programs used, measures that were largely adaptations of previous researcher's tools, and a step-by-step walkthrough of the study's procedure. This chapter additionally covers the different analyses that were performed on the collected data, broken down by the measures' purpose, and includes data cleaning procedures.

Participants

There were 100 participants in this study, all of whom were recruited from the participant pool at a large, mid-Atlantic university. Students received extra credit in their psychology courses for taking part in this study. The majority of students were between the age of 18 and 20 (82%), just above ten percent were aged between 21 and 23 (11%), and a few were older than 24 years old (7%), including one participant who was over the age of 31. Of the 100 participants, 66% were female and 34% were male. More than half (57%) of the sample were first-year college students, the next most frequent being sophomores (21%), while 9% and 12% were juniors and seniors, respectively. One participant was a graduate student. The ethnicity of the sample was majority Caucasian (53%), with the second most common being African-American (23%), followed by Asian-American (12%), while a number of other ethnicities were also represented (12%). Many participants did not regularly play video games, as 47% indicated no average weekly hours of game playing. Concerning the remainder of the sample, 25% played for less than one hour per week, 20% for one to five hours per week, 5% for five to ten hours per week, and 3% for greater than eleven hours per week.

There were two different exclusion criteria that resulted in an exclusion of 10 participants for the self-concept analyses ($N = 90$), and an exclusion of 6 participants for the behavioral analysis ($N = 96$). Nine of the exclusions for the self-concept analyses were based on data cleaning procedures suggested by Greenwald et al. (1998), and also included one participant who failed to complete the relevant measure. The six exclusions for the behavioral analyses were those who failed an awareness check.

Materials

Video Games

This study utilized two video games that have been used by past researchers of prosocial video game play on prosocial behavior, and in this way incorporates a degree of replication. The games are *Lemmings* and *Tetris*, two games used by Greitemeyer and Osswald (2010) that are markedly different in their prosocial content, while being similar in terms of the affect and arousal they induce. This selection criteria was based on the suggestions of the GLM, as discussed in an earlier chapter.

The game used for the prosocial gameplay condition was *Lemmings*, a puzzle game where players guide groups of small beings (called Lemmings) through a variety of stages. The player wins by safely leading the Lemmings through the hazards and to the stages' exit. The neutral game condition employed *Tetris*, a puzzle game where the player position descending geometrical figures into rows to earn points. Anderson and Dill (2000) utilized a similar game called *Tetrix* as their neutral condition. Both *Lemmings* and *Tetris* were played on a desk top PC as their own applications; this made navigating to the study's computerized testing measures quick and simple.

When *Lemmings* and *Tetris* were utilized by Greitemeyer and Osswald (2010), the researchers deceived their participants by telling them that the study was investigating the enjoyment factor of classic videogames. *Lemmings* and *Tetris* were released in 1991 and 1984, respectively, and when compared to modern AAA titles their graphical capabilities are clearly lacking. However, the minimalistic design characteristic of these older titles, once necessary to operate on the limited technology of the time, has recently made a resurgence in popularity. As the researcher has observed, many new and successful titles have adopted the aesthetic of older games, especially among independent developers who are limited by their budget rather than hardware capabilities (e.g., *FTL: Faster Than Light*, *Hotline Miami*, and *Undertale*). Similarly, many educational games, whose creators may not have the funds to invest in creating a modern graphical experience, would reasonably prefer a retro graphic style to cut costs while still achieving their goals. Thus, despite the use of older titles like *Lemmings* and *Tetris*, the results of the present study are still generalizable to today's gaming market.

MediaLab and DirectRT

Participants completed surveys and an implicit association test (IAT) digitally using the DirectRT program extension of MediaLab. MediaLab is a multimedia program that enables users to design experiments and integrate standard questionnaires with other media sources (e.g., images, audio, and video) without having to switch between programs. Developed by Empirisoft for Windows operating systems, MediaLab is marketed as being easy to use for individuals of all levels of technological competence. DirectRT is a companion program with MediaLab, though the two can operate separately. DirectRT is used to take highly accurate measurements of participant's reaction times,

capable of recording the speed of an input with millisecond precision (Empirisoft Corporation, 2014a, 2014b).

Though these programs do not facilitate playing video games within them, the present experiment utilized the technology to minimize the number of different contexts participants were exposed to during the experiment. It was desired for participants to complete measures under the same conditions as when they experienced their gameplay; because gameplay is performed on a computer, so too were the measures.

Measures

Implicit Association Test

Automatic prosocial self-concept was measured using an IAT (Greenwald & Farnham, 2000; Greenwald et al., 1998). An IAT is a computerized procedure in which people are instructed to sort lists of words (stimuli) into pairs of categories as quickly as possible. The test assumes that the sorting task is easiest when well-associated categories are paired together, and more difficult when not well associated categories are paired together. It is standard for an IAT to involve two pairs of contrasting categories (four categories total); as far as could be determined, no IAT had ever been developed to measure prosocial self-concept. Therefore, I developed a new IAT to include the two contrasted attribute categories of Helpful and Harmful, more colloquial terms for prosocial and antisocial (see Appendix A). Some stimuli belonging to the Harmful condition are adapted from the IAT Uhlmann and Swanson (2004) used to assess aggressive self-concept, whose categories were “aggressive” and “peaceful,” similar concepts as the present study’s but “peaceful” was thought to have more passive implications than “helpful,” and “harmful” a better parallel than “aggressive.” The other

contrasting pair of categories were Self and Other, common classifications when using an IAT to measure self-concept (Greenwald and Farham, 2000).

After a series of training blocks (as described later in this section), the critical blocks of the IAT instruct participants to perform two categorization tasks at once, where there are only two response keys for sorting the four categories of stimuli. For instance, in one critical task (Self=Helpful), participants must rapidly press one key (e.g., the d key) that has been assigned for stimuli fitting the categories of either Self or Helpful, while pressing a different key (e.g., the k key) for stimuli of the Other or Harmful categories. Then, in the second critical task (Self=Harmful), the category pairs are switched so that both Self and Harmful are mapped to one response key while Other and Helpful receive the alternative response option. Order of the two critical tasks is counterbalanced across participants. Each participant has an “IAT score” calculated, which is the difference between the mean latencies for the two IAT critical blocks; that is, the average response time to sort Self=Harmful critical block is subtracted from the average response time to sort Self=Helpful critical block, and thus a single value is generated. When participants have a strong prosocial self-concept, performance on the Self=Helpful critical block is expected to be markedly faster (shorter latency) than on the Self=Harmful critical block (longer latency), and thus should yield a small, or even negative, IAT score. Trials in which participants commit errors in the sorting task (such as assigning the word “their” to the Self category) are not usually analyzed despite rarely changing the overall pattern of effects (Greenwald et al., 1998; Greenwald & Nosek, 2001).

Following standard IAT guidelines (Greenwald et al., 1998), the IAT procedure includes seven trials of word categorization; the two critical blocks and five training blocks. The first training block introduces participants to the mechanics of categorizing words by having them sort words to the categories of Helpful (e.g., supportive, charitable) or Harmful (e.g., deadly, aggressive) using the “d” key and the “k” key, respectively. In the second block, participants categorize words belonging to the concepts of Self (e.g., me, mine) or of Other (e.g., they, it), also using the “d” key and the “k” key, respectively. The third training block combines the tasks such that participants press the “d” key for either Helpful or Self words, and the “k” key for Harmful or Other words. The fourth, critical IAT block, used the same list and key assignments as in the third block. In the fifth block participants categorize only Harmful and Helpful words, except the key assignments are reversed such that participants press “d” for Harmful and “k” for Helpful. Block six combines Harmful vs. Helpful words with Self vs. Other words such that the “d” key is pressed for words of either Harmful or Self categories and “k” for words of either Helpful or Other categories. The seventh and final critical IAT block is the same as the sixth block. The critical IAT blocks consist of 32 trials each and the training blocks of 20 trials each. Additionally, for half of the participants, the order of the category pairs were reverse (i.e., blocks one, three, and four had Harmful paired with Self, while blocks five, six, and seven had Helpful paired with Self), for the purpose of counterbalancing.

Explicit Prosocial Self-Concept Questionnaire

The researcher developed a self-report survey to measure self-perceived prosocial self-concept (*Cronbach's* $\alpha = .81$), which served as an explicit measure of self-concept

(see Appendix B). The questionnaire includes 30 traits for the participants to rate themselves on, using a Likert-style scale from 1 (*Not at all*) to 9 (*Extremely*). That is, participants indicated how much they perceive each trait as characteristic of them. This survey aimed to capture the participants' self-perceptions in the moment, as opposed to generally, such that any short-term changes in their beliefs would be reflected. The included traits were largely drawn from Goldberg's Big Five Personality Inventory (Goldberg, 1992), where half of the 30 items were considered prosocial traits (e.g., "Supportive," and "Responsible") while the other half were unrelated to prosocial traits (e.g., "Content," and "Thrifty"). The target, prosocial traits were agreeable, charitable, compassionate, cold, considerate, generous, helpful, indifferent, kind, responsible, selfish, supportive, sympathetic, uncooperative, and virtuous, where cold, indifferent, selfish, and uncooperative were reverse coded. The prosocial irrelevant traits were included to mask the target variable from the participants, but are not analyzed. An explicit prosocial self-concept score was calculated as the average rating of all the target items.

Tangram Assignment Task

Adopting a behavioral measure implemented by Gentile et al. (2009) and Saleem, Anderson, and Gentile (2012), participants completed a tangram assignment task, which employs a ruse where participants choose to either help or harm another, fictional participant. Tangram puzzles are a set of geometric shapes (e.g., small squares, large triangles) that fit together to create the outline of another shape; the more shapes required to create a specific outline shape, the harder and more time-consuming the puzzle is to solve. The assignment task asks participants to choose 11 of 30 possible tangram puzzles

for a “partner” to complete; there are 10 easy, 10 medium, and 10 hard puzzles to select from. The ruse is that there is no other participant solving the selected tangram puzzles, though this is what the participant is led to believe. They also believe that if the partner completes at least 10 of the 11 selected puzzles within 10 minutes, that partner will receive a \$10 gift card. Thus, participants can opt to help the fictional participant by selecting easy puzzles for him or her to complete or they can be hurtful by selecting hard puzzles. Because participants must choose 11 puzzles, and each difficulty level only has 10 puzzles to pick from, they necessarily select puzzles from multiple (at least two) difficulty levels.

The Tangram assignment task, or Tangram Help/Hurt task, has been demonstrated to be a reliable and valid measure of both hurting and harmful behavior for adults. Researchers Saleem, Anderson, and Barlett (2015) conducted three studies that established the task’s correlational convergence with traditional indicators of prosociality, such as trait empathy or perspective taking, as well as aggression, such as state hostility or trait neuroticism. The task also held discriminant validity in that tangram assignment choices did not correlate with certain factors that one would not want to relate to the task, such as the participant’s perceived difficulty of the task, social desirability, motivation for achievement, and emotional regularity. Additional tests revealed that participants’ tangram assignment choices were related to the intent to help or harm the “other participant” in the expected pattern (i.e., assigning easy puzzles was intended to help while assigning hard puzzles was intended to harm). Three additional studies were conducted to further validate the task, the first using an empathy-inducing prime known to produce prosocial behavior, while the next two studies applied provocative methods to

induce aggressive responses. The resulting tangram assignment choices were consistent with the researcher's expectations, thus lending evidence to the validity of the task for measuring helping and harming behavior.

The use of the Tangram assignment task in the present study was preferred over alternative measures of prosocial behavior for its unambiguous indicators of prosocial and aggressive behavior. In many laboratory measures of prosocial behavior, participants are given the opportunity to either help or not to help, and a degree of helping can usually be ascertained by, for example, counting the amount of pencils (or other materials) participants pick up after a spill (MacCrae & Johnston, 1998), or how much money is donated to a charity (van Baaren, Holland, Kawakami, & van Knippenberg, 2004). A concern about these paradigms is that participants lack a neutral response option, a criticism historically levied at studies of aggression (Ritter & Eslea, 2005). The Tangram assignment task avoids such criticism in that it includes the neutral (medium) response option, the only laboratory validated help/hurt task to do so (Saleem, Anderson, & Barlett, 2015). Additionally, the Tangram assignment task is exceedingly flexible in terms of scoring method in that one could calculate difference scores between easy and hard puzzles selected, or generate individual helping and harming scores. Helping and harming scores can further be made more or less exclusive by adjusting the criteria for helping or harming intent. For instance, helping (harming) can be defined as the number of easy (hard) puzzles selected minus one, so that only those who pick two or more easy (hard) puzzles will constitute helping (harming) behavior; this criteria can be made more stringent by defining helping (harming) as the number of easy (hard) puzzles selected minus two, and so on.

Game Experience Questionnaire and Demographics

Participants were issued the Game Experience Questionnaire (GEQ; IJsselsteijn, de Kort, & Poels, n.d.), a survey that measures the entertainment experience of video games (IJsselsteijn et al., 2008, p. 88). The GEQ consists of 33 items to assess players' competence, sensory and imaginative immersion, flow, tension/annoyance, challenge, negative affect, and positive affect (all *Cronbach's* $\alpha > .70$ in present sample). This measure was included to detect the possible moderating impact that these individual differences might have on the prosocial measures; different people experience the same game differently, though there is no reason to suspect that any of these elements may directly impact self-concept. This questionnaire allows for breaking the experience of video game play into distinct elements, and may help understand how video games impact self-concept.

Participants also completed a demographics survey, reporting their age, gender, class rank, ethnicity, and average weekly hours spent playing video games.

Procedure

A convenience sample of participants were assigned to two conditions: the prosocial gameplay condition or the neutral gameplay condition. Due to the desire to collect an even distribution of counterbalanced groups, condition assignments alternated between experimental and control, while counterbalancing the order of measures being presented and order of IAT category pairings. Upon arrival for the study, participants were greeted by the experimenter and prompted to read an informed-consent form (see Appendix C). The form indicates that the study investigates video games' effect on a variety of different cognitive elements, including reaction time and puzzle solving. After

consent was given, participants were made aware of a “partner” who would be joining shortly, though the experiment would begin without him or her. Participants were seated at a computer station where either the prosocial game *Lemmings* or the neutral game *Tetris* was set up earlier, before participant arrival. The experimenter then gave a brief explanation of the video game the participant was to play, prompting the participant to select the option to “play again” if the participant loses the game. The experimenter indicated that they would return after a short time, and addressed any questions or concerns the participant had before prompting the participant to begin play of the video game. The experimenter exited the testing room, and after ten minutes of game play, the experimenter reentered the testing room and asked the participant to pause the game. A ten minute gameplay session is in line with the relevant studies (see Greitemeyer & Osswald, 2010; Uhlmann & Swanson, 2004).

At the same computer station, the experimenter brought up the DirectRT programs where the prosocial self-concept IAT and the explicit prosocial self-concept questionnaire had been prepared earlier, the two measures being counterbalanced with one another. The experimenter instructed the participant to carefully read and follow the instructions that appear on the screen, before leaving the testing room again. The IAT and prosocial self-concept questionnaire took roughly ten to fifteen minutes to complete together. After the IAT and prosocial self-concept questionnaire were completed, the program instructed the participant to inform the experimenter that they were finished.

Once the participant contacted the experimenter, the experimenter prompted him or her to continue their gameplay from where they left off. Once again, participants received the instruction to select “play again” if they lose the game, and that the

experimenter would return shortly. The participant is prompted to unpause the game before the experimenter exits the room for another ten minutes of gameplay, after which the experimenter returned to initiate the next set of measures.

The experimenter explained to the participant that he or she would be completing a tangram assignment task. Participants were informed (falsely) that they and their partner, currently in a different room, would be completing tangram puzzles; the participant is explained the task of fitting small geometric shapes together to form outlines of larger geometric shapes, and that the more pieces of a puzzle there are, the harder and more time consuming it is to solve. Participants were told that they must choose 11 tangram puzzles for their partner to complete. Participants had 30 puzzles to choose from: 10 easy, 10 medium, and 10 hard, and were encouraged to select from a variety of difficulties. Participants' last piece of information was that if their partner completes at least 10 of the selected puzzles in less than 10 minutes, their partner would receive a \$10 gift card. This part of the experiment, as explained to the participant, was to investigate the effect of promised reward on task performance; there are multiple conditions, and because of the participant's condition assignment, was ineligible to win a gift card.

Participants watched a video of an example hard puzzle being solved (Tangram Channel, 2015) to demonstrate what tangram puzzles are and the difference between easy, medium, and hard puzzles. The example puzzle was identical across all participants, though this particular puzzle was not one that participants could have selected for their fictional partner later. The experimenter presented a tangram packet containing images of the puzzles, each page dedicated to each level of difficulty, with 10 puzzle on each page.

The Experimenter provided a highlighter and prompted the participant to circle 11 puzzles for their partner to complete. The experimenter stepped back to give the participant space to make selections. After the participant completed the task of highlighting 11 puzzles, the experimenter thanked and informed the participant that they would not need to complete any tangram puzzles; instead, the experimenter brought up DirectRT on the computer to prompt the participant to complete another set of surveys presented on the screen. The experimenter exited the room as the participant began completing two surveys: first was the GEQ (IJsselsteijn, de Kort, & Poels, n.d.), and finally a demographics survey.

After the surveys, instructions were presented on the participants' screen to inform the experimenter of the surveys' completion. Finally, to ascertain if participants' had any suspicions of the study's true hypotheses, they were asked an open ended question regarding the purpose of the study. The experimenter then debriefed the participant, explaining that there never was another "partner," they were never going to complete any puzzles, and nobody had a chance of winning a gift card. Participants were informed that the true purpose of the tangram assignment ruse was to see if the participant would choose different puzzles depending on what game they played. Participants were then thanked and dismissed. The duration of the experiment, from the moment participants arrive to when participants leave, was approximately 45 minutes.

Chapter IV

Results

Descriptive statistics about the sample were calculated using data from the explicit prosocial self-concept questionnaire, GEQ, and demographics survey, as well as from the prosocial IAT. Specifically these data describe participants' self-rated trait evaluations, implied prosocial self-concept, personal background information and their subjective experience with the game they played. This chapter presents the results of the study.

Respondents' Gameplay Experience

Preliminary analyses of GEQ data was conducted to determine if participants' gameplay experience, beyond that of exposure to prosocial content, impacted the prosocial outcomes of the study. Additionally, these analyses would confirm the comparability of the two games in terms of player experience. According to Greitemeyer and Osswald (2010), *Lemmings* and *Tetris* are relatable in terms of their affectual and arousal impact, which fits well with the GLM perspective the present study takes, but the GEQ is a more practical evaluation of games, grounded in the individuals' evaluation of their play. That is, there is face validity in comparing video games on their level of challenge, immersion, feelings of competence, and so on when judging game similarity, as opposed to a more abstracted measure of participant variables such as the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) and the Perceived Arousal Scale (Anderson, Deuser, & DeNeve, 1995), as Greitemeyer and Osswald (2010) used.

The data from the GEQ competence, immersion, flow, tension/anxiety, challenge, positive affect, and negative affect subscales underwent standard regression analyses. Cases were excluded in line with IAT data cleaning procedures (described later on in this section; $N = 90$) when predicting IAT and explicit prosocial self-concept scores, while cases were excluded for participants who failed the manipulation check regarding the tangram ruse when analyzing tangram assignment results ($N = 94$), so as to present the most appropriate interpretations. Results did not indicate that any GEQ subscales significantly predicted the prosocial outcome measures, including the prosocial IAT scores, $R^2 = .04$, $F(7, 89) = .42$, $p = .89$, explicit prosocial self-concept scores, $R^2 = .15$, $F(7, 89) = 2.205$, $p = .06$, or tangram puzzle assignments, $R^2 = .12$, $F(2, 93) = 1.63$, $p = .14$. GEQ results approached significance in predicting explicit prosocial self-concept scores, though the most influential variables were competence and challenge, which did not approach significance for predicting explicit prosocial self-concept scores, $\beta = .20$, $t(89) = -1.34$, $p = .19$ and $\beta = -.20$, $t(89) = -1.25$, $p = .22$, respectively.

Additionally, a multivariate analysis of variance (MANOVA) was conducted on these data to discern if game experience differed between game conditions. Using the IAT exclusion criteria, this analysis yielded a significant multivariate effect of game condition of GEQ subscales, Wilks' lambda = .74, $F(7, 82) = 4.11$, $p = .001$, $\eta_p^2 = .26$. Examining the univariate results, they suggest that there was a significant difference between conditions on participants' feelings of competence, $F(1, 88) = 9.66$, $p = .003$, $\eta_p^2 = .10$, flow $F(1, 88) = 3.99$, $p = .05$, $\eta_p^2 = .04$, and challenge, $F(1, 88) = 13.34$, $p < .001$, $\eta_p^2 = .13$. Differences were such that those who played *Lemmings* felt significantly more competent in their gameplay ($M = 3.50$, $SD = .79$) than those who played *Tetris* ($M =$

2.97, $SD = .82$). However, individuals who played *Tetris* experienced significantly more flow ($M = 3.26$, $SD = 1.04$) than those who played *Lemmings* ($M = 2.85$, $SD = .89$), and *Tetris* was more challenging ($M = 2.64$, $SD = .85$) than *Lemmings* ($M = 2.05$, $SD = .68$). All GEQ subscale mean and standard deviation values are presented for the prosocial group (*Lemmings*) and the control group (*Tetris*), as well as mean difference (MD), are presented in Table 1. These three GEQ factors were included as covariates in the main analyses.

Table 1

Means and Standard Deviations for GEQ Subscales

GEQ subscale	Lemmings		Tetris		MD
	M	SD	M	SD	
Competence	3.50	.79	2.97	.82	.53**
Immersion	2.71	1.01	2.60	.74	.11
Flow	2.85	.89	3.26	1.04	.43*
Tension/anxiety	1.73	.97	1.94	.92	.21
Challenge	2.05	.68	2.64	.85	.59***
Negative affect	1.96	.88	1.97	.70	1
Positive affect	3.41	1.05	3.43	.76	2

Notes. * $p < .05$. ** $p < .01$. *** $p < .001$

Research Question Results

The purpose of this study was to investigate the capacity of prosocial video games to increase individuals' prosocial self-concept. In other words, it sought to answer whether or not interacting with a computer game where the goals and mechanics of the

game facilitated the helping of virtual entities would cause an individual to form or strengthen self-beliefs regarding one's helpful nature. Additionally, this study sought to replicate past research suggesting the ability of prosocial video games to increase prosocial behavior. Below are the results of these two research questions.

Research Question 1

Will players of the prosocial video game have an increase in prosocial self-concept relative to those who played a neutral video game?

To determine the impact of prosocial video game play on prosocial self-concept, participants performed an IAT to measure automatic self-associations, as well as a prosocial self-concept survey that evaluated explicit self-beliefs. Following procedures mirrored by Greenwald et al. (1998), the five training blocks of the IAT were discarded while the two critical blocks were retained. Likewise, the first two trials of each critical block were deleted as those response latencies are typically longer. Latencies of less than 300 ms and greater than 3000 ms were recoded as 300 and 3000 ms, respectively, so to correct for any anticipatory responses or momentary inattention from the participant. Lastly, participant data that was unacceptably high in error rates (less than 70% accuracy) or had an extremely long average latency (greater than 1000 ms) was also omitted from analysis (Greenwald et al., 1998). The remaining data was then log transformed to normalize the distribution.

By these data cleaning procedures, nine participants were omitted from analysis, plus one additional participant who failed to complete the IAT ($N = 90$). The sample size in each participant condition was equal ($n = 45$ for both groups). The overall average IAT score was $M = -.08$ ($SD = .07$), indicating that participants were quickest in sorting

stimulus words when the Helpful and Self categories were paired together, suggesting that they self-associated themselves with helpful words more than with harmful words, as was expected.

Each participant generated an explicit prosocial self-concept score derived from their responses on the prosocial self-concept survey, a composite of 15 target items representing identifiably prosocial traits. For the sake of comparison, those participant data which failed to meet the data cleaning specifications for the IAT had their prosocial survey data omitted from analysis as well ($N = 90$). Most students rated themselves on the upper end of the scale, with an average overall explicit prosocial self-concept score of $M = 6.98$ ($SD = .78$) on the 1 to 9 scale.

Participants' IAT scores and explicit prosocial self-concept scores were not correlated (Pearson's $r = .11$, $p = .30$ [2-tailed]), despite both variables being a measure of self-concept. Difference in the explicit versus implicit natures of these assessments may account for their lack of unity. Because these dependent variables were not significantly correlated, one of the assumptions of the multivariate analysis of covariance (MANCOVA) was violated, therefore a pair of univariate analysis of covariance (ANCOVA) were deemed most appropriate for examination of these data. Additionally, assumptions of normality were met for IAT score data (Shapiro-Wilk test = 98 [$df = 90$], $p = .13$), but not for the explicit prosocial self-concept scores (Shapiro-Wilk test = 96 [$df = 90$], $p = .006$). Descriptive analysis of the explicit prosocial self-concept score distribution among all participants revealed that the sample had a skewness of $-.80$ ($SE = .25$) and a kurtosis of 1.49 ($SE = .50$). This score distribution was skewed and leptokurtic beyond an acceptable level (i.e., the skewness and kurtosis values fell outside the range

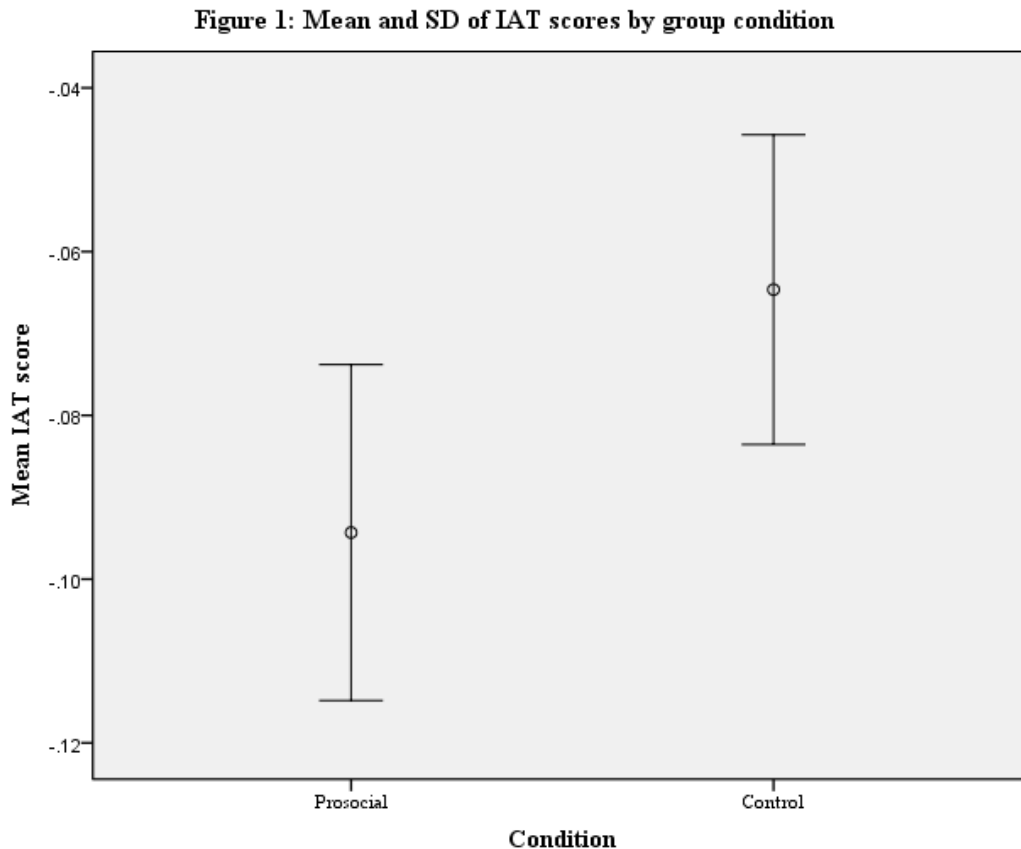
two times their respective standard errors; George & Mallery, 2010). Therefore, results of the ANCOVA analysis should be interpreted cautiously, and an additional nonparametric analysis was conducted.

To determine whether prosocial videogame play impacted automatic self-concept, an ANCOVA was performed on participants' IAT score data by game condition while controlling for their feelings of competence, flow, and perceived challenge of the games. Results indicate a significant main effect of game condition on IAT scores, $F(1, 85) = 4.11, p = .046, \eta_p^2 = .05$, observable power = .52, in that IAT scores were more negative for the prosocial game group ($M = -.09, SD = .07$) than for the neutral game group ($M = -.07, SD = .06$). Assumptions of homogeneity of variance were met (Levene's test, $F(1, 88) = .21, p = .65$). An error-bars diagram is presented in Figure 1, illustrating the significant difference between groups in that the mean IAT scores of each group fall outside the range of each other's standard deviations. None of this model's covariates significantly affected IAT scores. These results support Hypothesis 1 as it suggests that those who played *Lemmings* were quicker in assigning stimuli when the classifications of Helpful and Self were paired together as compared to those who played *Tetris*.

In examination of the impact of prosocial video game play on reported self-concept, a similar ANCOVA analysis was performed on explicit prosocial self-concept scores by game condition, controlling for competence, flow, and challenge. This analysis did not yield a significant effect of game condition of explicit prosocial self-concept scores, as the two groups hardly differed (Prosocial group $M = 7.05, SD = .72$; Control group $M = 6.90, SD = .84$), $F(1, 85) = .45, p = .50, \eta_p^2 = .005$, observable power = .10. Assumptions of homogeneity of variance were met (Levene's test, $F(1, 88) = 1.95, p =$

.17). An additional Kruskal Wallis test was performed due to the non-normality of the distribution, though this too did not yield significant results ($\chi^2 = .32$, $df = 1$, $p = .57$).

Notably, the covariates of competence and challenge neared significance ($ps = .058$ and $.052$, respectively), and ANCOVAs conducted individually for each of these two factors resulted in significant covariate effects (competence, $F(1, 87) = 6.99$, $p = .01$, $\eta_p^2 = .07$; challenge, $F(1, 87) = 7.71$, $p = .007$, $\eta_p^2 = .08$). Correlational investigation of these factors indicate that as feelings of competence increased, so did prosocial self-concept ratings ($r = .29$, $p = .006$ [2-tailed]), while as game challenge increased, prosocial self-concept ratings decreased ($r = -.30$, $p = .004$ [2-tailed]).



Research Question 2

Will players of the prosocial video game have an increase in prosocial behavior relative to those who played a neutral video game?

To investigate the impact of prosocial video game play on prosocial behavior, this study attempted to replicate the results of past studies using the Tangram Help/Hurt Task (Gentile et al., 2009; see Saleem, Anderson, & Barlett, 2015). This task allowed participants to “help” a supposed partner in winning a \$10 prize by assigning easy puzzles for him or her to complete, or participants could harm the partner by assigning difficult puzzles. Medium puzzles were also included so that participants could provide a neutral response, though by design participants necessarily selected at least one easy or hard puzzle. After participants had made their puzzle assignments, they were probed for the confounding factor of whether or not they believed the ruse regarding the existence of a partner. If participants suspected that there was no partner, then their puzzle selections would be invalidated. Of the 100 participant sample, 6 voiced their skepticism of there being a partner; those participants’ puzzle selection data were omitted from analysis ($N = 94$). Those omitted from the previous analyses as per IAT data cleaning procedures were re-entered into the sample (unless they failed the awareness check as well), as the tangram assignment task assesses a wholly different construct than the IAT, that of behavior rather than self-concept. Additionally, the tangram assignment task took place after a second gameplay session after the IAT was completed, which makes the two tasks distinct from each other methodologically. The sample size for each condition was equal ($n = 47$ for both groups).

Across all participants in the sample, the quantity of easy puzzles assigned ($M = 4.03$, $SD = 1.41$) was greater than the quantity of hard puzzles assigned ($M = 3.01$, $SD = .90$), paired-sample t test, $t(93) = -4.43$, $p < .001$. Difference scores were generated by subtracting the quantity of easy puzzles from quantity of hard puzzles for each participant, hence the more negative the difference score, the greater the difference was in favor of easy puzzles assigned. The average difference score was $M = -1.02$ ($SD = 2.23$), indicating that people typically selected more easy puzzles than hard puzzles. A analysis of covariance (ANCOVA) was conducted to determine if there was an effect of game condition on the extent to which one was helpful or harmful. While controlling for participants' sense of competence, flow, and perceived challenge of the game. Assumptions of homogeneity of variance were met (Levene's test, $p = .17$). Results indicated that there was no significant effect of game condition on difference scores, $F(1, 94) = .28$, $p = .60$, $\eta_p^2 = .003$. The average difference mean score for the prosocial gameplay group was $M = -.72$ ($SD = 1.99$), while the average mean difference score for the neutral gameplay group was $M = -1.32$ ($SD = 2.44$), as shown in Table 2. However, descriptive analysis of the data revealed that the distribution of the data had a skewness of -1.50 ($SE = .25$) and a kurtosis of 3.53 ($SE = .49$), both beyond terms of normality (George & Mallery, 2010). Therefore, a non-parametric Kruskal Wallis Test was performed on these same data, but yielded a similarly non-significant effect of game condition on difference scores ($\chi^2 = 3.02$, $df = 1$, $p = .08$).

Table 2

Means and Standard Deviations of Puzzle Assignments

Assignments	Lemmings		Tetris		p value
	M	SD	M	SD	
Easy Puzzles	3.85	1.29	4.21	1.52	.67
Hard Puzzles	3.13	.80	2.90	.98	.52
Difference Score	-.72	2.00	-1.32	2.44	.60

Chapter V

Discussion

This chapter discusses the results of the study, beginning with a summary of the study, followed by interpretation and discussion of the result findings. I conclude with a discussion on the limitations of this study and provide recommendations for prospective investigations of the influence of video games on self-concept and behavior.

Summary

Video games are an increasingly popular form of entertainment media, with the hardware and software more now than ever finding their way into the homes of youths. According to the Entertainment Software Association (ESA), four out of five American households own a device used to play video games, more than half of American households own a dedicate gaming console, and 41% of Americans play games for three or more hours per week (2015, 2014). However, video games have been consistently linked to negative behavioral and affective outcomes (see Anderson et al., 2010 for a review), contributing to the continued perception of the medium as a negative influence on children, similar to that of other new media throughout the twentieth century, like comic books and rock music (Wartella & Reeves, 1985). This study and recent other studies like it (Gentile et al., 2009; Greitemeyer & Osswald, 2010) aim to shine light on the beneficial social outcomes that can arise from prosocial video game play, which perhaps will challenge the social bias that pervades certain circles, including policy makers, against the technology.

This study sought to expand on prior research concerning video game play and self-concept (see Uhlmann & Swanson, 2004), while also adding to the prosocial video

game literature generally. By investigating changes in individuals' working self-concept where ideas about the self are subtly impacted by environmental and social contexts (Markus & Kunda, 1986), it was hoped that prosocial video game play would encourage an automatic change toward more helpful self-conceptions. Self-concept was thought of as a mediating factor between media exposure and behavior (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002), thus this study was interested in not only automatic self-associations following video game play, but also in the behavioral outcomes thereof. According to the GLM (Gentile et al., 2009), prosocial video game exposure activates the prosocial scripts within the cognitive domain, which then increases the likelihood of behaving prosocially. One hundred students completed an explicit, self-report measure of prosocial self-concept, an implicit, reaction-time based measure of self-concept, and an assignment task for measuring helping behavior to help address these hypotheses.

The primary analysis investigating automatic self-concept was successful in identifying a meaningful difference between those who played the prosocial game and those who played a neutral game, though the secondary analyses of reported prosocial self-concept and prosocial behavior failed to find such a distinction. Concerning both the explicit and implicit self-concept measures, the sample of 90 participants with valid data responded to the explicit prosocial self-concept survey in an expectedly self-enhancing manner. That is, participants typically rated themselves nearer to the more prosocial end of the scale ($M = 6.98$, $SD = .78$). Similarly, participants' normalized IAT scores were mostly negative ($M = -.080$, $SD = .067$), meaning that people associated themselves with helpful words more quickly than with harmful words, suggesting their self-concepts were

typically oriented towards prosociality. Notably, though prosocial game play produced stronger helpful-self associations, implying increased prosocial self-concept, prosocial gameplay only accounted for 5% of the variance in IAT score results, so gameplay only had a small impact on IAT results.

Concerning behavioral outcomes as measured by the tangram assignment task, people tended to select more easy puzzles than hard puzzles ($M_{\text{difference}} = -1.02$, $SD = 2.23$), indicating that the usual intent was to help rather than harm. This seems to follow the idea that self-concept mediates behavior, as both self-concept and behavior tended to have a prosocial orientation, although statistically speaking, there was no significant relationship between automatic self-concept and puzzle assignments ($r = .16$, $p = .14$). Both a parametric ANCOVA and nonparametric Kruskal Wallis Test were performed on mean difference scores to determine if there was an effect of game condition on puzzle selections, and though the nonparametric test was trending towards significance (albeit in the wrong direction), both analyses yielded nonsignificant results. Notably, these results failed to replicate the findings of Gentile et al. (2009).

Discussion of the Results

Although this study employed three different measures to evaluate three related constructs (implicit and explicit prosocial self-concept and helping behavior), greater focus is given to the automatic self-concept aspect of the study. Self-concept is thought to be an intervening factor in social behavior (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002), therefore it is afforded more attention as an influencer of human interaction. Past studies had linked prosocial gameplay to helping behavior (Gentile et al., 2009; Greitemeyer & Osswald, 2010), and violent gameplay to

aggressive self-concept (Uhlmann & Swanson, 2004), but never has the combination of prosocial and self-concept been investigated together with regard to video game play. In that regard, the present study provides a unique contribution to the growing collection of prosocial video game literature, as it goes a step beyond the usual investigation of behavioral outcomes after video game play, examining a possible root cause of behavior at an automatic level. This study hoped to find similar but conceptually opposite results as Uhlmann and Swanson (2004), and in this regard it succeeded. This study's findings support the conclusion that people adjust self-beliefs to become more prosocial following play of a video game involving helping virtual entities, even highly artificial, pixilated entities. However, though this change in self-concept occurred, the effect was small, and the statistical power was relatively weak. A larger sample size, if similar distributions of results were to hold, would be necessary to make a more confident conclusion of prosocial games' impact on self-concept, though effect size will likely remain small.

Though automatic self-associations for helpfulness differed between those who played a prosocial game versus those who played a neutral game, the self-report measure of prosocial self-conceptions did not find this difference. Slight deviation from normality notwithstanding, there is reason to suspect that an explicit measure would be unable to capture the subtle changes in working self-concept. Working self-concept posits that, though there are aspects of self-concept that are stable over time, individuals' self-beliefs are subject to slight variation depending on contextual and cognitive factors (Markus & Kunda, 1986). Though clever explicit measures are capable of capturing such automatic changes, it has been established that self-report measures such as trait surveys rely on controlled reflection rather than impulsive reaction (Frieze, Hofmann, Wänke, 2008;

Hofmann & Friese, 2008; Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008).

Automatic associations are more readily captured through spontaneous reactions at a range of a few hundred milliseconds, where the influence of subtle cognitive processes like priming can be tapped into (Fazio & Olson, 2003).

Variations in working self-concept are fleeting and subtle, and similarly subtle measures are required to identify them, such as with an IAT. Because of the restricted time for responding, the implicit measure is less prone to demand characteristics, social desirability, and other biasing factors like low levels of introspection (Degner, Wentura, & Rothermund, 2006). Not that implicit measures are strictly “better” than explicit measures, but that the two are suited for different kinds of evaluations; it is normal for implicit and explicit measures to differ when predicting impulsive and controlled behavior (Asendorpf, Banse, & Mücke, 2002), and research conditions can impact each independently (Gawronski & Bodenhausen, 2007). In fact, both in Uhlmann and Swanson’s (2004) study and another video game violence experiment utilizing IAT procedures (Bluemke, Friedrich, & Zumbach, 2010), a trait questionnaire failed to reflect an effect of gameplay while IAT results did. The fact that the present study found dissonant results between the self-report survey and IAT results further demonstrates the differentiation between controlled reflection and automatic association.

Indeed, Anderson et al. (2010) argued that one aspect of experimental laboratory best practices for measuring the effects of video game violence (or prosociality, in the present case), is to avoid using trait measures to assess aggressive (prosocial) behaviors following experimental manipulation, due to their limited sensitivity to short-term goal and intention changes. Though there is an argument to be made predicated on self-

perception theory (Bem, 1967) that self-report measures can reflect changes in self-beliefs after one is induced to behave in a way characteristic of a target trait (Fazio, Effrein, & Falender, 1981; Gergen, 1965; Jones, Rhodewalt, Berglas, & Skelton, 1981; Kulik, Sledge, & Mahler, 1986; Rhodewalt & Agustsdottir, 1986; Schlenker & Trudeau, 1990), confounds such as demand characteristics (Orne, 1962), evaluation apprehension (Rosenberg, 1969), impression management (Tedeschi, Schlenker, & Bonoma, 1971), self-deception (Gur & Sackeim, 1979), and self-enhancement (Greenwald, 1980; Taylor & Brown, 1984) may foil any such attempt.

Although automatic prosocial self-associations were stronger in the prosocial game condition, this unfortunately did not produce any behavioral difference, as those who played *Lemmings* were no more or less likely to help than those who played *Tetris*. One justification for this is the exceptionally small effect size that prosocial video game play saw in automatic prosocial self-concept change (only about 5%). Predictions derived from the GLM (Gentile et al., 2009) suggest that prosocial video game play, as a contextual influencer, will elicit prosocial cognitions, activating prosocial scripts that contribute to subsequent appraisals and behaviors. However, past research of video games' effects on social outcomes (that is, on aggression) traditionally have had small to average effect sizes (Anderson et al., 2010), though a small effect size still has substantial practical and applied implications when the relevant population is large, as is the case considering video game consumers.

Limitations and Recommendations

From this study, several recommendations can be proposed for future iterations of prosocial video game research. This study possessed a number of limitations, and suggestions for rectifying them are discussed in this section.

As is common in experimental video game research on social outcomes, a limitation of this study includes the issue where results are only applicable on the short-term. The link between prosocial gameplay and prosocial behavior has been established through longitudinal and correlational examination (Gentile et al., 2009), as has been the link between violent gameplay and aggressive behavior (see Greitemeyer & Mügge, 2014 for a review), but no such investigation has taken place on the long-term impact of prosocial gameplay on self-concept. The GLM posits that repeated exposure to social learning encounters will impact individuals' cognitive and cognitive-emotional factors, such as schemas and stereotypes, respectively, as well as affective traits like conditioned emotional responses (Gentile et al., 2009). In other words, repetition results in lasting changes in a persons' beliefs, assumptions, and reactions, or their personality. Therefore, frequent exposure to prosocial video games may cause lasting changes in individuals' personality such that they become more prosocial in self-beliefs and behavior.

This study utilized the most sensitive measure of subtle changes in self-concept that the researcher could assemble, that being an IAT (Greenwald et al., 1998), while also implementing a less effective measure of self-concept change in the form of the explicit prosocial self-concept survey. As had been discussed previously, self-report measures are not attuned to measures automatic reactions, but rather controlled reflections (Frieze, Hofmann, Wänke, 2008; Hofmann & Frieze, 2008; Hofmann, Gschwendner, Frieze,

Wiers, & Schmitt, 2008). The present study would have been better served to utilize the self-report survey, or an established and well-validated personality inventory such as the altruism subscale of the NEO personality assessment (Costa & MacCrae, 1992), as a measure of individual differences, rather than as a tool for assessing the effects of experimental manipulation.

Another possible limitation of this study was that of game selection. That is, a prosocial game, in line with self-perception theory (Bem, 1967), ought to have salient prosocial elements if it is to successfully illicit helpful behaviors. Though the games utilized by the present study were based on recommendations by Greitemeyer and Osswald (2010), who used both *Lemmings* and *Tetris* in most of their studies (i.e., study 1, study 2, and study 3), *Lemmings* may not have been as obviously prosocial in content as other games might have been. The nature of *Lemmings* is that of a puzzle game, where the players' goal is to guide virtual beings through a hazardous environment to safety, but the player is set apart from the characters he or she is tasked with directing. The lemmings move across the level in a pre-programmed and predictable path unless the player, an omniscient observer, interrupts them. Lemmings will even follow a path that is obviously harmful to their well-being. This game design, as the researcher observed through post-experiment discussion with participants, resulted in a lack of concern for the lemmings' survival by some players. Additionally, players had access of a "self-destruct" button that, once pressed and after a 5 second delay, will detonate all the lemmings remaining on screen in a shower of confetti, ending the level. This feature is included in the game because the lemmings can become helplessly trapped in some environmental hazards, which necessitates a reset of the level or else wait for the 5 minute timer to

expire. Both of these elements, the artificiality of lemmings' behavior and the opportunity to blow them up at will, contributes to a rather inauthentic experience.

It can be argued that *Lemmings* does little to facilitate a sympathetic relationship with the virtual characters. As past studies have determined, feelings of sympathy (i.e., feeling concerned for others) and empathy (i.e., feeling as others feel) is a positive indicator for prosocial behavior (Batson, 1991, 1998; Eisenberg., Eggum, & Di Giunta, 2010; Hoffman, 1982, 2000), thus when players of *Lemmings* fail to sympathize or empathize with their virtual charges, the potential prosocial outcomes may be less pronounced. Part of the charm of *Lemmings* is the ability to experience a spectacular failure as a train of lemmings mindlessly march off a cliff to their doom, but unfortunately their mindlessness reasonably limits their relatability, which is not conducive to helping behavior. However, to be fair, it is difficult to say how much or how little sympathizing or empathizing participants felt for the lemmings, as sympathy and empathy were not variables this study investigated.

Future studies might elect to manipulate and measure sympathy and empathy when investigating prosocial outcomes following prosocial video game play. One route by which to encourage empathy with virtual characters is through total immersion. One study that aimed to establish a grounded definition of immersion based on interview reports from gamers (Brown & Cairns, 2004) noted that total immersion, or the feeling of presence (i.e., a "psychological state in which virtual objects are experienced as actual objects in either sensory or nonsensory ways;" Lee, 2004, p.27), was partially characterized by the ability to empathize with the characters inside of games. Notably, those gamers who described feeling totally immersed almost exclusively reported

experiencing the phenomenon while playing a first-person shooter game, where the player's visual perspective is that of their character's within the virtual environment. Another study conceptualized the relationship differently, as empathy was thought of as a skill that mediated the presence effect, where higher empathic skill facilitates higher levels of experienced presence (Nicovich, Boller, & Cornwell, 2005). This view was supported, as empathy predicted presence within a highly immersive virtual simulation, as both constructs involved the ability to project oneself into an imagined experience.

The impact of in-game point-of-view (POV) remains largely unexplored, as are other game features common among modern games (Krcmar & Farrar, 2009). POV might affect the level of identification players have with their in-game character, though studies have had conflicting results in this regard, where both first-person (Tamborini, Eastin, Skalski, & Lachlan, 2004) and third-person (Farrar et al., 2006) perspective yielded more feelings of involvement than the other. Additionally, POV has been investigated for its impact on aggressive outcomes (Farrar et al., 2006; Krcmar & Farrar, 2009), but not for prosocial ones, though higher identification through video game play has been linked to greater prosocial or peaceful outcomes (Peng, Lee & Heeter, 2010).

In the present study, *Lemmings* and *Tetris*, both puzzle games, only elicited moderate levels of immersion, as indexed by GEQ results ($M = 2.61$, $SD = .90$). Neither *Lemmings* nor *Tetris* therefore were games that facilitated the distinct feeling of presence. A more intense immersion experience has been the goal of both applied and academic work in video games, as presence is thought to amplify the extent to which players respond to virtual stimuli, bringing virtual simulations closer in line with their real-world counterparts. Thus an increase in effectiveness of the virtual environment can be

achieved through highly immersive experiences (Nunez & Blake, 2001; Price & Anderson, 2007; Slater & Wilbur, 1997; Tamborini & Bowman, 2010; Tamborini & Skalski, 2006), such as with immersive technologies like virtual reality (VR). Studies investigating VR's impact on the presence experience has suggested that VR facilitates a more impactful feeling of immersion via its use of user-tracking, stereoscopic visuals, and wider field of view of visual displays, which are better indicators of immersion than graphical or audio fidelity (see Cummings & Bailenson, 2015 for a review). VR has even been used to study prosocial behavior, where researchers discovered that the totally immersive experience of flying like a superhero primed participants to behave more prosocially, regardless of whether or not they were being prosocial in the virtual simulation (Rosenberg, Baughman, & Bailenson, 2013). They concluded that the physical embodiment of a character reminiscent of Superman was sufficient enough of a prime to increase helping behavior regardless of the actions taken within the simulation.

This study encountered several issues regarding the tangram assignment task. Notably, several participants voiced skepticism of there being another participant involved in the study, citing that they did not believe that the other party was offered a gift-card reward while they were not, or that the laboratory environment was too quiet for there to be other people present. However, the majority voiced no such observations, the incidence being an occasional anomaly rather than the norm. Efforts should be taken in the future to account for such environmental confounds.

A possible confound in the present study was that participants were explained the tangram assignment task only after they had completed their last session of gameplay. This deviated from Gentile et al.'s (2009) conductance of the procedure, whose

explanation of the task was delivered before experimental manipulation, as to maximize the effect of priming and other short-lived cognitive processes on puzzle selections. Additionally, post-experiment probing revealed that some participants were more concerned in selecting a “fair” distribution of puzzle difficulties than in helping the fictional partner. Lastly, the tangram task was not counterbalanced with the self-concept measure, so participants always made puzzle selections nearing the close of the experiment. Thus, participant fatigue may have been an issue concerning the behavioral results. These methodological confounds may be avoided in future studies by more strictly following the procedures laid out by Saleem, Anderson, and Barlett (2015; see Saleem, n.d.).

As with most laboratory experiments conducted in university settings, this study suffers from the limitation of generalizability, as the sample is wholly made up of college students. Though college students are not an irrelevant demographic with regards to game playing as most game players are adults (only 26% are below 18 years old; ESA, 2015), the primary population of concern is that of children and adolescents. This study implies a generalizable effect based on a relatively uniform sample of age distributions, socio-economic status, and life experiences. For a more thorough understanding of prosocial gaming of self-concept, future studies must examine a more diverse population.

Similarly, this study followed previous video game studies in that only short, ten minute gameplay sessions were conducted. However, critics of psychological research concerning video games have indicated that a short play session during experimental hypothesis testing is one of a series of systematic limitations that characterize this area of study (Valadez and Ferguson, 2011). The concern regarding short play time in research is

one of ecological validity, as the typical game player spends longer than five to twenty minutes in a single play session. There is also the concern that research participants may have difficulty learning and becoming competent at a game's control and gameplay mechanisms in so short a time (Przybylski et al., 2010), which is another ecological discrepancy compared to actual game players.

Lastly, exploration into the impact of prosociality in video games should be conducted regarding the prosocial game factor itself. That is, it is feasible that prosocial and aggressive behaviors are not mutually exclusive. For instance, in team-based multiplayer competitive video games (e.g., *DOTA 2*, *Counterstrike*), actions taken by the players are often hurtful towards opponents while helpful towards allies simultaneously. Does at any point aggressive behavior constitute a prosocial action in terms of automatic association? Likewise, many modern video game titles include highly narrative storytelling, which may serve to provide justification for violent behavior given the context. Investigation into the limits of prosociality in video games is called for, as research on prosocial gameplay largely examines games that are exclusively prosocial in content (e.g., *Animal Crossing*, *Super Mario Sunshine*). But, as Gentile noted in an interview with a video game oriented media outlet, "A truly prosocial game wouldn't have any aggression (by the player-controlled character), although even violent games can have some prosocial aspects or acts" (G4, 2009). As the selection of truly prosocial games are relatively small and considerably less popular than violent games (over half of the top selling video games in 2014 contained violence; ESA, 2015), media researchers should explore where else prosocial effects might be derived from.

Beyond prosociality, there is a distinct lack of investigation into the possible mediating effects of specific video game features on psychological processes (Krcmar & Farrar, 2009). Consider that the present study witnessed a positive correlation between prosocial self-concept ratings and the feeling of competence, as well as a negative correlation between prosocial self-concept ratings and the perception of challenge. This would suggest that participants' self-reflections of currently held prosocial traits were dependent on their relative performance on the game, and a direct investigation into the impact of competency and challenge on, say, self-esteem, could follow from these findings. Investigation of game feature on the nature of prosocial self-concept is the natural next step for the present study, such as examining the influence of empathy and presence, POV, judgments of acceptable violence.

Implications

For years, violent video games have been associated with negative and aggressive outcomes in behavior, cognition, and affect (Anderson & Dill, 2000; Anderson et al., 2004; Anderson & Ford, 1986), to the extent that even criminal and physical violence has been ascribed to violent game play (Anderson & Dill, 2000; Gentile, Lynch, Linder, & Walsh, 2004). The plethora of studies endorsing these negative effects have contributed to a cultural atmosphere where video games are nearly synonymous with violence, a criticism that has influenced law and policy makers to restrict access to these games to children. Indeed, one such California law was the focus in the United States Supreme Court landmark case *Brown v. Entertainment Merchants Association* (2011), where it was ruled that "psychological studies purporting to show a connection between exposure to violent video games and harmful effects on children do not prove that such exposure

causes minors to act aggressively.” By evidence of the fact that video games have become such a controversial topic to require the highest legal court in the United States to rule on the entertainment industry’s behalf, a bias seems to have been engendered in the public mind against the medium.

The present study makes an effort to steer the conversation away from the harmful effects of video games and highlight the positive, social aspects associated with the medium. There have been a number of arguments supporting the cerebral benefits of video game play, including increased spatial cognition and mental rotation ability (Feng, Spence, & Pratt, 2007), as well as enhancing executive control in older adults (Anguera et al., 2013; Basak, Boot, Voss, & Kramer, 2008), but these points are often peripheral to the larger behavioral debate of video game play among children and adolescents. This study offers more weight to the prosocial argument, establishing a positive effect of prosocial video game play on self-concept, increasing the potential for beneficial, helpful behaviors (Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Todorov & Bargh, 2002). Video games thus are capable of being a part of the solution, just as television with prosocial content have been linked to increased prosocial behavior, reduced aggression, and tolerance (Mares & Woodard, 2005).

Automatic self-concept is a key influencer of how one interprets and interacts with the world (Greenwald et al., 2002). Self-associations impact how one processes information as it relates to the self, contributing to how one interprets ambiguous behaviors by others and how those behaviors are responded to (Anderson & Bushman, 2002). Prosocial self-concept thus would be characterized by more beneficial interpretations and charitable actions, or prosociality, which is associated with a number

benefits for society and the individual. For instance, prosociality has been shown to be positively correlated with self-esteem, as a ten year longitudinal study saw that the two constructs develop in parallel from middle adolescents to young adulthood (Zuffianò et al., 2014). Though correlation does not equate to causation, there is theoretical support for the idea that prosociality fosters a positive social environment where individuals feel valued and accepted, enhancing self-regard and sustaining positive self-esteem (Harter, 2003). Similarly, in a previous, five-year longitudinal study, prosociality was positively correlated with academic achievement (Caprara, Barbaranelli, Pastorelli, Bandura, Zimbardo, 2000).

Prosociality provides clear benefits to the recipient of an individual's "good actions" as well, but in the case of self-concept, the adage *it is better to give than to receive* is especially appropriate. As one study investigated, prosocial self-concept was involved in the motivational processes that promote "going beyond the call of duty" in school and societal contexts, or organizational citizenship behavior (OCB; Mayfield & Taber, 2010). People are motivated not only by utilitarian needs such as money and food, but by a desire to express themselves, their values, and beliefs as well (Katz & Kahn, 1966; Shamir, House, & Arthur, 1993). Self-concept expression is an intrinsic motivator for actions that reinforce one's identity beliefs, so when these beliefs are prosocial in nature, they are expressed as altruistic behavior. Prosocial self-concept thus is beneficial to both the actor and the recipient, as the actor derives satisfaction from being helpful on a self-affirming level. The present study shows that prosocial video game play promotes this beneficial orientation of self-concept, therefore it may be the case that repeated prosocial play fosters a lasting, valuable effect on beliefs, scripts, attitudes and other

internal constructs (Gentile et al., 2009). Thus prosocial video game play could produce self-motivated, altruistic individuals, which is good for society.

Conclusion

When considering the effects of video game play, the impact depends on the content of the game, so though violent games may contribute to aggressive thoughts and behaviors (Anderson et al., 2004). By the same token prosocial games can increase prosocial outcomes, as supported theoretically by the GLM (Gentile et al., 2009), as well as through evidence gathered by the present study in addition to others (Gentile et al., 2009; Greitemeyer & Osswald, 2010; Saleem, Anderson, & Gentile, 2012). The present experiment offers insight into the construct of self-concept through investigation of automatic self-associations, where playing a prosocial video game demonstrated an increase in helpful self-associations above that of playing a neutral video game. These results imply a positive, short-term impact on self-beliefs that may, with repeated exposure or practice, develop lasting change in personality towards prosocial traits. The goal of future research should be to further analyze the mechanisms behind the effects of prosocial and violent media, such as the impact of character identification on self-concept and empathy. Steps in gaming research should also be taken towards discovering how manipulation of game factors, including POV and the prosocial element itself, might influence the strength of psychological effects. Lastly, encouraging publishers to produce more video games featuring prosocial content would be an appropriate first step towards alleviating the negative stigma about video games, though researchers should also work towards finding the social benefits of playing the most popular video games as well.

Appendices

Appendix A

Implicit Association Test: Prosocial Self Concept

Greenwald and Farham (2000) provided the word lists for the categories of Self and Other for use in their Self Esteem IAT. To measure automatic prosocial self-concept, two additional categories were needed to be construct: Helpful and Harmful. These word lists are provided below.

Self: I, me, my, mine, self, myself

Other: they, them, their, it, other

Helpful: charitable, supportive, helpful, kind, friendly, generous

Harmful: violent, destructive, harmful, combat*, aggressive*, deadly

* Taken from the Aggression IAT used by Uhlmann and Swanson (2004).

Appendix B

Survey Questionnaire

Please use this list of common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself right now, at this moment, not as you wish to be in the future.

Please circle the number that most accurately describes you on the following rating scales:

	Not at all					Extremely				
<u>Creative:</u>	1	2	3	4	5	6	7	8	9	
<u>Talkative:</u>	1	2	3	4	5	6	7	8	9	
<u>Helpful:</u>	1	2	3	4	5	6	7	8	9	
<u>Reflective:</u>	1	2	3	4	5	6	7	8	9	
<u>Sympathetic:</u>	1	2	3	4	5	6	7	8	9	
<u>Supportive:</u>	1	2	3	4	5	6	7	8	9	
<u>Uneasy:</u>	1	2	3	4	5	6	7	8	9	
<u>Content:</u>	1	2	3	4	5	6	7	8	9	
<u>Uncooperative:</u>	1	2	3	4	5	6	7	8	9	
<u>Lazy:</u>	1	2	3	4	5	6	7	8	9	
<u>Compassionate:</u>	1	2	3	4	5	6	7	8	9	
<u>Stable:</u>	1	2	3	4	5	6	7	8	9	
<u>Generous:</u>	1	2	3	4	5	6	7	8	9	
<u>Indifferent:</u>	1	2	3	4	5	6	7	8	9	
<u>Practical:</u>	1	2	3	4	5	6	7	8	9	

<u>Unsophisticated:</u>	1	2	3	4	5	6	7	8	9
<u>Responsible:</u>	1	2	3	4	5	6	7	8	9
<u>Considerate:</u>	1	2	3	4	5	6	7	8	9
<u>Disorganized:</u>	1	2	3	4	5	6	7	8	9
<u>Timid:</u>	1	2	3	4	5	6	7	8	9
<u>Cold:</u>	1	2	3	4	5	6	7	8	9
<u>Virtuous:</u>	1	2	3	4	5	6	7	8	9
<u>Intelligent:</u>	1	2	3	4	5	6	7	8	9
<u>Kind:</u>	1	2	3	4	5	6	7	8	9
<u>Relaxed:</u>	1	2	3	4	5	6	7	8	9
<u>Thorough:</u>	1	2	3	4	5	6	7	8	9
<u>Selfish:</u>	1	2	3	4	5	6	7	8	9
<u>Agreeable:</u>	1	2	3	4	5	6	7	8	9
<u>Charitable:</u>	1	2	3	4	5	6	7	8	9
<u>Thrifty:</u>	1	2	3	4	5	6	7	8	9

Appendix C

Informed Consent Gaming, Reaction Time, and Puzzles

You are invited to take part in a research study titled “Gaming, Reaction Time, and Puzzles,” conducted by Michael Andrews as part of the graduating requirements for the Masters in Experimental Psychology program at Towson University. Your decision to take part is voluntary and you may refuse to take part, or choose to stop taking part, at any time. A decision not to take part, or to stop being part of the research project will not negatively impact you in any way.

PURPOSE: The purpose of this experiment is to investigate the effect of video game play on several cognitive factors, including reaction time and puzzle solving.

PARTICIPATION: Participation in this experiment is entirely voluntary. You must be 18 years of age or older to participate. You may discontinue participation at any time without penalty. Your participation in this study would help expand understanding of how video games impact our society.

In this experiment you will be asked to play a classic computer game and complete several tasks measuring a number of cognitive factors, including a computerized reaction-time task and solving geometric puzzles. There are also questionnaires regarding your personality, your experience with the game you play, and your demographics (age, class rank, etc.). This experiment should take approximately 1 hour to complete.

RISK(S): You will be at minimal risk. There is some risk regarding eyestrain and injury of the hands or wrists due to repetitive motions, but these risks are usually associated with multiple hours of gameplay. If you experience discomfort, you may discontinue at any time without penalty.

With research participation there is always a risk of inappropriate disclosure of data. However, the researchers have a number of procedures in place to ensure that all data collected is safe and protected.

CONFIDENTIALITY: All responses will be held in confidence by the researcher. Information you provide will be statistically summarized with the responses of others, and will not be attributable to any single individual. Any links between your identity and the data we collect will be destroyed once your participation is complete.

QUESTIONS: If you have any questions about this research study or would like to obtain a copy of the overall research results once the study is complete, please contact Michael Andrews at (240) 357-3765 or mandre12@students.towson.edu, my faculty adviser, Professor Jessica A. Stansbury at (410) 704-3196 or jstansbury@towson.edu, or the Chairperson of Towson University’s Institutional Review Board for the Protection of Human Participants, Dr. Debi Gartland, at (410) 704-2236 or ours@towson.edu.

I have read and understand this consent form, and I voluntarily choose to participate in this research study. I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in the study. I further understand that nothing in this consent form is intended to preempt any applicable federal, state, or local laws regarding informed consent.

Participant Signature:

Researcher Signature:

This research has been approved by the Institutional Review Board for the Protection of Human Subjects at Towson University.

Appendix D

IRB Approval Form



Date: Saturday, January 30, 2016

NOTICE OF APPROVAL

TO: Michael Andrews DEPT: PSYC

PROJECT TITLE: *Gaming, reaction Time & Puzzles*

SPONSORING AGENCY:

APPROVAL NUMBER: 16-A065

The Institutional Review Board for the Protection of Human Participants has approved the project described above. Approval was based on the descriptive material and procedures you submitted for review. Should any changes be made in your procedures, or if you should encounter any new risks, reactions, injuries, or deaths of persons as participants, you must notify the Board.

A consent form: ☒ is ☐ is not required of each participant

Assent: ☐ is ☒ is not required of each participant

This protocol was first approved on: 30-Jan-2016

This research will be reviewed every year from the date of first approval.

A handwritten signature in blue ink, appearing to read "Amy Layton", written over a horizontal line.

Towson University Institutional Review Board

Appendix E

Curriculum Vita

NAME: Michael W. Andrews

ADDRESS: 6701 Green Valley Rd, New Market, MD 21774

Collegiate institutions attended

May 2016	M.A., Psychology, experimental focus Towson University; Baltimore, MD
January 2013	B.A., Psychology, <i>cum laude</i> Hood College; Frederick, MD Minor: Philosophy
December 2010	A.A., Psychology, with honors Frederick Community College; Frederick, MD

Secondary education

Class of 2008	Linganore High School, New Market, MD, 21774
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Research experience

Laboratories

Fall 2014-	Towson University, Player's Lab. Director: Jessica Stansbury
Present	Website: http://jessicaastansbury.weebly.com/the-players-lab.html
Fall 2012-	Hood College, Dog Lab. Director: Shannon Kundey
Spring 2013	Website: https://sites.google.com/site/hooddogstudy/

Presentations

Andrews, M. (2015, March). *Can Playing Video Games Make You a Better Person: Prosocial Games and Self Concept*. MPAGS Annual Convention at Loyola University, MD.

Andrews, M. (2010, December). *An Exploration of the Motivations Behind the Playing of Massively Multiplayer Online Games*. Final presentation Psychology Honors Independent Study at Frederick Community College, MD.

Posters

Andrews, M. (2016, April). *Investigating Prosocial Gameplay and Prosocial Self-Concept*. Poster presented at the Undergraduate and Graduate Research Expo, Towson University, Towson, MD.

Andrews, M. (2012, May). *The Effect of First versus Third-Person Perspective on Avatars-Influenced Aggression*. Poster presented at the Annual Psychology Poster Day at Hood College, Frederick, MD.

Teaching experience

Fall 2014- Towson University; Baltimore, MD

Spring 2016 *Teaching Practicum*

- Introduction to Psychology
- Teaching Assistant*
- Experimental Research Methods
- Counseling Techniques

Fall 2012 Hood College; Frederick, MD

Tutor, Teaching Assistant

- Experimental Research Methods
- Introduction to Psychology

Career-related employment

2/2013- John Hopkins University; Baltimore, MD

5/2013 *Maryland Safe Supportive Schools (MDS3) project Data Collector*

8/2012- Way Station; Frederick, MD

11/2012 *Student Intern, facilitator*

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