

2007

The relationship between exposure to violence video games and self-efficacy

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The Relationship Between Exposure to Violence
Video Games and Self-Efficacy.

Thesis

Submitted to

The College of Arts and Sciences of the
UNIVERSITY OF DAYTON

In Partial Fulfillment of the Requirements for

The Degree

Master of Arts in Communication

by

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May, 2007

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ABSTRACT

THE RELATIONSHIP BETWEEN EXPOSURE TO VIOLENCE VIDEO GAMES AND SELF-EFFICACY

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This quantitative study evaluates the potential relationship between viewing video games and the resulting effect on levels self-efficacy. Four hundred thirty-three participants were asked to report video game viewing habits, such as time spent playing and most frequently played video games. In addition, the participants were asked to rate their self-efficacy based on certain tasks presented by the survey. The results of the statistical analysis overwhelmingly indicated there is a correlation between increased time spent playing video games and increased levels of self-efficacy based on mastery of experience, vicarious experience, and somatic and emotional reaction. Increased levels of self-efficacy based on antisocial behavior and learning from video games were also correlated with increased time spent playing video games. The responses provided relative levels of perceived self-efficacy and were significantly different based on the sex of the respondent. The implications of the study are that time

spent playing video games effects the individual's belief of perceived capability, which can result in the emulation of game content and behavior modification. Recommendations are made for additional research and investigation related to the development of self-efficacy, video game analyses, and behavior modification.

ACKNOWLEDGEMENTS

I would like to extend my gratitude and appreciation to those individuals who have motivated and assisted me throughout the accomplishment of this study, specifically:

Dr. Teresa Thompson. You gave me the encouragement, guidance, insight, and professional support without which I might never have succeeded in preparing this document. Your leadership and demeanor were exceptionally supportive and appreciated.

Dr. James Robinson. Your words of encouragement provided the drive to continue and forge ahead in this challenge. Through new ideas and knowledgeable suggestions, your guidance was invaluable in completing this study.

Dr. Ronda Scantlin. Thank you for providing related subject matter enlightenment and constructive criticism. Your expertise in the area of mass media and children is vital to the field and the future of children.

Professor David Marshal. Thank you for your willingness to hand out and collect surveys in your classes. Your enthusiasm to help and contribute to this project is admirable.

My parents. I am grateful for your devoted support and understanding during trying times. This project could not have even begun without your endless love and support. Thank you for always believing in me so that I have the opportunity and faith in myself to achieve my dreams.

Finally, I would like to acknowledge all of the children that we as adults, parents, and educators have the responsibility to nurture and provide a healthy and wholesome environment in which to grow and mature. May we never fail in this endeavor.

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CHAPTER ONE

REVIEW OF LITERATURE

Children and adolescents spend a significant amount of recreational time viewing television and using interactive media, especially video games and computer simulations. In 2003, 56.9% of children and adolescents in the United States between the ages of 5 to 17 years old use their at-home computers to play games (U.S. Census Bureau, 2007). The activity of playing games rated above any other activities including word processing, connecting to the Internet, e-mail, and completion of homework assignments (U.S. Census Bureau, 2007). Recent national survey of parents reveals that school-age children spend an average of seven hours per week playing video games (Gentile & Anderson, 2003). Another survey of over 600 eighth- and ninth-grade students indicated that children averaged 9 hours per week playing video games (Gentile & Anderson, 2003).

In addition, a recent analysis of video game content showed that approximately 89% of games contain violent content under the general category of violence (Gentile & Anderson, 2003). Playing violent video games has been found to account for a 13% to 22% increase in adolescent's violent behavior (Media Violence, 2001). A recent study conducted by the United States Department of Education (2006) addressed crime, violence, discipline, and safety in United States public schools. The data revealed that out of 65,523 schools,

there were 1,553,291 incidents of violent behavior at a rate of 33.3 incidents per 1,000 students. Violent incidents included rape, sexual battery other than rape, physical attack or fight with or without a weapon, threat of physical attack with or without a weapon, and robbery with or without a weapon. The data also indicated the higher rate of incidence occurred in the middle school, 52.7 incidents per 1,000 students, versus a 27 to 28 incident rate at the primary or high school levels (U.S. Department of Education, 2006). Gentile, Lynch, Linder, and Walsh (2004, p. 5) reported, "Adolescents who exposed themselves to greater amounts of video game violence were more hostile, reported getting into arguments with teachers more frequently, were more likely to be involved in physical fights, and performed more poorly in school." The American Academy of Pediatrics has identified violent media exposure as a significant risk to the health of children and adolescents (Media Violence, 2001).

Scientific research, qualitative studies, and quantitative analyses in media violence exposure have led to the conclusion that viewing violence increases aggression (Bushman & Anderson, 2001). Analytical studies indicate that playing violent video games can cause significant increases in aggression, and that media violence has significant short and long term causal effects on aggression and on interpersonal violence (Carnagey & Anderson, 2004). Violence and violent media is generally described as images that depict intentional attempts by individuals to inflict harm on others (Anderson & Bushman, 2001). Video media includes television, movies, video games,

computers, and hand held computing devices. Each of these media sources is capable of presenting violent video imagery. Video media provide a robust source of education, training, and entertainment, but many sectors of society are concerned about whether participation in video games by individuals, specifically children and teens, contributes to antisocial behavior, aggression, and violence.

Considerable research has also been done to assess the nature, influence, and impact of children's exposure to violence in multiple forms of video media. "Media violence exposure and total screen time both increase hostile attribution bias, which in turn was relegated to increased verbal, physical, and aggressive behavior as well as reduced prosocial behavior" (Gentile, Walsh, Ellison, Fox, & Cameron, 2004, p. 7). The content of television, the Internet, and video games have concerned parents, educators, and religious organizations that are upset by such themes as violence, aggression, sex, and gender stereotyping. Public opinion polls have reported that 75% of American adults believe that television violence contributes to crime and aggression (Wilson et al., 2006). Other areas of concern are video game addiction and the denigration of academic performance, antisocial tendencies, poor motivation, personality changes, and behavior modification.

Video game imagery technology has progressed to the point of virtual reality and provides the participant with experience realism. This point is important to behavior development and learning theory as related to video exposure, real world experience, and experiential reality. What children see on

the screen is what they believe they can do, not just for entertainment (Lieberman, 2001). "Research on learning shows that when one becomes actively involved in something, one learns much more than if one only watches it" (Gentile & Anderson, 2003, p. 135). Violent video games by their nature require active participation in violent acts (Gentile & Anderson, 2003). Funk, Baldacci, Pasold, and Baumgardner (2004) state,

Video game players actually participate in, and to some extent create the video game actions, rather than simply being a content recipient. In order to succeed at a violent video game, players must identify and then choose violent strategies. Repeated violent choices result in a continuous cycle of reward (p.24).

Lieberman (2001) also found if the process of these interactive media is entertaining and offers a challenge that is neither too easy nor difficult, young people will try it repeatedly until they master it. Evidence shows that these skills learned through this process are more likely to be carried over in real life (Lieberman, 2001). When these types of actions and skills are learned, this is a sense of accomplishment and rewarding to the individual. Participants can control what is on the screen, create new content, and be interactive with the other content and participants on the screen with the feature of automatic feedback (Lieberman, 2001). These media put participants in the environment and require them to act on a task of choice with decision-making actions to obtain a goal.

Many researchers have concluded that playing violent video game is related to aggressive behavior (Anderson & Bushman, 2001; Anderson & Dill, 2000; Bushman & Anderson, 2001; Gentile & Anderson, 2003). Gentile and Anderson (2003) performed a meta-analytic summary of violent video games. A consistent pattern of effects of playing violent games was found in five areas. These areas include an increase physiological arousal, aggressive cognitions, aggressive emotions, aggressive behaviors, and a decrease prosocial behavior. Anderson and Dill (2000) examined violent video game affects on aggression-related variables. The results revealed that violent video game play and aggressive personality accounted for major portions of both aggressive behavior and non-aggressive behavior. Violent video games were also shown to be a predictor of aggressive and non-aggressive behavior compared with time spent playing all types of video games. Anderson and Dill (2000) also reported that college-age students who reported playing more violent video games in junior high school and high school engaged in more aggressive behavior. In this study, they concluded playing a violent video game appeared to affect aggression by priming aggressive thoughts (Anderson & Dill, 2000). Furthermore, Anderson and Bushman (2001) performed a meta-analytic review of the video game research literature that revealed exposure to violent video games is positively associated with heightened levels of aggression in young adults and children, both male and female. This study also revealed violent video game exposure is negatively associated with prosocial behavior as well as positively linked to

aggressive affect and physiological arousal (Anderson & Bushman, 2001).

Anderson and Bushman (2001) concluded exposure to violent video games is related to the main mechanism underlying long-term effects on the development of aggressive personality-aggressive cognitions.

Studies indicate that there is a strong relation between viewing violence in media and learning aggressive, antisocial behavior based on that exposure. When viewing video game media, the viewer inherently increases knowledge based upon the experience. The learning that occurs provides a basis for social behavior and actions.

Learning Theory

Social learning theory, social cognitive theory, and self-efficacy describe learning and behavioral development processes. When coupled with the concept of self-efficacy, learning and social cognitive theories provide a foundational basis for considering the acquisition of aggressive behavior through video game participation. Social learning theory, as conceptually evolved by Bandura, states that "most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (Bandura, 1978, p.14). From observation of the behavior of others, people can extract general tactics and strategies of behavior that enable them to go beyond what they have seen or heard. Social learning theory consists of four necessary

activities that iterate cause and effect of media exposure and violence. These are attention, retention, reproduction, and motivation (Bandura, 1986). The first activity, attention, occurs in order for the individual to learn. The next activity, retention, is the actual storing of either visual images or verbal symbols so that they may be retrieved and applied in behavior response or change. The third, reproduction, is the translation of the visual images or verbal symbols into behavioral response. Reproduction allows the individual to act on or imitate the stored information and once performed, successive iterations produce character and behavioral traits. The fourth action is motivation. Motivation is the desire or reason to act. Motivation can be based on rewards or punishments, such as past reinforcement, promised reinforcement, or vicarious reinforcement. This theory, when applied to the genre of video games and media, establishes a foundation for learning and behavioral modification.

Learning theory provides the rationale for the process of personal perceived capability and the increase in likelihood of behavioral trait development. The learning process also produces a modification of behavior by observing others through mediated communication channels. Norms, accepted behavior, and desirable personae are more likely to be adopted when the model is positively viewed (Wilson et al., 2006). Context portrayals also play a role relative to the potential affects on viewers exposed to media. Four variables that impact how viewers interpret messages are the types of characters committing

the act, the rewarding nature of the act, justification, and motivation (Potter & Ware, 1987).

Children and teenagers pay close attention to characters that are perceived as being similar to them (Anderson, 2000). They relate, compare, and attach themselves to the way the character acts, looks, and portrays itself. These characters must be appealing to the participant. The impacts of socio-economic status, ethnicity, and personal perceptions become important when considering characters and roles within the visual media, video games, or simulations. Identification with the aggressor increases initiation of the aggression (Anderson, 2000; Gentile & Anderson, 2003). This can cause a validation of the way the person acts and can positively affect self-esteem. "If a simulation or game is used, the characters should appear in scenarios that involve the user in making decisions and performing skills intended by the campaign, and realistic consequences of those decisions should be depicted" (Lieberman, 2001, p. 378). These qualities are typically imbedded in violent video games. The appeal of the role model characters helps attract and hold the attention of the user. This can stimulate discussion and thoughts of life problems and solutions presented in the program which can, in turn, affect the solutions that the user perceives as realistic in personal real life problems.

Social learning theory states that behaviors can be imitated from observing other people's actions and the consequence of those actions (Bandura, 1978). Through social learning, people notice which actions are

rewarded and which have unpleasant outcomes. Reward is an important factor in determining the probability that a viewer will learn from the model behavior.

Rewards, such as peer recognition and personal attention, can also be based on negative behavior. Those actions that are rewarded are more likely to be repeated in their own lives, when conditions and circumstances are right. "Over 88% of all antisocial acts are portrayed as rewarded. Rewarding modeling is more effective than modeling alone in fostering similar patterns of behavior" (Potter & Ware, 1987, p. 683). People who watch video violence or participate in violent games are more likely to behave aggressively if media content shows a perpetrator who is rewarded. A reward can be defined as whether or not the person committing an act receives a benefit as a consequence of having performed the act (Potter & Ware, 1987). Benefits can be recognized and produce a tangible feeling of satisfaction, dependent upon post act influences and emotions.

If role models are shown committing antisocial acts they feel justified in committing, the viewer's inhibitions about committing the same act are lessened (Potter & Ware, 1987). Antisocial acts that are portrayed as being justified have a stronger affect on aggressive behavior than do antisocial acts that are not portrayed as being justified. There are two bases considered for justification of a behavior. The first is the feeling of justification for a particular act that can be determined as a socially approved behavior and the second is that which may have a personal basis of determination (Potter & Ware, 1987). This type of

justification follows an ends-justify-means stratagem. "In 93% of the antisocial activity the perpetrator felt justified" (Potter & Ware, 1987, p.683). When a character is externally motivated, the character is forced to commit the antisocial act because of necessity or outside force. If the character performs without external inducement, then the act was performed for the personal pleasure of being engaged in action and not in response to demands placed from another person or external to oneself. According to Potter and Ware (1987):

Sixty percent of all antisocial action is externally motivated, especially if those acts are performed by heroes. Seventy-five percent of antisocial acts are done because the character is forced to. Heroes and villain both rarely are shown feeling remorse or experience punishment for the crimes committed (p. 682).

Social learning theory therefore conceptually provides insight into the relationship between media exposure and behavioral modification.

The social cognitive theory, developed by Bandura (2001), evolved from social learning theory. Social learning theory emphasizes that behaviors are motivated by drives and one individual acts as a stimuli for another individual (Bandura, 1978). This established a reciprocal relationship between environment and behavior. Bandura continued the development of the social learning theory by emphasizing cognitive concepts of social experiences and how this influences behavior and development (Bandura, 2001). Bandura's development

incorporates the additional concepts of vicarious learning, reciprocal determinism, and self-efficacy.

The social cognitive theory is conceived on a basis of cognitive, vicarious, self-regulatory, and self-reflective processes (Bandura, 2001). The individual's concept of reality is formed by reciprocity and feedback with the interaction of the environment and one's own cognitions. These cognitions change overtime because of the individual's motivation, experience, and maturation (Bandura, 2001). The relationship between concept of reality, the environment, and personal cognitions are influenced and controlled by the individual's self-regulatory state. Self-regulation is important relative to self-efficacy because it exercises controls over good and bad, right and wrong, and normal or antisocial behavior. The self-regulation of motivation, affect, and action operates partly through internal standards and evaluative reactions to ones own behavior (Bandura, 2001). Through this process of reality concept, influences, and self-regulation individuals change behavior and mature. Maturation is involved with both mental and physiological development and is significant relative to experience and motivation.

Physiological development and human growth from childhood to young adulthood produce many significant bodily changes. Individual maturation is both physical and mental and varies with age. Studies reveal that, as we mature physically, our abilities to reason and interpret develop through various external stimuli such as environmental factors and social exposure. "The values operative

in violent video games may be more likely to have lasting impact on children who are still developing moral reasoning principles as a guide to prosocial behavior than on individuals with established valued systems" (Funk, Baldacci, Pasold, & Baumgardner , 2004, p. 34). As our brain develops, we tend to capture more information, learn to process it, and form opinions, rationalities, and character. A recent study conducted by the National Institute of Mental Health (NIMH) reveals that the brain's center of reasoning and problem solving is one of the last parts to develop (NIMH, 2004). The study is based on the Magnetic Resonance Imaging (MRI) of the brain's development in individuals from ages 4 to 21. The same individuals were scanned every 2 years for a 10-year period and the amount of gray matter was recorded, as was the mapping of neuron branches. The NIHM (2004) study found that:

The first areas to mature, extreme front and back of the brain, are those with the most basic functions, such as processing the senses and movement. Areas involved in integrating information from the senses, reasoning, and other "executive" functions, the frontal cortex, mature last (p.2).

This physiological, brain development process was correlated with chronological age maturation and illustrates that learning ability and reaction vary with age.

The study indicates a relative lack of ability, from a reasoning perspective, on the part of teen to adapt. Researchers also compared the MRI scans of individuals aged 23 to 30 years with those of teens. Areas of the frontal lobe,

which address maturity and decision-making, showed a significant difference between teens and young adults. They specifically looked for myelin, which would suggest more mature, efficient neurological connections within the gray matter. Increased myelination in the adult frontal cortex was related to the maturation of cognitive processing and other “executive” functions (NIHM, 2001). Decety and Grezes (2006, p. 12) reported, “The combined results of functional neuroimaging studies demonstrate that when individuals perceive the actions and the emotions produced by others, they use the same neural mechanisms as when they produce the actions and the emotions themselves.” The implications of these psycho-physiological studies, when viewed from a cultural and social violence perspective, tend to help us understand how violence-based interactive media may contribute to teenagers acting in a violent and socially unacceptable way.

The application of this information to the present study revolves around learning theory and the relationship of age, mental development, maturity, media exposure, individual interpretation, experiential involvement, and susceptibility to behavior modification through increased self-efficacy. Perceived benefits, role model emulation, motivation, and acceptance of the act are driven by maturity and psycho-physical contributing factors in modification of self-efficacy.

Self-Efficacy

Self-efficacy is important when individuals gain confidence in their abilities to carry out desired behaviors. This also mediates the social influence of the behavior. The self-reflective process during learning allows the individual to analyze an experience, evaluate his or her own thoughts, and change his or her thoughts accordingly (Bandura, 2001). "Adolescent perception of efficacy plays an important role in their transition from childhood dependency to adulthood self-sufficiently" (Zimmerman & Cleary, 2006). Zimmerman and Cleary (2006) report research has shown that adolescent self-efficacy beliefs emerge from a rich and complex interaction of forces. According to the social cognitive theory, self-efficacy is a major determinant in the course of learning (Bandura, 1994). During the self-reflective process, self-efficacy adjusts depending on the situation presented. "How people interpret the results of their own actions informs and alters their environments and the personal factors they possess, which, in turn, inform and alter future actions" (Pajares, 2006, p. 340). Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives (Bandura, 1994). When the individuals believe their self-efficacy is high about a behavior, they are more likely to perform the action in belief that they will succeed. This notion can be helpful in predicting future actions and outcomes. Self-efficacy is context specific and varies across several dimensions, such as level, generality, and strength (Bandura, 2006; Zimmerman and Cleary, 2006).

Self-efficacy beliefs are developed and strengthened by mastery of experiences, social modeling, and persuasive forms of social influences (Bandura, Caprara, Barfaronelli, Gerbino, & Pastorelli, 2003). Users become more successful when rehearsing difficult but desirable activities.

Self-efficacy can determine the way individuals think, feel, motivate themselves, and behave (Bandura, 1994). The evidence from nine large meta-analyses consistently showed that efficacy beliefs contribute significantly to the level of motivation and performance (Bandura & Locke, 2003). The nine meta-analyses were conducted across diverse subjects that included work-related performance, psychosocial functioning in children and adolescents, academic achievement and persistence, health functioning, athletic performance, laboratory environments, and perceived collective efficacy in-group functioning (Bandura & Locke, 2003). Evidence from meta-analyses across diverse spheres and diverse populations for both collective and individual efficacy shows that efficacy beliefs contribute significantly to level of motivation, socio-cognitive functioning, and performance accomplishments (Bandura, 2006). People with high assurance in their capabilities approach tasks as challenges with goals to be achieved. The higher the self-efficacy, the more knowledge one has about how to perform the evident behavior. The more rehearsal of behavior, the more confidence one will gain, which increases self-efficacy and likelihood to perform the action in reality. High self-efficacy causes the person to be engrossed and obsessed with mastering the activity (Bandura et al., 2003). The person sets

high goals to achieve and maintains the strong commitment to achieve them. As an individual's self-efficacy increases, so does his or her willingness to undertake more difficult challenges, which increase self-efficacy further (Lieberman, 2001). Mastering such an activity can help the participant to approach threatening situations with confidence, which helps them exercise control over the situation. The relationship of this concept to implications of interactive media and computerized virtual reality programs is significant (Lieberman, 2001). The inference is that participation and exposure to video media and video games that contain violence results in experiential learning and increased self-efficacy can produce behavior modification.

According to Bandura (1994), there are specific ways to increase self-efficacy. The most effective way is through mastery of experiences. Successes build a strong belief in one's personal efficacy. Failures undermine it, especially if the failures occur before a sense of efficacy is firmly established. An individual's own performances are the most reliable guides for gauging self-efficacy (Schunk & Meece, 2006). The second way is through the vivid experiences provided by social models. As discussed previously in the current study, seeing another person, similar to oneself, succeed by sustained effort, whether legal or illegal, raises observers' beliefs that they also possess the capabilities to master comparable activities and can succeed. Schunk and Meece (2006, p. 82) report, "Observation of peers accomplishing a task can raise observers' self-efficacy and lead them to believe that they also can perform the

task.” Friends and peer networks are key social influences on adolescents’ self-efficacy (Schunk & Meece, 2006). These similarities may be in the form of social status, ethnicity, or group association.

The impact of the modeling is strongly influenced by the perceived similarity to the model. This indicates the importance of character portrayal in visual and interactive media. The appeal of the character is not the only influence on an adolescent’s perception. Enactments, values, beliefs, and attitudes of the model are adopted and emulated (Bandura, 1994). The greater the assumed similarity, the more models’ successes and failures are persuasive. A model provides a standard of comparison to the actions performed (Bandura, 2001). Therefore, the individual can judge his or her actions that can influence efficacy. If people see models as unlike themselves there is little influence by the models’ behaviors and the results they produce. Through the behavior and expressed ways of thinking, models transmit knowledge and teach observers effective skills and strategies for managing environmental demands (Bandura, 1994).

The third way to strengthen personal beliefs in ourselves is based upon the conceptualization that we have what it takes to succeed in the task. If the people believe they are capable of mastering an activity, they are more likely to exert great effort and inhibit any self-doubts from overcoming them. In an analysis of self-efficacy in a learning environment, Meyer and Sternberger (2005, p. 225) stated, “The strength of a student’s convictions as to the success of the behavior or the performance, will affect whether the behavior is initiated as well as the

persistence.” If the individual participating believes the task is too difficult the task will not be initiated. The fact that most violent interactive computer media are designed to achieve levels of success thus encourages task completion as a reward factor (Bandura, 1994).

Finally, people rely on their somatic and emotional states in judging their capabilities. The somatic state refers to the individual’s assessment of physical capability and potential (Bandura, 1994). The emotional state refers to the psychological and physiological condition of the assessment of capability. Decety and Grezes (2006) state,

The social functions, such as planning one’s own behavior, anticipating one’s own and other’s behavior, and empathizing with others, suggest an evolutionary advantageous role of imagination. For instance, while we read fiction, we may identify with characters and become absorbed in the experience on a deep emotional level. We feel real emotion even though we know the characters themselves are not real (p. 4).

The individual assesses whether he or she is mentally prepared to take action. When approaching certain situations the evaluation of one’s physiological reaction will increase or decrease self-efficacy for that situation. As Bandura points out, “among the self-referent thought none is more central or pervasive than people’s belief in their efficacy to exert control over their level of functioning and events that affect their lives” (Bandura, 2001, p. 4).

Most courses of action are organized in thought. People's belief in their own self-efficacy shapes the types of anticipatory scenarios they construct and rehearse. Those who have a high sense of efficacy, visualize success scenarios that provide positive guides and support for performance. Such skills require cognitive processing of information. According to Bandura (1994),

In learning predictive and regulative rules people must draw on their knowledge to construct options, to weight and integrate predictive factors, to test and revise their judgments against the immediate and distal results of their action, and to remember which factors they had tested and how well they worked (p. 3).

Media, especially a form with direct and personal interaction, promotes the learning process of enactments of character portrayal. This provides a primary method to increase individual efficacy.

Self-Efficacy in Relation to Video Game Play

Previous literature and research suggests there is relationship between viewing media and learning a behavior portrayed by the actions on that medium. There has been considerable attention directed toward video media, video games, and the impact of the violence that is expressed in these media forms. This exposure may affect an individual's behavior and personal aggression tendencies. This includes differing perspectives and arriving at different conclusions. Past literature and research is used from media viewing patterns,

learning theory, and self-efficacy to assess the relationship between self-efficacy and video game play. The focus of this study is to explore the relationship between time spent playing video games and personal perceptions of self-efficacy

Based on the literature presented relative to video game play, social cognitive theory, and self-efficacy, several hypotheses regarding the relationship between time spent playing video games and an individual's perceived self-efficacy will be tested. The individual's perceived level of self-efficacy is addresses based on the elements of self-efficacy: mastery of experience, vicarious experience, and somatic and emotional reaction. Items of antisocial behavior and learning, based on video games, are also specifically addressed. By testing these elements individually, more specific insight can be gained into the reported levels of self-efficacy.

H1: Increased time spent playing video games will be related to an increase in an individual's perceived level of self-efficacy based on mastery of experience.

H2: Increased time spent playing video games will be related to an increase in an individual's perceived level of self-efficacy based on vicarious experience.

H3: Increased time spent playing video games will be related to an increase in an individual's perceived level of self-efficacy based on antisocial behavior.

H4: Increased time spent playing video games will be related to an increase in an individual's perceived level of self-efficacy based on somatic and emotional reaction.

H5: Increased time spent playing video games will be related to an increase in an individual's perceived level of self-efficacy based on learning from video games.

The types of video games that individuals play are assessed to provide the types of video games being played. The following research question is asked to reveal this pattern:

RQ1: What types of video games are individuals choosing to play?

The relationship between the type of video games that individuals play and the level of self-efficacy is assessed to gain insight into the individual's exposure to certain types of video games and the individual's perception of his or her own self-efficacy. The three research questions are asked based on the elements of self-efficacy: mastery of experience, vicarious experience, and somatic and emotional reaction. These are addressed in the following research questions:

RQ2: Is the type of video game played related to an individual's perceived level of self-efficacy based on mastery of experience?

RQ3: Is the type of video game played related to an individual's perceived level of self-efficacy based on vicarious experience?

RQ4: Is the type of video game played related to an individual's perceived level of self-efficacy based on somatic and emotional reaction?

The NIHM study (2001) reveals that physiologically the brain develops independently of physical stature and the levels of myelination reveal differences in behavioral development potential. Bandura (2001) supports this by stating cognitions change over time based on maturation. The research question is proposed to gain insight of the potential relationship of age and the amount of video games played to impact levels of self-efficacy.

RQ5: Does age interact with the amount of video games played to impact levels of self-efficacy?

The levels of perceived self-efficacy and the difference in gender are explored to achieve insight on gender variance and levels of self-efficacy when

playing video games. The following research question is asked to investigate this difference:

RQ6: Do males rate the total level of perceived self-efficacy different than females rate the level of perceived self-efficacy experienced through involvement and emulation in video game play?

These hypotheses and research questions will be addressed in a quantitative analysis including a survey developed to address self-efficacy in relation to playing video games. The relationship of exposure time, video type, and self-efficacy level is indicative of potential behavior adjustment. The method applied provides insight into this relationship.

CHAPTER TWO

METHOD

College students at two local, midwestern Universities were used in conducting this investigation. The students were asked to take the surveys to other individuals who voluntarily completed them. The individuals were informed that most of the questions focus on video games, that some questions are general in nature, and the survey is completely anonymous (see Appendix A). The participants were not asked their names or any other questions that would identify them. The questionnaires were returned when completed for tabulation and analysis. Students were given extra credit in return for the completed surveys.

Instrumentation

The survey included one page of preliminary questions, such as student's age and gender, as well as video game behavior description. An estimation of the average number of hours spent playing video games per week and an estimation of the average number of hours spent playing video games with friends per week were asked in a 4-point Likert-type scale. The scale consisted of: a. < 5 hours, b. 6-10 hours, c. 11-20 hours, d. > 20 hours. Students were also asked to list the video games that they play most frequently, rating them on a descending scale from one to four.

The second part of the questionnaire was designed to rate self-efficacy beliefs of video game activity. The 40-item survey was designed from Bandura's guide for the development of a self-efficacy scale (Bandura, 2006). This included items addressing mastery of experience, vicarious learning, perceived capability, learning, antisocial behavior, and somatic and emotional changes that occur when playing video games. Students were asked to rate how certain they are that they could do the specific activities discussed in each item, based on their experience playing video games, by writing the appropriate number (see Appendix A). The rating system was based on a 100-point scaled ranging in 10 unit intervals, identifying "0" as "I cannot do," "50" as "moderately confident that I can do," and "100" as "confident that I can do." Although this scale was customized to the specific topic of video game play, the guide for constructing this scale was developed by Bandura (2006). A 10 unit interval scale was used to increase reliability and allow the individual to have enough range to limit bias response (Bandura, 2006). Because self-efficacy is concerned with perceived capability, the descriptors on the scale are "cannot do" and "can do." Efficacy items were to accurately reflect the construct to increase content validity (Bandura, 2006). The self-efficacy assessment was tailored to domains of functioning and task demands that identify patterns of strengths and limitations in perceived capability as suggested by Bandura (2006).

The issue of reliability, when specifically tailoring assessments to domains, reduces the opportunities of literature research study correlation and

analysis. Domain specificity and 100-point scale assessment produced strictly defined and detailed response data. Pajares, Hartley, and Valiante (2001) investigated whether the 0-100 format of assessing writing self-efficacy beliefs differed in empirical qualities from a traditional 1-6 point Likert-type format. In the instrument, there were two versions of writing self-efficacy scale that differed only in the way individuals could provide their responses. A factor analysis revealed that both the 0-100 scale and the Likert-type scale were composed of two factors, factor 1 included the second five items and factor 2 included the first five items. Cronbach's alpha revealed the reliability coefficients to be .86 for 0-100 scale and .85 for the Likert-type scale for factor 1. For factor 2, the reliability coefficient was .90 for the 0-100 scale and .87 for the Likert-type scale (Pajares, Hartley, & Valiante, 2001). Although these results are similar, the 0-100 scale reports to be higher in reliability and demonstrated better differentiation and predictive utility. The results were also consistent with Bandura's warning that the self-efficacy response scales with too few steps should be avoided because it cannot capture fine distinctions among individuals' self-efficacy beliefs and to limit response bias (Bandura, 2006; Pajares, Hartley, & Valiante, 2001). Pajares, Hartley, and Valiante (2001) conclude that Bandura's guidelines regarding self-efficacy assessment are empirically well-grounded. "Results of the factor and reliability analyses showed that the writing self-efficacy scale with a 0-100 response format was psychometrically stronger than a traditional Likert format scale" (Pajares, Hartley, & Valiante, 2001, p. 219).

Maurer and Andrews (2000) compared three scales; traditional, Likert, and simplified measure of self-efficacy. The traditional scale required the participants to respond with a "can do" judgment and a percentage of confidence from 0 to 100. The simplified measure gave the participants three options to choose under each task are. The Likert-type scale included items ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability coefficient was calculated for each of the three measures using seven dimension scores. The Cronbach's alpha coefficients obtained for the traditional, Likert, and simplified scales were all .85 (Maurer & Andrews, 2000). The results of this study revealed the three types of scales were similar in both reliability and validity. Although the results are similar, Maurer and Andrews (2000) concluded the traditional and Likert-type scale measure provided more diagnostic information in the assessment of the level of performance participants felt they could confidently obtain.

May and Limandri (2004) explored the reliability and validity of the self-efficacy scale for abused women. In this study, the self-efficacy scale consisted of a 27-item questionnaire to measure the specific nature of the sample and asked the respondent to rate her perceived ability to accomplish defined attributes by indicating on a scale 0 (couldn't do at all) to 100 (completely sure I can do). The participants were asked to complete the instrument once at the beginning of a 12- week period and once at the end. The test-retest reliability of the self-efficacy scale for times 1 and 2, using Pearson product moment bivariate correlation, was $r = .85$, $p < .01$ which indicate good stability (May & Limandri,

2004). The Cronbach's alphas were .95 for time 1 and .96 for time 2, in which internal consistency and reliability was concluded. The results revealed the self-efficacy 0-100 scale developed can be used as a reliable measure of self-efficacy in this specific context (May & Limandri, 2004). The results of these studies, although not domain specific as cited by Bandura (2006), suggest sufficient internal consistency and reliability. Therefore adequate evidence is provided for use of the developed test instrument as a reliable measure of self-efficacy assessment.

The self-efficacy guide, developed by Bandura (2006), is not an all-application measure for self-efficacy and is intended to be designed specific for the area of study. All-purpose self-efficacy scales have been found to be limiting in exploratory and predictive value because it has little or no relevance to the domain of functioning (Bandura, 2006). Thus the topic of exploration was applied to Bandura's (2006) construct of the self-efficacy scale. The internal consistency reliability of the scale was conducted by the researcher using Cronbach's alpha (Bandura, 2006). The self-efficacy scale was developed to link factors that determine quality of functioning in the domain of interest (Bandura, 2006).

Preliminary tests were performed to pretest the items specific to the domain of playing video games as well as analyze items for scale construction (Bandura, 2006). The pretest identified the form of challenges or impediments to build the self-efficacy items and recognized different degrees of difficulty built into the self-efficacy items to avoid repetitive response and a ceiling effect (Bandura,

2006). The first phase of the pretest included a written survey of 24 questions for analysis, and the second included a set of questions for verbal interviews. Once the surveys were complete, the information was analyzed for the construction of the self-efficacy scale used in this study.

Pretest

The written pretest survey of 24 questions was prepared and distributed to undergraduate college students in an entry-level communication course. The students were instructed to give the survey to other people to complete. The instructions include that it was anonymous and respondents should answer accurately and honestly. The questionnaire included both short answer questions, questions that were answered by a 5- Point Likert-type scale, and questions that were answered by multiple choice of appropriate relevancy to the question. The survey covered the area of general attitude about video games and violence.

Participants were first asked if they play video games based on a yes/no response. The responses of those who responded yes were further analyzed for this study. Participants were then asked how frequently they play video games per week. The responses were measured on a 4-point scale ranging from 1 (<5 hours), 2 (6-10 Hours), 3 (11-20 hours), and 4 (> 20 hours). A set of questions were asked for the response of general attitudes that addressed video game dynamics, self-efficacy, learning behaviors, physiological and behavior change,

mastery of actions, and justification of behavior (see Appendix B). These questions were measured on a 5- point Likert-type scale from 1 (strongly disagree) to 4 (strongly agree). Participants were asked which role they chose when playing video games. The choices of response were measured on a 5- point scale and are as follows; 1 (Hero), 2 (Bad guy), 3 (The victim), 4 (The By-stander), and 5 (Other). Open-ended questions were included in the survey to obtain additional information with open responses of the participants. Items addressed include the habits of the individual's and the friend's of the individual in video game playing, games that the individual's parents restrict from them, attitudes and beliefs about what specific video games their own children would be allowed to play if they are parent, and benefits from playing video games. The responses to these questions collected to reveal patterns, themes, and additional information otherwise not obtain by a scale-response method to provide additional insight and information. The information received was ranked with the top three most received answers and generalized into specified themes of video games played. Age and ethnicity were asked in the preliminary test. Age of the participant was obtained by a 5-point scale ranging from 1 (17-18), 2 (19-20), 3 (21-22), 4 (22-30), 5 (31 or older). Ethnicity of the participant was obtained by a 4- point nominal scale from 1 (African-American), 2 (Caucasian), 3 (Hispanic), and 4 (Other).

Interview Pretest

Interview questions were asked to investigate the potential importance of items about video game exposure and its effect on self-efficacy. The objective was to assess this relationship from a target population to provide a relative degree of confidence in the data gathered. The questions were presented verbally to individuals, randomly chosen, ranging from the ages of 5 to 16 years old, who play video games. Age and ethnicity of the participants were annotated.

The interview questions addressed eight areas concerning family orientation, game enjoyment, physical and mental stimulation, positive and negative reinforcement, perceived capability when playing video games, external factors affecting self-efficacy, role identity, and comparison of different media. Questions included if the participant has siblings, what games he or she enjoys and why, how each individual feels when playing video games, how the individual feels when he or she succeeds to the next level of the game, how he or she feels when performing the actions to achieve the next level of the game, if the individual feels he or she could imitate the action of the character being played, if he or she feels practicing the action on the video game could help them perform the action in real life, if the individual feels the actions he or she learns on the video game would be acceptable in real life, if a non-violent game make the individual feel different when played versus how he or she feels when playing a violent game, why he or she selects a particular character when play a game, if he or she feels viewing actions on the television are the same as playing the

action on a video game, and what would be the next choice he, she, or the parent would buy. Also a scenario was provided and then the child was asked, "if you did this in a game do you think you could do this if you saw it happen in a neighborhood." These questions were asked verbally and answers were written by researcher.

The pretests revealed the form the challenges and obstacles take, that was built into the self-efficacy items. From the pretests, the survey was developed.

Analysis

After the surveys were distributed and returned, a quantitative analysis was accomplished using the Statistical Package for the Social Sciences (SPSS). Hypotheses one, two, three, four, and five addressed the relationship between increased time spent playing video games and the individual's level of perceived self-efficacy. The individuals perceived level of self-efficacy was examined by the dependent variables, mastery of experience, vicarious experience, somatic and emotional reaction, antisocial behavior and learning. These were tested using the statistical test Pearson product moment correlation (r). These tests revealed if there is a positive or inverse relationship between the items tested.

The first research question was addressed by asking individuals to list video games that are most frequently played (see Appendix A). These were coded by the researcher based on a categorical content system used by

Buchman and Funk (1996). This provided information of what types of video games individuals are choosing to play.

Funk (as cited in Buchman & Funk, 1996) developed a content coding system from a survey completed by 357 seventh-and eighth-grade students. The coding system is based on the student responses that listed their three favorite video games. From the list of games generated by the study subjects, Funk developed five video game content categories: general entertainment, educational, fantasy violence, human violence, and sports. Funk and Buchman (as cited in Buchman & Funk, 1996) revised the system to include an additional category, sports violence. The resulting six categories are as follows: general entertainment, defined as the main action is a story or game with no fighting or destruction; educational, defined as the main action involves learning new information or inventing new ways to use information; fantasy violence, the main action is a story in which a cartoon character must fight or destroy things and avoid being killed or destroyed while trying to reach a goal, rescue someone, or escape from something; human violence, defined as the main action is a story where a human character must fight or destroy things and avoid being killed or destroyed while trying to reach a goal, rescue someone, or escape from something; nonviolent sports, defined as the main action is sports without fighting or destruction; and sports violence, described as the main action is sports with fighting or destruction.

The independent variable as type of video game, in relation to the dependent variables, levels of perceived self-efficacy based on mastery of experience, vicarious experience, and somatic and emotional reaction, were tested using a one-way analysis of variance to explore research question two, three, and four. This was used to test the differences among the types of video games played and the different elements of self-efficacy. An analysis of variance was also used to address the relationship of the independent variables, type of video game content played and age of the participant and the dependent variable, level of perceived self-efficacy. The analysis was used to test the differences among the types of video games played and the various ages of the participants. In the investigation of gender differences and individual's total level of perceived self-efficacy, including mastery of experience, vicarious experience, somatic and emotional reaction, learning, and antisocial behavior, an analysis of covariance was used to address research question six. The "playing" variables were used as covariates to take into consideration that males and females may spend a different amount of time spent playing. Therefore the covariates for this analysis were reported hours playing video games per week and reported hours playing video games with friends per week. The test was used to analyze the independent variable, sex differences and the dependent variable, elements of self-efficacy. Significance was determined at the .05 alpha level.

CHAPTER THREE

RESULTS

A reliability analysis revealed high reliability on the overall variables in that the Cronbach's Alpha was .96. The factor analysis revealed that all of the items loaded on two factors with factor one being most prevalent. The results of the factor analysis can be found in Table 1. Although the factor analysis revealed these results, items were grouped by elements (mastery of experience, vicarious experience, somatic and emotional reaction, antisocial behavior, and learning) of self-efficacy based on the description of the element and the nature of the item to further test the level of self-efficacy. Descriptive statistics of the 40 self-efficacy items can be found in Table 2a and Table 2b. The means indicated a moderately confident to confident rate of perceived self-efficacy levels rated on the 40 items of the scale.

The sample consisted of 433 participants ($N = 433$). Thirty-seven percent of the participants were female and 63% were male. The age distribution consisted of 1.6% between the ages of 4-10; 3.7% between the ages of 11-12; 22.6% between the ages of 13-15; 31.9% between the ages 16-18; 31.6% between the ages 19-21%; and 8.5% ages of 22 and older.

Table 1, Factor Analysis of Self-efficacy Measures

Component Matrix^a

	Component				
	1	2	3	4	5
successfully complete an entire video game	.733	-.235	.210	2.484E-02	-3.614E-03
use learned video game knowledge in real life	.609	.269	.312	-.262	-.237
use video games to learn accurately use a weapon in a video game	.543	.267	.415	-.253	-.257
successfully use multiple weapons to defend myself in a video game	.755	-.195	.188	.284	-.111
plan an attack in a war type video game	.771	-.207	.195	.289	-.193
successfully reach the next level in a video game through practice	.764	-.172	.143	.288	-.115
successfully be a "good guy" in a video simulation	.608	-.356	.203	.111	.295
get excited while playing video games	.577	-.285	.276	6.343E-02	.217
perform better in a video game when my video game opponent makes me mad	.642	-.226	2.871E-02	-.393	.133
improve my school performance through video game participation	.587	8.309E-02	-.137	-.280	2.273E-02
learn to be assertive in life by playing video games	.478	.591	.293	-9.313E-02	-.114
defeat my friend in video game competitions	.561	.474	.180	-3.301E-02	-.128
control my emotions while destroying my video opponent in the video game	.717	-.161	7.609E-02	-6.840E-02	.112
engage in video game actions that are against the law to win the video game	.371	-.153	.392	.301	.243
achieve each required higher level in the video game quickly	.562	.158	-5.795E-02	.293	-.170
take the part of either the hero or villain in a video game and win	.762	-.123	.164	5.990E-02	-4.743E-02
I can vent my frustrations by playing video games	.764	-.235	5.117E-02	8.608E-02	-.146
demonstrate improvement of video game skills when challenged by a video game	.617	6.802E-02	1.772E-02	-.340	1.403E-03
learn to drive a car from a video game	.793	-.143	9.396E-02	-.140	-2.277E-02
	.455	.530	-1.710E-02	.147	.348

Extraction Method: Principal Component Analysis.

Component Matrix^a

	Component				
	1	2	3	4	5
get a feeling of accomplishment from playing a video game	.729	-3.121E-02	-.117	-.167	2.267E-02
learn to fight to beat my opponent in a video game	.796	-7.013E-02	-.178	3.015E-02	-.171
learn how to defeat my enemies in video games	.796	-8.118E-02	-.205	7.360E-02	-.197
learn strategies to destroy my opponent in a video game	.799	-.135	-.174	6.254E-02	-.159
model my actions to the role of the characters in the video game	.560	.507	-9.567E-03	-5.751E-02	2.779E-02
feel good when I beat my friends in a video game competition	.668	-.116	-.222	-.270	1.558E-02
try to get revenge on a video game character even when I fail to win the game	.659	.236	-.259	-6.954E-02	-.119
learn to defend myself in a video game	.683	9.245E-02	-.230	.167	.152
imitate the actions in real life of the character I am playing in the video game	.472	.624	-1.194E-02	1.311E-02	.130
successfully be the "bad guy" in a video simulation	.720	-4.406E-03	-.170	.128	-.150
learn to be aggressive if necessary in a video game	.715	-7.648E-02	-.362	3.830E-02	-.143
perform the actions necessary to achieve the end goal of "win" in a video game	.734	-.272	-.120	4.581E-02	-4.983E-02
practice until I win in a video game	.691	-.206	-1.374E-03	-.176	.297
demonstrate skills to protect myself when playing a video game	.736	6.939E-02	-.134	3.533E-02	.177
master skills through repetitive video game playing	.741	-.136	-.126	-.118	.107
use video game characters as role models	.445	.616	4.406E-02	.102	.104
change strategies to achieve video game goals	.751	-.117	2.577E-02	-9.829E-02	-4.048E-03
continue to play a video game even when I lose	.608	-.183	5.999E-02	-.226	.280
learn how to harm someone in a video game	.612	.153	-.374	.192	.124
learn to fly an airplane through a video simulation	.455	.504	-2.154E-02	.260	.209

Extraction Method: Principal Component Analysis

a 5 components extracted

Table 2a , Descriptive Analysis of Self-Efficacy Measures

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
successfully complete an entire video game	433	.00	100.00	65.6536	34.67134
use learned video game knowledge in real life	433	.00	100.00	38.6397	33.23241
use video games to learn	433	.00	100.00	38.9330	32.88276
accurately use a weapon in a video game	433	.00	100.00	62.0993	34.66783
successfully use multiple weapons to defend myself in a video game	433	.00	100.00	60.1617	36.07357
plan an attack in a war type video game	433	.00	100.00	54.5196	37.36674
successfully reach the next level in a video game through practice	433	.00	100.00	71.4296	30.85825
successfully be a "good guy" in a video simulation	433	.00	100.00	66.4734	31.49618
get excited while playing video games	433	.00	100.00	71.8314	30.67756
perform better in a video game when my video game opponent makes me mad	433	.00	100.00	56.7806	34.12824
improve my school performance through video game participation	433	.00	100.00	27.9746	31.61914
learn to be assertive in life by playing video games	433	.00	100.00	32.6074	32.61643
defeat my friend in video game competitions	433	.00	100.00	59.9215	33.31984
control my emotions while destroying my video opponent in the video game	433	.00	100.00	55.9284	34.71267
engage in video game actions that are against the law to win the video game	433	.00	100.00	47.9238	38.51889
achieve each required higher level in the video game quickly	433	.00	100.00	54.7644	32.65008
take the part of either the hero or villian in a video game and win	433	.00	100.00	62.0254	33.82912
I can vent my frustrations by playing video games	432	.00	100.00	49.9630	35.41728
demonstrate improvement of video game skills when challenged by a video game	433	.00	100.00	59.6328	32.31173
learn to drive a car from a video game	433	.00	100.00	36.5520	35.35328
Valid N (listwise)	432				

Table 2b

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
get a feeling of accomplishment from playing a video game	433	.00	100.00	59.2148	34.88191
learn to fight to beat my opponent in a video game	433	.00	100.00	58.6952	35.04150
learn how to defeat my enemies in video games	433	.00	100.00	58.3580	35.05081
learn strategies to destroy my opponent in a video game	433	.00	100.00	58.9908	35.08910
model my actions to the role of the characters in the video game	433	.00	100.00	38.0970	34.53762
feel good when I beat my friends in a video game competition	433	.00	100.00	65.0092	34.49235
try to get revenge on a video game character even when I fail to win the game	433	.00	100.00	48.7760	37.08684
learn to defend myself in a video game	433	.00	100.00	52.6490	35.62090
imitate the actions in real life of the character I am playing in the video game	433	.00	100.00	31.2309	33.55727
successfully be the "bad guy" in a video simulation	433	.00	100.00	57.3741	35.59050
learn to be aggressive if necessary in a video game	433	.00	100.00	58.9238	35.35241
perform the actions necessary to achieve the end goal of "win" in a video game	433	.00	100.00	64.1386	33.53280
learn how to harm someone in a video game	433	.00	100.00	49.7829	37.12047
learn to fly an airplane through a video simulation	433	.00	100.00	34.7390	35.89012
practice until I win in a video game	433	.00	100.00	63.2702	34.02911
demonstrate skills to protect myself when playing a video game	433	.00	100.00	51.3972	35.32408
master skills through repetitive video game playing	433	.00	100.00	61.5958	34.90013
use video game characters as role models	433	.00	100.00	29.6236	35.40368
change strategies to achieve video game goals	433	.00	100.00	60.7506	35.73057
continue to play a video game even when I lose	433	.00	100.00	68.5635	34.00063
Valid N (listwise)	433				

Hypotheses

The relationships posited in hypotheses one through five were analyzed using Pearson product moment correlations. The relationship was determined by using both reported time spent playing video games per week and reported time spent playing video games with friends per week. The results of the Pearson product moment correlations can be found in Tables 3, 4, 5, 6, and 7.

Hypothesis one (Table 3) suggested there was a relationship between increased time spent playing video games and an increase of the individual's level of perceived self-efficacy based on mastery of experience. The correlation between these variables did prove to be statistically significant for time spent playing video game ($r = .386$, $N = 433$, $p < .001$) and time spent playing video games with friends ($r = .223$, $N = 433$, $p < .001$), therefore hypothesis one is supported.

Hypothesis two (Table 4) addresses the relationship of increased time spent playing video games and an individual's level of perceived self-efficacy based on vicarious experience. The relationship was statistically significant for time spent playing video game ($r = .263$, $N = 433$, $p < .001$) as well as time spent playing video games with friends ($r = .247$, $N = 433$, $p < .001$). Hypothesis two was also supported.

Table 3, Hypothesis One

Correlations

		hours spent playing video games	hours spent playing video games w/ friends	MASTERY
hours spent playing video games	Pearson Correlation	1	.604**	.386**
	Sig. (2-tailed)	.	.000	.000
	N	433	433	433
hours spent playing video games w/ friends	Pearson Correlation	.604**	1	.223**
	Sig. (2-tailed)	.000	.	.000
	N	433	433	433
MASTERY	Pearson Correlation	.386**	.223**	1
	Sig. (2-tailed)	.000	.000	.
	N	433	433	433

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4, Hypothesis two

Correlations

		hours spent playing video games	hours spent playing video games w/ friends	VICAR
hours spent playing video games	Pearson Correlation	1	.604**	.263**
	Sig. (2-tailed)	.	.000	.000
	N	433	433	433
hours spent playing video games w/ friends	Pearson Correlation	.604**	1	.247**
	Sig. (2-tailed)	.000	.	.000
	N	433	433	433
VICAR	Pearson Correlation	.263**	.247**	1
	Sig. (2-tailed)	.000	.000	.
	N	433	433	433

** . Correlation is significant at the 0.01 level (2-tailed).

An increased exposure to violent video games in relationship to increased levels of perceived self-efficacy based on antisocial behavior was addressed in hypothesis three (Table 5). The correlation between the two variables was found to be statistically significant for time spent playing video games ($r = .4$, $N = 433$, $p < .001$) and time spent playing video games with friends ($r = .272$, $N = 433$, $p < .001$). Hypothesis three was supported.

The relationship between increased time spent playing video games and an individual's perceived level of self-efficacy based on somatic and emotional reaction was proposed in hypothesis four (Table 6). The relationship was statistically significant for time spent playing video games ($r = .375$, $N = 432$, $p < .001$) as well as time spent playing video games with friends ($r = .263$, $N = 432$, $p < .001$), therefore hypothesis four is supported.

Hypothesis five addresses (Table 7) the relationship between time spent playing video games and an individual's perceived level of self-efficacy based on learning from video games. The relationship found to be statistically significant and supports hypothesis five for time spent playing video games ($r = .389$, $N = 433$, $p < .001$) and for time spent playing video games with friends ($r = .3$, $N = 433$, $p < .001$).

Table 5, Hypothesis three

Correlations

		ANTISOC	hours spent playing video games	hours spent playing video games w/ friends
ANTISOC	Pearson Correlation	1	.400**	.272**
	Sig. (2-tailed)	.	.000	.000
	N	433	433	433
hours spent playing video games	Pearson Correlation	.400**	1	.604**
	Sig. (2-tailed)	.000	.	.000
	N	433	433	433
hours spent playing video games w/ friends	Pearson Correlation	.272**	.604**	1
	Sig. (2-tailed)	.000	.000	.
	N	433	433	433

** . Correlation is significant at the 0.01 level (2-tailed).

Table 6, Hypothesis four

Correlations

		hours spent playing video games	hours spent playing video games w/ friends	SOMAEMOT
hours spent playing video games	Pearson Correlation	1	.604**	.374**
	Sig. (2-tailed)	.	.000	.000
	N	433	433	432
hours spent playing video games w/ friends	Pearson Correlation	.604**	1	.263**
	Sig. (2-tailed)	.000	.	.000
	N	433	433	432
SOMAEMOT	Pearson Correlation	.374**	.263**	1
	Sig. (2-tailed)	.000	.000	.
	N	432	432	432

** . Correlation is significant at the 0.01 level (2-tailed).

Table 7, Hypothesis five

Correlations

		hours spent playing video games	hours spent playing video games w/ friends	LEARN
hours spent playing video games	Pearson Correlation	1	.604**	.389**
	Sig. (2-tailed)	.	.000	.000
	N	433	433	433
hours spent playing video games w/ friends	Pearson Correlation	.604**	1	.300**
	Sig. (2-tailed)	.000	.	.000
	N	433	433	433
LEARN	Pearson Correlation	.389**	.300**	1
	Sig. (2-tailed)	.000	.000	.
	N	433	433	433

** . Correlation is significant at the 0.01 level (2-tailed).

Research Questions

Research question one asked about the type of video games individuals are choosing to play. Each participant was asked to list video games that they play most frequently, rating them on a descending scale from one to four (see Appendix A). Results for this research question can be found in Tables 8, 9, 10, and 11. The first group of video games (Table 8) was those that were chosen as the individual's favorite video games. This revealed 41.3% of the participants chose nonviolent sport content, 18.9% of the participants chose human violence content, 18.7% of the participants chose general entertainment content, 10.2% of the participants chose fantasy violence content, 6.2% of the participants did not choose a video game to report, 2.5% of the participants chose sports violence content, and 2.1% of the participants chose educational content.

The second grouping of video games (Table 9) indicated that 32.1% of the participants chose nonviolent sport content, 22.2% of the participants chose human violence content, 15.9% of the participants did not choose a video game to report, 15.7% of the participants chose general entertainment content, 9.2% of the participants chose fantasy violence content, 3.2% of the participants chose sports violence content, and 1.6% of the participants chose educational content. The third grouping of video games (Table 10) revealed that 28.9% of the

Table 8, Research question one: Video game played one

video games most frequently played 1

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid none	27	6.2	6.2	6.2
general entertainment	81	18.7	18.7	24.9
educational	9	2.1	2.1	27.0
nonviolent sports	179	41.3	41.3	68.4
sports violence	11	2.5	2.5	70.9
fantasy violence	44	10.2	10.2	81.1
human violence	82	18.9	18.9	100.0
Total	433	100.0	100.0	

Table 9, Research question two: Video game played two

video games most frequently played 2

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid none	69	15.9	15.9	15.9
general entertainment	68	15.7	15.7	31.6
educational	7	1.6	1.6	33.3
nonviolent sports	139	32.1	32.1	65.4
sports violence	14	3.2	3.2	68.6
fantasy violence	40	9.2	9.2	77.8
human violence	96	22.2	22.2	100.0
Total	433	100.0	100.0	

Table 10, Research question one: Video game played three

video games most frequently played 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	119	27.5	27.5	27.5
	general entertainment	47	10.9	10.9	38.4
	educational	4	.9	.9	39.4
	nonviolent sports	125	28.9	28.9	68.3
	sports violence	9	2.1	2.1	70.4
	fantasy violence	35	8.1	8.1	78.5
	human violence	93	21.5	21.5	100.0
	Total	432	99.8	100.0	
Missing	System	1	.2		
Total		433	100.0		

participants chose nonviolent sport content, 27.5% of the participants did not choose a video game to report, 21.5% of the participants chose human violence content, 10.9% of the participants chose general entertainment content, 8.1% of the participants chose fantasy violence content, 2.1% of the participants chose sports violence content, and .9% of the participants chose educational content.

The fourth grouping of video games (Table 11) indicated that 41.8% of the participants did not choose a video game to report, 16.6% of the participants chose nonviolent sport content, 16.2% of the participants chose human violence content, 10.2% of the participants chose fantasy violence content, 9.5% of the participants chose general entertainment content, 4.2% of the participants chose sports violence content, and 1.6% of the participants chose educational content.

Three research questions addressed the potential relationships between an individual's report of the most frequently played games and the levels of perceived self-efficacy. The types of video games played were analyzed with an analysis of variance to examine the relationship between types of video games most frequently played and the levels of perceived self-efficacy (mastery of experience, vicarious experience, and somatic and emotional reaction).

Research question two asked whether the type of video game played related to an individual's perceived level of self-efficacy based on mastery of experience. In support of research question two, an analysis of variance was performed on the level of perceived self-efficacy based on mastery of experience

Table 11, Research question one: Video game played four

video games most frequently played 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	181	41.8	41.8	41.8
	general entertainment	41	9.5	9.5	51.3
	educational	7	1.6	1.6	52.9
	nonviolent sports	72	16.6	16.6	69.5
	sports violence	18	4.2	4.2	73.7
	fantasy violence	44	10.2	10.2	83.8
	human violence	70	16.2	16.2	100.0
	Total	433	100.0	100.0	

and first video game choice, second video game choice, and fourth video game choice. The analysis of variance can be found in Table 12, 13, and 14.

The analysis of variance for the first video game choice (Table 12) was significant [$F(6,426) = 9.15, p < .001$], such that the LSD (Least Significant Difference) multiple comparison test indicates specifically there is a difference between the individuals who play educational content and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play educational video game content ($M = 778.11, SD = 385.21$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 546.30, SD = 400.78$). LSD also indicated a specific difference between the individuals who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play nonviolent video game content ($M = 734.29, SD = 299.31$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who reports playing no video games ($M = 546.30, SD = 400.78$). A specific difference was also found in those individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play nonviolent video game content ($M = 734.29, SD = 299.31$)

Table 12, Research question two: Video game choice one

Descriptive Statistics

Dependent Variable: MASTERY

video games most	Mean	Std. Deviation	N
none	546.2963	400.77711	27
general entertainment	625.5679	291.78318	81
educational	778.1111	385.21242	9
nonviolent sports	734.2905	299.30537	179
sports violence	846.8182	239.98201	11
fantasy violence	699.7500	311.75058	44
human violence	917.7195	247.51457	82
Total	737.2263	314.44232	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: MASTERY

F	df1	df2	Sig.
3.888	6	426	.001

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY1

Tests of Between-Subjects Effects

Dependent Variable: MASTERY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4876018.096 ^a	6	812669.683	9.150	.000
Intercept	90806859.0	1	90806859.03	1022.364	.000
VGPLAY1	4876018.096	6	812669.683	9.150	.000
Error	37837537.7	426	88820.511		
Total	278050207	433			
Corrected Total	42713555.8	432			

a. R Squared = .114 (Adjusted R Squared = .102)

Multiple Comparisons

Dependent Variable: MASTERY

LSD

(I) video games most frequently played 1	(J) video games most frequently played 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	-79.2716	66.22838	.232	-209.4467	50.9035
	educational	-231.8148*	114.71092	.044	-457.2847	-6.3450
	nonviolent sports	-187.9942*	61.52928	.002	-308.9330	-67.0554
	sports violence	-300.5219*	106.60319	.005	-510.0556	-90.9882
	fantasy violence	-153.4537*	72.85806	.036	-296.6597	-10.2477
	human violence	-371.4232*	66.12734	.000	-501.3997	-241.4467
general entertainment	none	79.2716	66.22838	.232	-50.9035	209.4467
	educational	-152.5432	104.71626	.146	-358.3681	53.2817
	nonviolent sports	-108.7226*	39.90932	.007	-187.1663	-30.2789
	sports violence	-221.2503*	95.76608	.021	-409.4831	-33.0174
	fantasy violence	-74.1821	55.81395	.185	-183.8871	35.5229
	human violence	-292.1516*	46.68754	.000	-383.9182	-200.3850
educational	none	231.8148*	114.71092	.044	6.3450	457.2847
	general entertainment	152.5432	104.71626	.146	-53.2817	358.3681
	nonviolent sports	43.8206	101.80938	.667	-156.2906	243.9319
	sports violence	-68.7071	133.95349	.608	-331.9991	194.5850
	fantasy violence	78.3611	109.03024	.473	-135.9431	292.6653
	human violence	-139.6084	104.65239	.183	-345.3077	66.0909
nonviolent sports	none	187.9942*	61.52928	.002	67.0554	308.9330
	general entertainment	108.7226*	39.90932	.007	30.2789	187.1663
	educational	-43.8206	101.80938	.667	-243.9319	156.2906
	sports violence	-112.5277	92.57859	.225	-294.4954	69.4400
	fantasy violence	34.5405	50.14830	.491	-64.0284	133.1094
	human violence	-183.4290*	39.74143	.000	-261.5427	-105.3153
sports violence	none	300.5219*	106.60319	.005	90.9882	510.0556
	general entertainment	221.2503*	95.76608	.021	33.0174	409.4831
	educational	68.7071	133.95349	.608	-194.5850	331.9991
	nonviolent sports	112.5277	92.57859	.225	-69.4400	294.4954
	fantasy violence	147.0682	100.46512	.144	-50.4009	344.5372
	human violence	-70.9013	95.69623	.459	-258.9969	117.1942
fantasy violence	none	153.4537*	72.85806	.036	10.2477	296.6597
	general entertainment	74.1821	55.81395	.185	-35.5229	183.8871
	educational	-78.3611	109.03024	.473	-292.6653	135.9431
	nonviolent sports	-34.5405	50.14830	.491	-133.1094	64.0284
	sports violence	-147.0682	100.46512	.144	-344.5372	50.4009
	human violence	-217.9695*	55.69403	.000	-327.4388	-108.5002
human violence	none	371.4232*	66.12734	.000	241.4467	501.3997
	general entertainment	292.1516*	46.68754	.000	200.3850	383.9182
	educational	139.6084	104.65239	.183	-66.0909	345.3077
	nonviolent sports	183.4290*	39.74143	.000	105.3153	261.5427
	sports violence	70.9013	95.69623	.459	-117.1942	258.9969
	fantasy violence	217.9695*	55.69403	.000	108.5002	327.4388

Based on observed means.

*. The mean difference is significant at the .05 level.

rate level of perceived self-efficacy based on mastery of experience higher than individuals who report playing general entertainment video game content ($M = 625.57$, $SD = 291.78$).

LSD also indicated there is a difference between the individuals who play sports violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play sports violence video game content ($M = 846.82$, $SD = 239.98$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 546.30$, $SD = 400.78$). A specific difference exists between those individuals who play sports violence and the individuals who report playing general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play sports violence video game content ($M = 846.82$, $SD = 239.98$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who general entertainment video game content ($M = 625.57$, $SD = 291.78$). A difference was found between individuals who play fantasy violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play fantasy violence video game content ($M = 699.75$, $SD = 311.75$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 546.30$, $SD =$

400.78). LSD indicates specifically there is a difference between the individuals who play human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 917.72$, $SD = 314.44$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 546.30$, $SD = 400.78$).

There is also a specific difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 917.72$, $SD = 314.44$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 625.57$, $SD = 291.78$). Individuals who play human violence and the individuals who play nonviolent sports content video games also found to have specific difference on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 917.72$, $SD = 314.44$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play nonviolent sports video game content ($M = 734.29$, $SD = 299.31$). LSD also indicates a specific difference between the individuals who play human violence and the individuals who play fantasy violence content video games on his or her level of

perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 917.72$, $SD = 314.44$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play fantasy violence video game content ($M = 699.75$, $SD = 311.75$).

The analysis of variance for the second choice video games (Table 13) was also significant [$F(6,426) = 17.13$, $p < .05$] such that LSD indicates there is a difference between the individuals who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play nonviolent sport video game content ($M = 764.31$, $SD = 270.91$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 490.87$, $SD = 346.9$). A specific difference is also found in those individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play nonviolent sport video game content ($M = 764.31$, $SD = 270.91$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 626.99$, $SD = 287.83$).

Table 13, Research question two: Video game choice two

Descriptive Statistics

Dependent Variable: MASTERY

video games most	Mean	Std. Deviation	N
none	490.8696	346.89526	69
general entertainment	626.9853	287.92694	68
educational	832.2857	204.91845	7
nonviolent sports	764.3165	270.91220	139
sports violence	820.5714	237.54990	14
fantasy violence	792.1750	288.60139	40
human violence	911.1771	257.75986	96
Total	737.2263	314.44232	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: MASTERY

F	df1	df2	Sig.
2.331	6	426	.032

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY2

Tests of Between-Subjects Effects

Dependent Variable: MASTERY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8302272.315 ^a	6	1383712.052	17.130	.000
Intercept	95914317.1	1	95914317.15	1187.387	.000
VGPLAY2	8302272.315	6	1383712.052	17.130	.000
Error	34411283.5	426	80777.661		
Total	278050207	433			
Corrected Total	42713555.8	432			

a. R Squared = .194 (Adjusted R Squared = .183)

Multiple Comparisons

Dependent Variable: MASTERY

LSD

(I) video games most frequently played 2	(J) video games most frequently played 2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	-136.1157 *	48.56539	.005	-231.5734	-40.6581
	educational	-341.4161 *	112.74022	.003	-563.0125	-119.8198
	nonviolent sports	-273.4470 *	41.85481	.000	-355.7146	-191.1793
	sports violence	-329.7019 *	83.30981	.000	-493.4513	-165.9524
	fantasy violence	-301.3054 *	56.48126	.000	-412.3221	-190.2888
	human violence	-420.3075 *	44.85671	.000	-508.4756	-332.1395
general entertainment	none	136.1157 *	48.56539	.005	40.6581	231.5734
	educational	-205.3004	112.81654	.069	-427.0468	16.4459
	nonviolent sports	-137.3313 *	42.05997	.001	-220.0022	-54.6604
	sports violence	-193.5861 *	83.41307	.021	-357.5385	-29.6337
	fantasy violence	-165.1897 *	56.63346	.004	-276.5055	-53.8739
	human violence	-284.1918 *	45.04820	.000	-372.7362	-195.6474
educational	none	341.4161 *	112.74022	.003	119.8198	563.0125
	general entertainment	205.3004	112.81654	.069	-16.4459	427.0468
	nonviolent sports	67.9692	110.09451	.537	-148.4269	284.3652
	sports violence	11.7143	131.56557	.929	-246.8842	270.3128
	fantasy violence	40.1107	116.44358	.731	-188.7648	268.9862
	human violence	-78.8914	111.27039	.479	-297.5987	139.8160
nonviolent sports	none	273.4470 *	41.85481	.000	191.1793	355.7146
	general entertainment	137.3313 *	42.05997	.001	54.6604	220.0022
	educational	-67.9692	110.09451	.537	-284.3652	148.4269
	sports violence	-56.2549	79.69296	.481	-212.8952	100.3855
	fantasy violence	-27.8585	50.99584	.585	-128.0932	72.3763
	human violence	-146.8605 *	37.71695	.000	-220.9950	-72.7261
sports violence	none	329.7019 *	83.30981	.000	165.9524	493.4513
	general entertainment	193.5861 *	83.41307	.021	29.6337	357.5385
	educational	-11.7143	131.56557	.929	-270.3128	246.8842
	nonviolent sports	56.2549	79.69296	.481	-100.3855	212.8952
	fantasy violence	28.3964	88.25687	.748	-145.0767	201.8696
	human violence	-90.6057	81.30970	.266	-250.4238	69.2125
fantasy violence	none	301.3054 *	56.48126	.000	190.2888	412.3221
	general entertainment	165.1897 *	56.63346	.004	53.8739	276.5055
	educational	-40.1107	116.44358	.731	-268.9862	188.7648
	nonviolent sports	27.8585	50.99584	.585	-72.3763	128.0932
	sports violence	-28.3964	88.25687	.748	-201.8696	145.0767
	human violence	-119.0021 *	53.48715	.027	-224.1337	-13.8705
human violence	none	420.3075 *	44.85671	.000	332.1395	508.4756
	general entertainment	284.1918 *	45.04820	.000	195.6474	372.7362
	educational	78.8914	111.27039	.479	-139.8160	297.5987
	nonviolent sports	146.8605 *	37.71695	.000	72.7261	220.9950
	sports violence	90.6057	81.30970	.266	-69.2125	250.4238
	fantasy violence	119.0021 *	53.48715	.027	13.8705	224.1337

LSD indicated there is a difference between the individuals who play sports violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play sports violence video game content ($M = 820.57$, $SD = 237.55$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 490.87$, $SD = 346.9$). A specific difference exists between those individuals who play sports violence and the individuals who report to play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play sports violence video game content ($M = 820.57$, $SD = 237.55$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 626.99$, $SD = 287.83$).

Individuals who play fantasy violence and the individuals who did not indicate any frequently played video games also found to have specific difference on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play fantasy violence video game content ($M = 792.18$, $SD = 288.6$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 490.87$, $SD = 346.9$). LSD indicates that there is a difference between the individuals who play fantasy violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy

based on mastery of experience ($p < .01$). Individuals who play fantasy violence video game content ($M = 792.18$, $SD = 288.6$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 626.99$, $SD = 287.83$).

A specific difference is also found between the individuals who play human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 911.18$, $SD = 257.76$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 490.87$, $SD = 346.9$). There is also a difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 911.18$, $SD = 257.76$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 626.99$, $SD = 287.83$). Individuals who play human violence and the individuals who play nonviolent sports content video games also found to have specific difference on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 911.18$, $SD = 257.76$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play

nonviolent sport video game content ($M = 764.31$, $SD = 270.91$). LSD also indicates a specific difference between the individuals who play human violence and the individuals who play fantasy violence content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$).

Individuals who play human violence video game content ($M = 911.18$, $SD = 257.76$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play fantasy violence video game content ($M = 792.18$, $SD = 288.6$).

The analysis of variance for fourth video game choice (Table 14) was also significant [$F(6,426) = 11.84$, $p < .001$], such that LSD indicates specifically there is a difference between the individuals who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy, based on mastery of experience ($p < .001$).

Individuals who play nonviolent sports video game content ($M = 838.81$, $SD = 247.37$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 615.65$, $SD = 338.57$). A difference is also found in those individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her

Table 14, Research question two: Video game choice four

Descriptive Statistics

Dependent Variable: MASTERY

video games most	Mean	Std. Deviation	N
none	615.6464	338.56983	181
general entertainment	707.0000	295.35639	41
educational	617.1429	403.26642	7
nonviolent sports	838.8056	247.36747	72
sports violence	881.3889	162.97605	18
fantasy violence	786.0682	236.68794	44
human violence	909.0571	249.85294	70
Total	737.2263	314.44232	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: MASTERY

F	df1	df2	Sig.
7.181	6	426	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY4

Tests of Between-Subjects Effects

Dependent Variable: MASTERY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6102665.470 ^a	6	1017110.912	11.835	.000
Intercept	102701091	1	102701091.0	1195.018	.000
VGPLAY4	6102665.470	6	1017110.912	11.835	.000
Error	36610890.3	426	85941.057		
Total	278050207	433			
Corrected Total	42713555.8	432			

a. R Squared = .143 (Adjusted R Squared = .131)

Multiple Comparisons

Dependent Variable: MASTERY
LSD

(I) video games most frequently played 4	(J) video games most frequently played 4	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	-91.3536	50.70440	.072	-191.0155	8.3083
	educational	-1.4964	112.92522	.989	-223.4564	220.4635
	nonviolent sports	-223.1591*	40.84652	.000	-303.4450	-142.8733
	sports violence	-265.7425*	72.45216	.000	-408.1507	-123.3343
	fantasy violence	-170.4218*	49.27493	.001	-267.2740	-73.5695
	human violence	-293.4107*	41.26187	.000	-374.5129	-212.3085
general entertainment	none	91.3536	50.70440	.072	-8.3083	191.0155
	educational	89.8571	119.88919	.454	-145.7908	325.5051
	nonviolent sports	-131.8056*	57.35633	.022	-244.5422	-19.0689
	sports violence	-174.3889*	82.88924	.036	-337.3117	-11.4661
	fantasy violence	-79.0682	63.63434	.215	-204.1445	46.0082
	human violence	-202.0571*	57.65286	.001	-315.3766	-88.7377
educational	none	1.4964	112.92522	.989	-220.4635	223.4564
	general entertainment	-89.8571	119.88919	.454	-325.5051	145.7908
	nonviolent sports	-221.6627	116.06429	.057	-449.7927	6.4673
	sports violence	-264.2460*	130.58253	.044	-520.9123	-7.5798
	fantasy violence	-168.9253	119.29166	.157	-403.3988	65.5482
	human violence	-291.9143*	116.21112	.012	-520.3328	-63.4957
nonviolent sports	none	223.1591*	40.84652	.000	142.8733	303.4450
	general entertainment	131.8056*	57.35633	.022	19.0689	244.5422
	educational	221.6627	116.06429	.057	-6.4673	449.7927
	sports violence	-42.5833	77.25367	.582	-194.4291	109.2625
	fantasy violence	52.7374	56.09663	.348	-57.5233	162.9980
	human violence	-70.2516	49.20727	.154	-166.9708	26.4677
sports violence	none	265.7425*	72.45216	.000	123.3343	408.1507
	general entertainment	174.3889*	82.88924	.036	11.4661	337.3117
	educational	264.2460*	130.58253	.044	7.5798	520.9123
	nonviolent sports	42.5833	77.25367	.582	-109.2625	194.4291
	fantasy violence	95.3207	82.02261	.246	-65.8987	256.5401
	human violence	-27.6683	77.47408	.721	-179.9473	124.6108
fantasy violence	none	170.4218*	49.27493	.001	73.5695	267.2740
	general entertainment	79.0682	63.63434	.215	-46.0082	204.1445
	educational	168.9253	119.29166	.157	-65.5482	403.3988
	nonviolent sports	-52.7374	56.09663	.348	-162.9980	57.5233
	sports violence	-95.3207	82.02261	.246	-256.5401	65.8987
	human violence	-122.9890*	56.39978	.030	-233.8455	-12.1325
human violence	none	293.4107*	41.26187	.000	212.3085	374.5129
	general entertainment	202.0571*	57.65286	.001	88.7377	315.3766
	educational	291.9143*	116.21112	.012	63.4957	520.3328
	nonviolent sports	70.2516	49.20727	.154	-26.4677	166.9708
	sports violence	27.6683	77.47408	.721	-124.6108	179.9473
	fantasy violence	122.9890*	56.39978	.030	12.1325	233.8455

Based on observed means.

*. The mean difference is significant at the .05 level.

level of perceived self-efficacy based on mastery of experience ($p < .05$).

Individuals who play nonviolent sports video game content ($M = 838.81$, $SD = 247.37$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 707$, $SD = 295.36$).

LSD also indicated there is a difference between the individuals who play sports violence and the individuals who report play no video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play sports violence video game content ($M = 881.39$, $SD = 162.98$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 615.65$, $SD = 338.57$). A specific difference exists between those individuals who play sports violence and the individuals who reported playing general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play sports violence video game content ($M = 881.39$, $SD = 162.98$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 707$, $SD = 295.36$). Individuals who play sports violence and the individuals who play educational content video games found to have specific difference on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play sports violence video game content ($M = 881.39$, $SD = 162.98$) rate level of perceived

self-efficacy based on mastery of experience higher than individuals who play educational video game content ($M = 617.14$, $SD = 403.27$).

Individuals who play fantasy violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience were also found to be different ($p < .01$). Individuals who play fantasy violence video game content ($M = 786.07$, $SD = 236.69$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 615.65$, $SD = 338.57$). LSD indicates that there is a difference between the individuals who play human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .001$). Individuals who play human violence video game content ($M = 909.06$, $SD = 249.85$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who did not indicate any frequently played video games ($M = 615.65$, $SD = 338.57$). There is also a difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play human violence video game content ($M = 909.06$, $SD = 249.85$) rate levels of perceived self-efficacy based on mastery of experience higher than individuals who play general entertainment video game content ($M = 707$, $SD = 295.36$). Individuals who play human violence and the individuals who

play educational content video games also found to have specific difference on his or her level of perceived self-efficacy based on mastery of experience ($p < .01$). Individuals who play human violence video game content ($M = 909.06$, $SD = 249.85$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play educational video game content ($M = 617.14$, $SD = 403.27$). LSD also indicates a specific difference between the individuals who play human violence and the individuals who play fantasy violence content video games on his or her level of perceived self-efficacy based on mastery of experience ($p < .05$). Individuals who play human violence video game content ($M = 909.06$, $SD = 249.85$) rate level of perceived self-efficacy based on mastery of experience higher than individuals who play fantasy violence video game content ($M = 786.07$, $SD = 249.85$).

Research question three addressed the potential relationship between the type of video game played and an individual's perceived level of self-efficacy based on vicarious experience. The research question was supported and analysis of variance was performed on the level of perceived self-efficacy based on vicarious experience and first video game choice and second video game choice. The analyses of variance can be found in Tables 15 and 16.

Table 15, Research question three: Video game choice one

Descriptive Statistics

Dependent Variable: VICAR

video games most	Mean	Std. Deviation	N
none	118.8889	112.70565	27
general entertainment	99.8148	71.03012	81
educational	131.8889	88.03188	9
nonviolent sports	123.8883	79.57400	179
sports violence	136.3636	75.93059	11
fantasy violence	130.7273	85.45130	44
human violence	157.9512	77.98051	82
Total	126.7021	82.36744	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: VICAR

F	df1	df2	Sig.
4.457	6	426	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY1

Tests of Between-Subjects Effects

Dependent Variable: VICAR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	143677.947 ^a	6	23946.325	3.660	.001
Intercept	2771869.166	1	2771869.166	423.660	.000
VGPLAY1	143677.947	6	23946.325	3.660	.001
Error	2787180.621	426	6542.678		
Total	9881988.000	433			
Corrected Total	2930858.568	432			

a. R Squared = .049 (Adjusted R Squared = .036)

Multiple Comparisons

Dependent Variable: VICAR

LSD

(I) video games most frequently played 1	(J) video games most frequently played 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	19.0741	17.97485	.289	-16.2564	54.4045
	educational	-13.0000	31.13335	.676	-74.1941	48.1941
	nonviolent sports	-4.9994	16.69948	.765	-37.8230	27.8243
	sports violence	-17.4747	28.93286	.546	-74.3437	39.3942
	fantasy violence	-11.8384	19.77419	.550	-50.7055	27.0287
	human violence	-39.0623*	17.94743	.030	-74.3389	-3.7858
general entertainment	none	-19.0741	17.97485	.289	-54.4045	16.2564
	educational	-32.0741	28.42073	.260	-87.9364	23.7882
	nonviolent sports	-24.0735*	10.83167	.027	-45.3636	-2.7833
	sports violence	-36.5488	25.99159	.160	-87.6365	14.5389
	fantasy violence	-30.9125*	15.14830	.042	-60.6872	-1.1377
	human violence	-58.1364*	12.67133	.000	-83.0425	-33.2303
educational	none	13.0000	31.13335	.676	-48.1941	74.1941
	general entertainment	32.0741	28.42073	.260	-23.7882	87.9364
	nonviolent sports	8.0006	27.63178	.772	-46.3110	62.3122
	sports violence	-4.4747	36.35592	.902	-75.9341	66.9846
	fantasy violence	1.1616	29.59158	.969	-57.0021	59.3253
	human violence	-26.0623	28.40340	.359	-81.8906	29.7659
nonviolent sports	none	4.9994	16.69948	.765	-27.8243	37.8230
	general entertainment	24.0735*	10.83167	.027	2.7833	45.3636
	educational	-8.0006	27.63178	.772	-62.3122	46.3110
	sports violence	-12.4754	25.12648	.620	-61.8627	36.9119
	fantasy violence	-6.8390	13.61060	.616	-33.5913	19.9133
	human violence	-34.0630*	10.78610	.002	-55.2636	-12.8623
sports violence	none	17.4747	28.93286	.546	-39.3942	74.3437
	general entertainment	36.5488	25.99159	.160	-14.5389	87.6365
	educational	4.4747	36.35592	.902	-66.9846	75.9341
	nonviolent sports	12.4754	25.12648	.620	-36.9119	61.8627
	fantasy violence	5.6364	27.26694	.836	-47.9581	59.2309
	human violence	-21.5876	25.97263	.406	-72.6380	29.4629
fantasy violence	none	11.8384	19.77419	.550	-27.0287	50.7055
	general entertainment	30.9125*	15.14830	.042	1.1377	60.6872
	educational	-1.1616	29.59158	.969	-59.3253	57.0021
	nonviolent sports	6.8390	13.61060	.616	-19.9133	33.5913
	sports violence	-5.6364	27.26694	.836	-59.2309	47.9581
	human violence	-27.2239	15.11575	.072	-56.9347	2.4868
human violence	none	39.0623*	17.94743	.030	3.7858	74.3389
	general entertainment	58.1364*	12.67133	.000	33.2303	83.0425
	educational	26.0623	28.40340	.359	-29.7659	81.8906
	nonviolent sports	34.0630*	10.78610	.002	12.8623	55.2636
	sports violence	21.5876	25.97263	.406	-29.4629	72.6380
	fantasy violence	27.2239	15.11575	.072	-2.4868	56.9347

Based on observed means.

*. The mean difference is significant at the .05 level.

The analysis of variance for first video game choice (Table 15) was significant [$F(6,426) = 3.66, p < .05$], such that LSD indicates there is a difference between the individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .05$). Individuals who play nonviolent sport video game content ($M = 123.89, SD = 79.57$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play general entertainment video game content ($M = 99.81, SD = 71.03$). Individuals who play fantasy violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .05$). Individuals who play fantasy violence video game content ($M = 130.73, SD = 85.45$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play general entertainment video game content ($M = 99.81, SD = 71.03$).

LSD indicates specifically there is a difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .001$). Individuals who play human violence video game content ($M = 157.95, SD = 77.98$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play general entertainment video game content ($M = 99.81, SD = 71.03$). A difference exists between the individuals who play human violence and the individuals who did not indicate any

frequently played video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .01$). Individuals who play human violence video game content ($M = 157.95$, $SD = 77.98$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who did not indicate any frequently played video games ($M = 118.89$, $SD = 112.71$). Individuals who play human violence and the individuals that play nonviolent sports content video games also found to be different on his or her level of perceived self-efficacy based on vicarious experience ($p < .01$). Individuals who play human violence video game content ($M = 157.95$, $SD = 77.98$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play nonviolent sports video game content ($M = 123.89$, $SD = 79.57$).

The analysis of variance for the second video game choice (Table 16) was significant [$F(6,426) = 4.48$, $p < .05$] since LSD indicates there is a difference between the individuals who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .01$). Individuals who play nonviolent sports video game content ($M = 135.67$, $SD = 81.04$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who did not indicate any frequently played video games ($M = 98.62$, $SD = 99.96$).

Table 16, Research question three: Video game choice two

Descriptive Statistics

Dependent Variable: VICAR

video games most	Mean	Std. Deviation	N
none	98.6232	99.96280	69
general entertainment	97.8971	72.65932	68
educational	141.0000	86.15103	7
nonviolent sports	135.6691	81.04100	139
sports violence	145.0000	73.37994	14
fantasy violence	132.3750	69.64477	40
human violence	148.2292	73.53631	96
Total	126.7021	82.36744	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: VICAR

F	df1	df2	Sig.
3.497	6	426	.002

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY2

Tests of Between-Subjects Effects

Dependent Variable: VICAR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	173892.976 ^a	6	28982.163	4.478	.000
Intercept	2823638.927	1	2823638.927	436.302	.000
VGPLAY2	173892.976	6	28982.163	4.478	.000
Error	2756965.593	426	6471.750		
Total	9881988.000	433			
Corrected Total	2930858.568	432			

a. R Squared = .059 (Adjusted R Squared = .046)

Multiple Comparisons

Dependent Variable: VICAR

LSD

(I) video games most frequently played 2	(J) video games most frequently played 2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	.7261	13.74650	.958	-26.2933	27.7455
	educational	-42.3768	31.91127	.185	-105.1000	20.3463
	nonviolent sports	-37.0459*	11.84706	.002	-60.3318	-13.7599
	sports violence	-46.3768*	23.58095	.050	-92.7263	-.0273
	fantasy violence	-33.7518*	15.98710	.035	-65.1752	-2.3284
	human violence	-49.6060*	12.69675	.000	-74.5621	-24.6499
general entertainment	none	-.7261	13.74650	.958	-27.7455	26.2933
	educational	-43.1029	31.93288	.178	-105.8685	19.6627
	nonviolent sports	-37.7720*	11.90513	.002	-61.1721	-14.3719
	sports violence	-47.1029*	23.61018	.047	-93.5099	-.6960
	fantasy violence	-34.4779*	16.03018	.032	-65.9860	-2.9699
	human violence	-50.3321*	12.75096	.000	-75.3947	-25.2695
educational	none	42.3768	31.91127	.185	-20.3463	105.1000
	general entertainment	43.1029	31.93288	.178	-19.6627	105.8685
	nonviolent sports	5.3309	31.16240	.864	-55.9203	66.5821
	sports violence	-4.0000	37.23981	.915	-77.1966	69.1966
	fantasy violence	8.6250	32.95951	.794	-56.1585	73.4085
	human violence	-7.2292	31.49523	.819	-69.1346	54.6762
nonviolent sports	none	37.0459*	11.84706	.002	13.7599	60.3318
	general entertainment	37.7720*	11.90513	.002	14.3719	61.1721
	educational	-5.3309	31.16240	.864	-66.5821	55.9203
	sports violence	-9.3309	22.55720	.679	-53.6682	35.0063
	fantasy violence	3.2941	14.43444	.820	-25.0775	31.6657
	human violence	-12.5601	10.67583	.240	-33.5440	8.4238
sports violence	none	46.3768*	23.58095	.050	.0273	92.7263
	general entertainment	47.1029*	23.61018	.047	.6960	93.5099
	educational	4.0000	37.23981	.915	-69.1966	77.1966
	nonviolent sports	9.3309	22.55720	.679	-35.0063	53.6682
	fantasy violence	12.6250	24.98123	.614	-36.4768	61.7268
	human violence	-3.2292	23.01482	.888	-48.4659	42.0076
fantasy violence	none	33.7518*	15.98710	.035	2.3284	65.1752
	general entertainment	34.4779*	16.03018	.032	2.9699	65.9860
	educational	-8.6250	32.95951	.794	-73.4085	56.1585
	nonviolent sports	-3.2941	14.43444	.820	-31.6657	25.0775
	sports violence	-12.6250	24.98123	.614	-61.7268	36.4768
	human violence	-15.8542	15.13961	.296	-45.6118	13.9035
human violence	none	49.6060*	12.69675	.000	24.6499	74.5621
	general entertainment	50.3321*	12.75096	.000	25.2695	75.3947
	educational	7.2292	31.49523	.819	-54.6762	69.1346
	nonviolent sports	12.5601	10.67583	.240	-8.4238	33.5440
	sports violence	3.2292	23.01482	.888	-42.0076	48.4659
	fantasy violence	15.8542	15.13961	.296	-13.9035	45.6118

Based on observed means.

*. The mean difference is significant at the .05 level.

LSD also indicates there is a difference between the individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .01$). Individuals who play nonviolent sports video game content ($M = 135.67$, $SD = 81.04$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play general entertainment video game content ($M = 97.9$, $SD = 72.66$). Individuals who play fantasy violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .05$).

Individuals who play fantasy violence video game content ($M = 132.38$, $SD = 69.64$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who did not indicate any frequently played video games ($M = 98.62$, $SD = 99.96$). Also, Individuals who play fantasy violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .05$).

Individuals who play fantasy violence video game content ($M = 132.38$, $SD = 69.64$) rate level of perceived self-efficacy based on vicarious experience higher than individuals play general entertainment video game content ($M = 97.9$, $SD = 72.66$).

LSD indicates there is a difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on vicarious

experience ($p < .001$). Individuals who play human violence video game content ($M = 148.23$, $SD = 73.54$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who play general entertainment video game content ($M = 97.9$, $SD = 72.66$). A difference exists between the individuals who play human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on vicarious experience ($p < .001$). Individuals who play human violence video game content ($M = 148.23$, $SD = 73.54$) rate level of perceived self-efficacy based on vicarious experience higher than individuals who did not indicate any frequently played video games ($M = 98.62$, $SD = 99.96$).

The type of video game played related to an individual's perceived level of self-efficacy based on somatic and emotional reaction is asked in research question four. In support of research question four, analyses of variance were performed on the level of perceived self-efficacy based on somatic and emotional reaction and first video game choice (VGC1), second video game choice (VGC2), and fourth video game choice (VGC4). The analyses of variance can be found in Tables 17, 18, and 19.

The analysis of variance for the first video game choice (Table 17) was significant [$F(6,425) = 6.05$, $p < .05$], in that LSD indicates a difference between the individuals who play educational content and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on

Table 17, Research question four: Video game choice one

Descriptive Statistics

Dependent Variable: SOMAEMOT

video games most	Mean	Std. Deviation	N
none	265.0000	186.37741	27
general entertainment	297.0494	128.97024	81
educational	405.1111	155.08098	9
nonviolent sports	344.8090	132.54360	178
sports violence	390.0000	141.56271	11
fantasy violence	331.9545	140.80152	44
human violence	400.9268	127.38663	82
Total	342.6157	141.07942	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: SOMAEMOT

F	df1	df2	Sig.
2.529	6	425	.020

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY1

Tests of Between-Subjects Effects

Dependent Variable: SOMAEMOT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	675354.546 ^a	6	112559.091	6.053	.000
Intercept	20307021.6	1	20307021.59	1092.050	.000
VGPLAY1	675354.546	6	112559.091	6.053	.000
Error	7903011.667	425	18595.322		
Total	59288922.0	432			
Corrected Total	8578366.213	431			

a. R Squared = .079 (Adjusted R Squared = .066)

somatic and emotional reaction ($p < .01$). Individuals who play educational video game content ($M = 405.11$, $SD = 155.08$) rate level of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 265$, $SD = 186.38$). A significant difference exists between the individuals who play educational content and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play educational video game content ($M = 405.11$, $SD = 155.08$) rate level of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video game content ($M = 297.05$, $SD = 128.97$).

LSD also indicates a difference between the individuals who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .01$). Individuals who play nonviolent sports video game content ($M = 344.81$, $SD = 132.54$) rate level of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 265$, $SD = 186.38$). A difference is also found between individuals who play nonviolent sports and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .01$). Individuals who play nonviolent sports video game content ($M = 344.81$, $SD = 132.54$) rate levels

of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video game content ($M = 297.05$, $SD = 128.97$).

LSD also indicated there is a difference between the individuals who play sports violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play sports violence video game content ($M = 390$, $SD = 141.56$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 265$, $SD = 186.38$). A difference exists between those individuals who play sports violence and the individuals who report playing general entertainment content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play sports violence video game content ($M = 390$, $SD = 141.56$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video game content ($M = 297.05$, $SD = 128.97$).

Individuals who play fantasy violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction were also found to be different ($p < .05$). Individuals who play fantasy violence video game content ($M = 331.95$, $SD = 140.80$) rate levels of perceived self-efficacy based on somatic and

emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 265$, $SD = 186.38$). LSD indicates that there is a difference between the individuals who play human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play games with human violence content ($M = 400.93$, $SD = 127.39$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 265$, $SD = 186.38$).

There is also a difference between the individuals who play human violence and the individuals who play general entertainment content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play games with human violence ($M = 400.93$, $SD = 127.39$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video game content ($M = 297.05$, $SD = 128.97$). Individuals who play human violence and the individuals who play nonviolent sports content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction were also significantly different ($p < .01$). Individuals who play games with human violence ($M = 400.93$, $SD = 127.39$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play nonviolent sports video games ($M = 344.81$, $SD = 132.54$). LSD also indicates a difference

between the individuals who play human violence and the individuals who play fantasy violence content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .01$). Individuals who play human violence video games ($M = 400.93$, $SD = 127.39$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play fantasy violence video games ($M = 331.95$, $SD = 140.80$).

The analysis of variance for second video game choice (Table 18) was significant [$F(6,425) = 12.08$, $p < .05$] in that LSD indicates there is a difference between the individuals who play general entertainment content and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play general entertainment video games ($M = 295.66$, $SD = 115.36$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$). A significant difference exists between the individuals who play games with educational content and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play educational video games ($M = 363.71$, $SD = 138.49$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$). LSD also indicates a difference between the individuals

Table 18, Research question four: Video game two

Descriptive Statistics

Dependent Variable: SOMAEMOT

video games most	Mean	Std. Deviation	N
none	246.6087	160.55338	69
general entertainment	295.6618	115.36090	68
educational	363.7143	138.48552	7
nonviolent sports	365.5000	131.98121	138
sports violence	397.8571	108.76429	14
fantasy violence	342.1000	132.53404	40
human violence	402.6042	118.94488	96
Total	342.6157	141.07942	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: SOMAEMOT

F	df1	df2	Sig.
2.430	6	425	.025

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY2

Tests of Between-Subjects Effects

Dependent Variable: SOMAEMOT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1249500.356 ^a	6	208250.059	12.076	.000
Intercept	20365792.2	1	20365792.20	1181.010	.000
VGPLAY2	1249500.356	6	208250.059	12.076	.000
Error	7328865.857	425	17244.390		
Total	59288922.0	432			
Corrected Total	8578366.213	431			

a. R Squared = .146 (Adjusted R Squared = .134)

Multiple Comparisons

Dependent Variable: SOMAEMOT

LSD

(I) video games most frequently played 2	(J) video games most frequently played 2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	-49.0531*	22.43909	.029	-93.1585	-4.9477
	educational	-117.1056*	52.09034	.025	-219.4923	-14.7188
	nonviolent sports	-118.8913*	19.36177	.000	-156.9480	-80.8346
	sports violence	-151.2484*	38.49235	.000	-226.9075	-75.5894
	fantasy violence	-95.4913*	26.09652	.000	-146.7856	-44.1970
	human violence	-155.9955*	20.72553	.000	-196.7328	-115.2582
general entertainment	none	49.0531*	22.43909	.029	4.9477	93.1585
	educational	-68.0525	52.12560	.192	-170.5086	34.4036
	nonviolent sports	-69.8382*	19.45645	.000	-108.0811	-31.5954
	sports violence	-102.1954*	38.54006	.008	-177.9482	-26.4425
	fantasy violence	-46.4382	26.16684	.077	-97.8708	4.9943
	human violence	-106.9424*	20.81401	.000	-147.8536	-66.0312
educational	none	117.1056*	52.09034	.025	14.7188	219.4923
	general entertainment	68.0525	52.12560	.192	-34.4036	170.5086
	nonviolent sports	-1.7857	50.87675	.972	-101.7871	98.2157
	sports violence	-34.1429	60.78837	.575	-153.6261	85.3404
	fantasy violence	21.6143	53.80143	.688	-84.1357	127.3643
	human violence	-38.8899	51.41122	.450	-139.9418	62.1620
nonviolent sports	none	118.8913*	19.36177	.000	80.8346	156.9480
	general entertainment	69.8382*	19.45645	.000	31.5954	108.0811
	educational	1.7857	50.87675	.972	-98.2157	101.7871
	sports violence	-32.3571	36.83343	.380	-104.7555	40.0412
	fantasy violence	23.4000	23.58112	.322	-22.9501	69.7501
	human violence	-37.1042*	17.45246	.034	-71.4081	-2.8003
sports violence	none	151.2484*	38.49235	.000	75.5894	226.9075
	general entertainment	102.1954*	38.54006	.008	26.4425	177.9482
	educational	34.1429	60.78837	.575	-85.3404	153.6261
	nonviolent sports	32.3571	36.83343	.380	-40.0412	104.7555
	fantasy violence	55.7571	40.77808	.172	-24.3947	135.9090
	human violence	-4.7470	37.56822	.900	-78.5897	69.0956
fantasy violence	none	95.4913*	26.09652	.000	44.1970	146.7856
	general entertainment	46.4382	26.16684	.077	-4.9943	97.8708
	educational	-21.6143	53.80143	.688	-127.3643	84.1357
	nonviolent sports	-23.4000	23.58112	.322	-69.7501	22.9501
	sports violence	-55.7571	40.77808	.172	-135.9090	24.3947
	human violence	-60.5042*	24.71313	.015	-109.0793	-11.9290
human violence	none	155.9955*	20.72553	.000	115.2582	196.7328
	general entertainment	106.9424*	20.81401	.000	66.0312	147.8536
	educational	38.8899	51.41122	.450	-62.1620	139.9418
	nonviolent sports	37.1042*	17.45246	.034	2.8003	71.4081
	sports violence	4.7470	37.56822	.900	-69.0956	78.5897
	fantasy violence	60.5042*	24.71313	.015	11.9290	109.0793

Based on observed means.

*. The mean difference is significant at the .05 level.

who play nonviolent sports and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play nonviolent sports video games ($M = 365.5$, $SD = 131.98$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$).

A difference is also found in those individuals who play nonviolent sports games and the individuals who play general entertainment video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play nonviolent sports video games ($M = 365.5$, $SD = 131.98$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video games ($M = 295.66$, $SD = 115.36$). LSD also indicated there is a difference between the individuals who play games with sports violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play sports violence video games ($M = 397.86$, $SD = 108.76$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$).

Another difference exists between those individuals who play sports violence and the individuals who report playing general entertainment video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .01$). Individuals who play sports violence video games ($M = 397.86$, $SD = 108.76$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video game content ($M = 295.66$, $SD = 115.36$). Individuals who play games with fantasy violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction were also found to be different ($p < .001$). Individuals who play fantasy violence video games ($M = 342.1$, $SD = 132.53$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$).

LSD indicates there is a difference between the individuals who play games with human violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play human violence video games ($M = 402.60$, $SD = 141.08$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 246.61$, $SD = 160.55$). There is also a difference between the individuals who play games with human

violence and the individuals who play general entertainment video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play human violence video games ($M = 402.60$, $SD = 141.08$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play general entertainment video games ($M = 295.66$, $SD = 115.36$). Individuals who play human violence and the individuals who play nonviolent sports content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction were also found to be different ($p < .05$). Individuals who play human violence video games ($M = 402.60$, $SD = 141.08$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play nonviolent sports video games ($M = 365.5$, $SD = 131.98$).

LSD also indicates a difference between the individuals who play human violence games and the individuals who play fantasy violence content video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play human violence video games ($M = 402.60$, $SD = 141.08$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who play fantasy violence video games ($M = 342.1$, $SD = 132.53$).

The analysis of variance for fourth video game choice (Table 19) was significant [$F(6,425) = 6.61$, $p < .001$], such that LSD indicates there is a difference between the individuals who play general entertainment games and

Table 19, Research question four: Video game choice four

Descriptive Statistics

Dependent Variable: SOMAEMOT

video games most	Mean	Std. Deviation	N
none	297.5028	154.12342	181
general entertainment	355.4750	135.69404	40
educational	292.8571	127.37272	7
nonviolent sports	377.6250	120.64888	72
sports violence	394.7222	89.82781	18
fantasy violence	364.9545	112.06310	44
human violence	393.4429	123.02405	70
Total	342.6157	141.07942	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: SOMAEMOT

F	df1	df2	Sig.
3.545	6	425	.002

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VGPLAY4

Tests of Between-Subjects Effects

Dependent Variable: SOMAEMOT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	732226.466 ^a	6	122037.744	6.610	.000
Intercept	21917733.4	1	21917733.44	1187.213	.000
VGPLAY4	732226.466	6	122037.744	6.610	.000
Error	7846139.747	425	18461.505		
Total	59288922.0	432			
Corrected Total	8578366.213	431			

a. R Squared = .085 (Adjusted R Squared = .072)

Multiple Comparisons

Dependent Variable: SOMAEMOT

LSD

(I) video games most frequently played 4	(J) video games most frequently played 4	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
none	general entertainment	-57.9722*	23.73889	.015	-104.6325	-11.3120
	educational	4.6456	52.33885	.929	-98.2296	107.5208
	nonviolent sports	-80.1222*	18.93164	.000	-117.3335	-42.9109
	sports violence	-97.2195*	33.58030	.004	-163.2236	-31.2153
	fantasy violence	-67.4518*	22.83806	.003	-112.3414	-22.5622
	human violence	-95.9401*	19.12415	.000	-133.5298	-58.3504
general entertainment	none	57.9722*	23.73889	.015	11.3120	104.6325
	educational	62.6179	55.66772	.261	-46.8005	172.0362
	nonviolent sports	-22.1500	26.79454	.409	-74.8163	30.5163
	sports violence	-39.2472	38.56393	.309	-115.0470	36.5526
	fantasy violence	-9.4795	29.68362	.750	-67.8245	48.8654
	human violence	-37.9679	26.93090	.159	-90.9022	14.9665
educational	none	-4.6456	52.33885	.929	-107.5208	98.2296
	general entertainment	-62.6179	55.66772	.261	-172.0362	46.8005
	nonviolent sports	-84.7679	53.79375	.116	-190.5028	20.9671
	sports violence	-101.8651	60.52270	.093	-220.8262	17.0960
	fantasy violence	-72.0974	55.28958	.193	-180.7725	36.5777
	human violence	-100.5857	53.86180	.063	-206.4544	5.2830
nonviolent sports	none	80.1222*	18.93164	.000	42.9109	117.3335
	general entertainment	22.1500	26.79454	.409	-30.5163	74.8163
	educational	84.7679	53.79375	.116	-20.9671	190.5028
	sports violence	-17.0972	35.80571	.633	-87.4755	53.2811
	fantasy violence	12.6705	25.99980	.626	-38.4337	63.7747
	human violence	-15.8179	22.80670	.488	-60.6458	29.0101
sports violence	none	97.2195*	33.58030	.004	31.2153	163.2236
	general entertainment	39.2472	38.56393	.309	-36.5526	115.0470
	educational	101.8651	60.52270	.093	-17.0960	220.8262
	nonviolent sports	17.0972	35.80571	.633	-53.2811	87.4755
	fantasy violence	29.7677	38.01603	.434	-44.9552	104.4905
	human violence	1.2794	35.90787	.972	-69.2998	71.8585
fantasy violence	none	67.4518*	22.83806	.003	22.5622	112.3414
	general entertainment	9.4795	29.68362	.750	-48.8654	67.8245
	educational	72.0974	55.28958	.193	-36.5777	180.7725
	nonviolent sports	-12.6705	25.99980	.626	-63.7747	38.4337
	sports violence	-29.7677	38.01603	.434	-104.4905	44.9552
	human violence	-28.4883	26.14030	.276	-79.8687	22.8921
human violence	none	95.9401*	19.12415	.000	58.3504	133.5298
	general entertainment	37.9679	26.93090	.159	-14.9665	90.9022
	educational	100.5857	53.86180	.063	-5.2830	206.4544
	nonviolent sports	15.8179	22.80670	.488	-29.0101	60.6458
	sports violence	-1.2794	35.90787	.972	-71.8585	69.2998
	fantasy violence	28.4883	26.14030	.276	-22.8921	79.8687

Based on observed means.

*. The mean difference is significant at the .05 level.

the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .05$). Individuals who play general entertainment video games ($M = 355.48$, $SD = 135.69$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 297.50$, $SD = 154.12$). LSD also indicates a difference between the individuals who play nonviolent sports games and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play nonviolent sports video games ($M = 377.63$, $SD = 120.65$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 297.5$, $SD = 154.12$). LSD also indicated there is a difference between the individuals who play sports violence and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .01$). Individuals who play sports violence video games ($M = 394.72$, $SD = 89.83$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 297.5$, $SD = 154.12$).

Individuals who play fantasy violence games and the individuals who reported playing no video games on his or her level of perceived self-efficacy based on somatic and emotional reaction also are different ($p < .01$). Individuals

who play fantasy violence video games ($M = 364.95$, $SD = 112.06$) rate levels of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 297.5$, $SD = 154.12$). LSD indicates that there is a difference between the individuals who play human violence games and the individuals who did not indicate any frequently played video games on his or her level of perceived self-efficacy based on somatic and emotional reaction ($p < .001$). Individuals who play human violence video games ($M = 393.44$, $SD = 123.02$) rate level of perceived self-efficacy based on somatic and emotional reaction higher than individuals who did not indicate any frequently played video games ($M = 297.5$, $SD = 154.12$).

Research question five asked if age interacts with amount of video game play to impact levels of self-efficacy. This research question was addressed using an analysis of variance on the total level of perceived self-efficacy as the dependent variables and specified hours playing video games, hours playing video games with a friend, and the individual's age as the independent variables. Research question five was not supported, in that none of the main effects or interactions in the analysis of variance was statistically significant.

The analysis of variance can be found on Table 20. Age was recoded to categories by the researcher: category 1 was ages 4-10; category 2 was ages 11-12; category 3 included ages 13-15; category 4 included ages 16-18, category 5 included ages 19-21; and category 6 represented ages 22 and above.

Table 20, Research question five

Descriptive Statistics

Dependent Variable: TOTAL

NEWAGE2	hours spent playing	hours spent playing	Mean	Std. Deviation	N
1.00	<5hrs	<5hrs	2059.7500	1345.80592	4
		Total	2059.7500	1345.80592	4
	6-10hrs	6-10hrs	2955.0000	.	1
		Total	2955.0000	.	1
	11-20hrs	>20hrs	2090.5000	622.96107	2
		Total	2090.5000	622.96107	2
	Total	<5hrs	2059.7500	1345.80592	4
		6-10hrs	2955.0000	.	1
		>20hrs	2090.5000	622.96107	2
		Total	2196.4286	1040.37315	7
2.00	<5hrs	<5hrs	1747.0000	959.59540	10
		Total	1747.0000	959.59540	10
	6-10hrs	<5hrs	1780.0000	84.85281	2
		6-10hrs	2350.0000	1018.23376	2
		Total	2065.0000	675.49981	4
	11-20hrs	6-10hrs	2920.0000	.	1
		Total	2920.0000	.	1
	>20hrs	11-20hrs	3365.0000	.	1
		Total	3365.0000	.	1
	Total	<5hrs	1752.5000	868.45867	12
		6-10hrs	2540.0000	791.64386	3
		11-20hrs	3365.0000	.	1
		Total	2000.9375	931.76932	16
3.00	<5hrs	<5hrs	1741.7241	958.51001	58
		6-10hrs	2573.3333	1020.06536	3
		Total	1782.6230	969.72517	61

Descriptive Statistics

Dependent Variable: TOTAL

NEWAGE2	hours spent playing	hours spent playing	Mean	Std. Deviation	N
3.00	6-10hrs	<5hrs	2878.8235	547.55002	17
		6-10hrs	2845.6250	304.60088	8
		11-20hrs	3530.0000	42.42641	2
		>20hrs	4000.0000	.	1
		Total	2955.8929	523.37412	28
	11-20hrs	<5hrs	2730.0000	.	1
		6-10hrs	2873.2500	681.38260	4
		Total	2844.6000	593.56196	5
	>20hrs	<5hrs	3540.0000	.	1
		6-10hrs	3080.0000	.	1
		>20hrs	2900.0000	.	1
		Total	3173.3333	330.05050	3
	Total	<5hrs	2028.9610	1006.58196	77
		6-10hrs	2816.1250	540.97897	16
		11-20hrs	3530.0000	42.42641	2
		>20hrs	3450.0000	777.81746	2
		Total	2219.0515	1004.95834	97
4.00	<5hrs	<5hrs	1980.2105	882.76324	95
		6-10hrs	2317.5000	499.49141	4
		Total	1993.8384	871.52583	99
	6-10hrs	<5hrs	2715.7273	770.29291	22
		6-10hrs	2422.9000	573.78441	10
		Total	2624.2187	718.71183	32
	11-20hrs	<5hrs	2920.0000	266.64583	3
		6-10hrs	2795.0000	601.04076	2
		Total	2870.0000	361.31704	5
	>20hrs	<5hrs	2525.0000	1477.85317	2
		Total	2525.0000	1477.85317	2
	Total	<5hrs	2144.8852	908.52071	122
		6-10hrs	2443.0625	540.84076	16
		Total	2179.4565	877.62057	138
5.00	<5hrs	<5hrs	1866.8272	906.05103	81
		6-10hrs	2407.0000	792.34567	7
		Total	1909.7955	905.41908	88
	6-10hrs	<5hrs	2872.9286	435.76025	14
		6-10hrs	2362.9286	578.79058	14
		11-20hrs	2570.0000	.	1
		Total	2616.2759	555.69872	29
	11-20hrs	<5hrs	2556.6667	1009.47181	3
		6-10hrs	3206.2500	609.52680	4
		11-20hrs	3176.6000	596.09714	5
		>20hrs	2712.7500	243.05743	4
		Total	2951.8125	630.33422	16
	>20hrs	6-10hrs	2580.0000	.	1
		11-20hrs	3451.6667	569.04159	3
		Total	3233.7500	637.04232	4

Descriptive Statistics

Dependent Variable: TOTAL

NEWAGE2	hours spent playing	hours spent playing	Mean	Std. Deviation	N
5.00	Total	<5hrs	2031.6735	925.67495	98
		6-10hrs	2512.8846	679.91890	26
		11-20hrs	3200.8889	576.47451	9
		>20hrs	2712.7500	243.05743	4
		Total	2219.6934	910.90776	137
6.00	<5hrs	<5hrs	2009.5294	1037.63253	17
		6-10hrs	2220.0000	.	1
		Total	2021.2222	1007.87304	18
	6-10hrs	<5hrs	2790.0000	308.00433	4
		6-10hrs	2119.2000	1109.35711	5
		11-20hrs	2890.0000	.	1
		Total	2464.6000	843.82097	10
	11-20hrs	<5hrs	3010.0000	.	1
		6-10hrs	2960.0000	.	1
		11-20hrs	2940.0000	707.10678	2
		Total	2962.5000	409.58312	4
	>20hrs	<5hrs	2243.3333	172.14335	3
		>20hrs	3545.0000	784.88853	2
		Total	2764.0000	822.87909	5
	Total	<5hrs	2202.4800	918.36563	25
		6-10hrs	2253.7143	958.57007	7
		11-20hrs	2923.3333	500.83264	3
		>20hrs	3545.0000	784.88853	2
		Total	2343.1892	932.76417	37
Total	<5hrs	<5hrs	1887.6377	922.97039	265
		6-10hrs	2403.9333	694.17376	15
		Total	1915.2964	918.59586	280
	6-10hrs	<5hrs	2773.3390	621.36209	59
		6-10hrs	2458.1500	642.75351	40
		11-20hrs	3130.0000	480.62459	4
		>20hrs	4000.0000	.	1
		Total	2677.6250	655.32137	104
	11-20hrs	<5hrs	2771.2500	590.82116	8
		6-10hrs	2982.3333	538.63368	12
		11-20hrs	3109.0000	577.53759	7
		>20hrs	2505.3333	465.09598	6
		Total	2871.3030	563.05153	33
	>20hrs	<5hrs	2553.3333	837.46443	6
		6-10hrs	2830.0000	353.55339	2
		11-20hrs	3430.0000	466.63690	4
		>20hrs	3330.0000	668.35619	3
		Total	2979.3333	731.59041	15
	Total	<5hrs	2074.9734	938.09095	338
		6-10hrs	2548.3043	655.65253	69
		11-20hrs	3200.2000	509.67177	15
		>20hrs	2902.2000	720.66278	10
		Total	2208.7940	923.60817	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: TOTAL

F	df1	df2	Sig.
2.228	46	385	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design:

Intercept+NEWAGE2+HRPLYVG+HRPLYVG2+NEWAGE2 * HRPLYVG+NEWAGE2 * HRPLYVG2+HRPLYVG * HRPLYVG2+NEWAGE2 * HRPLYVG * HRPLYVG2

Tests of Between-Subjects Effects

Dependent Variable: TOTAL

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	93838086.8 ^a	46	2039958.410	2.868	.000
Intercept	384629513	1	384629513.3	540.787	.000
NEWAGE2	915904.731	5	183180.946	.258	.936
HRPLYVG	4920152.599	3	1640050.866	2.306	.076
HRPLYVG2	2178791.055	3	726263.685	1.021	.383
NEWAGE2 * HRPLYVG	3177264.016	11	288842.183	.406	.953
NEWAGE2 * HRPLYVG2	3039712.125	7	434244.589	.611	.747
HRPLYVG * HRPLYVG2	5997373.821	6	999562.303	1.405	.211
NEWAGE2 * HRPLYVG * HRPLYVG2	1030139.880	7	147162.840	.207	.984
Error	273827348	385	711239.864		
Total	2475294443	432			
Corrected Total	367665435	431			

a. R Squared = .255 (Adjusted R Squared = .166)

Research question six was tested by using an analysis of covariance to examine specific types of differences between sexes. Research question six asked if males rate the total level of perceived self-efficacy experienced through involvement and emulation in video game play different than females rate the level of perceived self-efficacy. Because males and females may well be different on time spent playing, however, the "playing" variables were used as covariates. Thus, the covariates for this analysis were reported hours playing video games per week and reported hours playing video games with friends per week. The analysis of covariance revealed the results were statistically significant [$F(1, 428) = 57.4, p < .001$]. Males rate a higher level of perceived self-efficacy experienced through involvement and emulation in video game play ($M = 2524.68, SD = 783.97$) than females rate the level of perceived self-efficacy ($M = 1671.78, SD = 896.62$), even controlling for differences in time playing, which was statistically significant. Results for the analysis of covariance can be found in Table 21.

The different variables of self-efficacy were also tested by analysis of covariance to further support research question six. The results of the analysis were statistically significant when testing the difference between males and females of their level of perceived self-efficacy base on mastery of experience [$F(1, 429) = 67.93, p < .001$]. Males ($M = 847.90, SD = 267.02$) rate their levels of self-efficacy higher than females ($M = 548.39, SD = 299.59$) rate their

Table 21, Research question six: Total self-efficacy

Descriptive Statistics

Dependent Variable: TOTAL

gender	Mean	Std. Deviation	N
female	1671.7813	896.61638	160
male	2524.6838	783.96965	272
Total	2208.7940	923.60817	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: TOTAL

F	df1	df2	Sig.
6.487	1	430	.011

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: TOTAL

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	98328219.3 ^a	3	32776073.10	52.084	.000
Intercept	179816522	1	179816522.0	285.744	.000
HRPLYVG	13789449.6	1	13789449.62	21.913	.000
HRPLYVG2	456383.768	1	456383.768	.725	.395
GENDER	36121439.4	1	36121439.41	57.400	.000
Error	269337215	428	629292.559		
Total	2475294443	432			
Corrected Total	367665435	431			

a. R Squared = .267 (Adjusted R Squared = .262)

perceived self-efficacy based on mastery of experience. The differences between male and female rate of perceived self-efficacy based on vicarious experience was also statistically significant [$F(1, 429) = 37.64, p < .001$] in who males ($M = 149.12, SD = 78.18$) rate their level of self-efficacy higher than females ($M = 88.44, SD = 75.1$) rate their levels of self-efficacy based on vicarious experience. The somatic and emotional reaction variable of self-efficacy was also found to be statistically significant between males and females [$F(1, 428) = 31.97, p < .001$]. Males ($M = 382.53, SD = 125.67$) rate a higher level of perceived self-efficacy than females ($M = 274.76, SD = 140.27$) levels of perceived self-efficacy based on somatic and emotional reaction. The results of the analyses can be found on Tables 22, 23, and 24

Also tested were the variables of learning and antisocial behavior to explore additional differences between males and females using an analysis of covariance. The analysis between male and female and the variable learning was statistically significant [$F(1, 429) = 38.28, p < .001$]. Males ($M = 720.36, SD = 278.5$) rate higher than females ($M = 465.9, SD = 305.45$) rate the level of perceived self-efficacy based on learning. When exploring the difference between male and female level of perceived self-efficacy based on antisocial behavior the results were also statistically significant [$F(1, 429) = 79.23, p < .001$]. Males ($M = 533.58, SD = 187.92$) rate a higher level of self-efficacy than females ($M = 309.1, SD = 206.12$) rate their level of perceived self-efficacy based

Table 22, Research question six: Mastery of experience

Descriptive Statistics

Dependent Variable: MASTERY

gender	Mean	Std. Deviation	N
female	548.3875	299.59268	160
male	847.9011	267.01523	273
Total	737.2263	314.44232	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: MASTERY

F	df1	df2	Sig.
5.974	1	431	.015

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: MASTERY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	11349174.4 ^a	3	3783058.125	51.744	.000
Intercept	22811767.3	1	22811767.33	312.018	.000
HRPLYVG	1831603.168	1	1831603.168	25.053	.000
HRPLYVG2	39872.198	1	39872.198	.545	.461
GENDER	4966396.045	1	4966396.045	67.930	.000
Error	31364381.4	429	73110.446		
Total	278050207	433			
Corrected Total	42713555.8	432			

a. R Squared = .266 (Adjusted R Squared = .261)

Table 23, Research question six: Vicarious experience

Descriptive Statistics

Dependent Variable: VICAR

gender	Mean	Std. Deviation	N
female	88.4438	75.09832	160
male	149.1245	78.18459	273
Total	126.7021	82.36744	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: VICAR

F	df1	df2	Sig.
.607	1	431	.436

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: VICAR

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	455559.199 ^a	3	151853.066	26.318	.000
Intercept	544759.028	1	544759.028	94.413	.000
HRPLYVG	10754.920	1	10754.920	1.864	.173
HRPLYVG2	27211.974	1	27211.974	4.716	.030
GENDER	217188.601	1	217188.601	37.641	.000
Error	2475299.370	429	5769.929		
Total	9881988.000	433			
Corrected Total	2930858.568	432			

a. R Squared = .155 (Adjusted R Squared = .150)

Table 24, Research question six: Somatic and emotional reaction

Descriptive Statistics

Dependent Variable: SOMAEMOT

gender	Mean	Std. Deviation	N
female	274.7562	140.26501	160
male	382.5331	125.67115	272
Total	342.6157	141.07942	432

Levene's Test of Equality of Error Variances^a

Dependent Variable: SOMAEMOT

F	df1	df2	Sig.
3.785	1	430	.052

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: SOMAEMOT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1730763.372 ^a	3	576921.124	36.060	.000
Intercept	4535962.128	1	4535962.128	283.514	.000
HRPLYVG	308082.458	1	308082.458	19.256	.000
HRPLYVG2	10366.519	1	10366.519	.648	.421
GENDER	511475.871	1	511475.871	31.969	.000
Error	6847602.841	428	15999.072		
Total	59288922.0	432			
Corrected Total	8578366.213	431			

a. R Squared = .202 (Adjusted R Squared = .196)

on antisocial behavior. The results of the each analysis of covariance further support the difference between male and female overall rate of self-efficacy experience through involvement and emulation of video game play. The results of these analyses of covariance can be found on Tables 25 and 26.

Table 25, Research question six: Learning

Descriptive Statistics

Dependent Variable: LEARN

gender	Mean	Std. Deviation	N
female	465.0937	305.44853	160
male	720.3626	278.49660	273
Total	626.0370	313.67126	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: LEARN

F	df1	df2	Sig.
5.373	1	431	.021

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: LEARN

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9653911.002 ^a	3	3217970.334	42.024	.000
Intercept	11891910.8	1	11891910.78	155.299	.000
HRPLYVG	1321468.108	1	1321468.108	17.257	.000
HRPLYVG2	198380.318	1	198380.318	2.591	.108
GENDER	2930896.806	1	2930896.806	38.275	.000
Error	32850422.4	429	76574.411		
Total	212206674	433			
Corrected Total	42504333.4	432			

a. R Squared = .227 (Adjusted R Squared = .222)

Table 26, Research question six: Antisocial behavior

Descriptive Statistics

Dependent Variable: ANTISOC

gender	Mean	Std. Deviation	N
female	309.1000	206.11996	160
male	533.5751	187.92292	273
Total	450.6282	222.79786	433

Levene's Test of Equality of Error Variances^a

Dependent Variable: ANTISOC

F	df1	df2	Sig.
4.161	1	431	.042

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+HRPLYVG+HRPLYVG2+GENDER

Tests of Between-Subjects Effects

Dependent Variable: ANTISOC

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6265859.760 ^a	3	2088619.920	59.033	.000
Intercept	7011111.629	1	7011111.629	198.164	.000
HRPLYVG	707777.552	1	707777.552	20.005	.000
HRPLYVG2	8774.265	1	8774.265	.248	.619
GENDER	2803128.778	1	2803128.778	79.229	.000
Error	15178139.4	429	35380.278		
Total	109371470	433			
Corrected Total	21443999.1	432			

a. R Squared = .292 (Adjusted R Squared = .287)

CHAPTER FOUR

DISCUSSION

The purpose of the current study is to investigate the relationship between video game play and an individual's perceived self-efficacy. The self-reflective process of social cognitive learning is crucial to the concept of an individual's self-efficacy and is based on the individual analysis of the experience, self-evaluation of personal thoughts, and changes in the individual's thoughts, (Bandura, 2001). This process of self-efficacy results in behavior change that ultimately produces action patterns. The current data and analysis revealed several areas of significance in the results that are worth review and consideration. The results of five hypotheses and six research questions are presented first, followed by study limitations and future research.

Hypotheses

The results of the five hypotheses indicate there is a relationship between elements of self-efficacy and time spent playing video games. As cited by Bandura (1994), the elements of self-efficacy (mastery of experience, vicarious experience, and somatic and emotional reaction) are ways to increase one's self-efficacy. Learning and antisocial behavior influences are also explored to provide insight about self-efficacy and increased time of video game play.

Hypothesis one was supported, in that increased time spent playing video games, individually as well as with friends, resulted in an increase of the individual's perceived level of self-efficacy based on mastery of experience. According to Bandura (1994), the element of mastery of experience is the most effective way to increase self-efficacy. The results indicate that as the individual plays more of the video game, the direct experience includes success and mastery of the actions performed in the game. As the individual achieves success, the outcome is an increased level of self-efficacy. The results of this hypothesis support this concept relative to the process of video game playing and the affects on self-efficacy.

Hypothesis two was also supported, and the results revealed a significant relationship between increased time spent playing video games, both individually and with friends, and an increase in the individual's perceived level of self-efficacy based on vicarious experience. Social modeling within the vicarious experience is confirmed as an important aspect of increasing one's self-efficacy, especially in video game play. As an individual spends an increased amount of time playing video games, the social models being played increase the observer's beliefs that he or she possesses the capability to master and succeed as the model did in the game. The evidence that this occurs is revealed by the results of hypotheses two. As pointed out by Shunk and Meece (2006), the results also indicated that playing with friends and peers can raise the individual's self-efficacy and lead him or her to believe they can also perform the task.

Hypothesis three was also supported: An increased amount of time spent playing video games increases the level of perceived self-efficacy based on antisocial behavior. This relationship was supported when participants played video games individually as well as with friends. The results of this hypothesis are significant, in that the content within the video games, which can be violent and shown as antisocial behavior, does have an effect on the individual's perceived level of self-efficacy. As the individual's self-efficacy increases in this particular domain, the risk of acting out the antisocial behavior increases. The study analysis results confirm the relationship between video game content and its effect on the individual's level of perceived self-efficacy.

Increased time spent playing video games, individually as well as with friends, increases an individual's perceived self-efficacy based on the element somatic and emotional reaction. This relationship was predicted in hypothesis four and was supported by the data. Because individuals rely on somatic and emotional reaction to assess whether they are prepared to take on an action, the level of self-efficacy is increased with increased time spent playing video games. The study results support the concept of somatic and emotional reaction as a way to increase an individual's perceived self-efficacy.

In the assessment of a correlation between increased time spent playing video games and an increase in an individual's perceived level of self-efficacy based on learning from video games, the study results indicated there is a statistically significant relationship; therefore hypothesis five is supported. An

individual's level of self-efficacy based on learning increases as the individual increases time spent playing video games. This was also found to be statistically significant when examining increased time spent playing video games with friends. Study results indicate that this hypothesis is supported, in that learning from video game exposure does take place and the individual's perceived self-efficacy increases as a result.

Research Questions

The first research question addressed the types of video games individuals most frequently play. The first video game choice (VGC1) indicated that 41.3% of the participants chose to play nonviolent sports video game content most frequently. Video games of human violence content were chosen second most often, at 18.9 % of the total sample population. General entertainment followed human violence content with 18.7% of the participants choosing general entertainment content video games. Fantasy violence was chosen by 10.2% of the individuals, and 6.2% of the individuals did not indicate any frequently played video games. Sports violence was selected by 2.5% of the participants, with educational content reporting 2.1% of the participants. It is important to note that when asked to list four video games on the questionnaire that were played, some respondents that did not report four selections. This should not be interpreted that because they did not provide four choices that they do not play video games.

The second video game choice (VGC2) showed that 32.1 % of the participants chose to play nonviolent sports video game content most often. Human violence content was selected by 22.2% of the participants. Following human violence, 15.9% of the participants did not indicate any frequently played video games. General entertainment (15.7%) content followed closely behind those who did not report a video game. Fantasy violence content was chosen by 9.2%, sports violence was chosen by 3.2% of the participants, and educational content was chosen by 1.6% of the participants.

Nonviolent sports content video games (28.9%) were also chosen most often for video game choice three (VGC3). Those individuals that did not indicate any frequently played video games produced the second highest percentage (27.5%). Third was human violence content, rated at 21.5% by the respondents. General entertainment was chosen by 10.9% of the participants, fantasy violence was reported by 8.1% of the participants, sports violence was selected by 2.1%, and followed by education content at .9%.

The fourth choice of video games (VGC4) most frequently played revealed that approximately half of the participants (41.8%) did not indicate any frequently played video games. Following this was nonviolent sports content, which was chosen by 16.6%, and human violence content was chosen by 16.2% of the participants. Fantasy violence was selected by 10.2% of the participants, and general entertainment followed at 9.5% of the participants. Sports violence

content (4.2%) and educational content (1.6%) were chosen by the remaining participants.

The pattern of most frequently played video game, as a result of this study, is nonviolent sports for VGC1, VGC2, and VGC3. The VGC4 results indicated individuals reported playing no video game content for their fourth choice. Although nonviolent sports rated second in VGC4, the percentage difference between those who reported playing no video games and nonviolent sports was large. Human violence was rated in the top three most frequent played video games in all four choices. The study results are noteworthy, in that individuals do choose to play human violence content video games more often than general entertainment, fantasy violence, sports violence, and education content. Also, human violence was rated second after nonviolent sports in VGC1 and VGC2. The results of research question one indicate that individuals are playing a significant amount of human violence content video games.

The fact that video games that offered a challenge and an opportunity for role playing appeared in the top four selections in all four choices, with total scores of greater than 55% for four choices and greater than 45% for the fourth choice, is relevant when compared to the elements of mastery of experience, vicarious experience, and somatic and emotional reaction. The challenges offered by the video game content presented the scenarios that influenced player self-efficacy. Through active game participation and video game character role

assumption, the player, when successful in achieving objective in the video game, gains an increase in perceived self-efficacy.

Research question two was developed to explore the differences between types of video games, based on video game content, and their effect on the self-efficacy. The research question was answered. VGC1 revealed there is a higher level of perceived self-efficacy in the individuals who play nonviolent content, sports violence content, fantasy violence content, educational content, and human violence content than the individuals who did not indicate any frequently played video games. Once again, it is important to note certain participants chose not to report video game content. This does not mean nor can it be assumed that video games are not being played, they just did not list four choices of video games when asked on the questionnaire. There was a higher level of self-efficacy in the individuals who played nonviolent sports content, sports violence, and human violence than the individuals who played general entertainment content video games. Statistical results also revealed that the individuals who play human violence content rate level of perceived self-efficacy higher than nonviolent sports content and fantasy violence.

Additional information to address research question two is provided by the analysis of VGC2, which revealed that there is a higher level of perceived self-efficacy in the individuals who report playing nonviolent sports, sports violence, fantasy violence, and human violence than individuals who did not indicate any frequently played video games. Also, those who play games with nonviolent

sports content, sports violence content, and human violence content rate levels of perceived self-efficacy higher than those who play general entertainment video game content. Again, the significant results reveal that individuals who play human violence content report a higher level of perceived self-efficacy than the individuals who play nonviolent sports and fantasy.

Because the results of research question two data analysis were significant, the video game genre became noteworthy relative to mastery of experience. In all instances, the highest differences in level of self-efficacy were associated with scenarios that offered a challenge to the player. This allowed more opportunity for mastery resulting in an increase of perceived self-efficacy. In addition, individuals who play human violence content reported a higher level of perceived self-efficacy than nonviolent sports, fantasy, general entertainment content, and the individuals who did not indicate any frequently played video games. Research question two analysis results therefore established a direct relationship between increased self-efficacy through mastery of experience when playing human violence video games.

Research question three is addressed by examination of the type of video game played as it relates to an individual's perceived level of self-efficacy based on vicarious experience and was answered. VGC1 revealed those who play nonviolent sports content, fantasy violence, and human violence report a higher level of perceived self-efficacy than the individuals who play general entertainment video game content. The individuals who play games with human

violence content rate level of perceived self-efficacy higher than the individuals who play nonviolent video game content and individuals who did not indicate any frequently played video games. VGC2 revealed the individuals that play nonviolent sports content, fantasy violence content, and human violence content report levels of perceived self-efficacy higher than those who play general entertainment video game content as well as those who report no video game content.

The results of research question three indicate that in those video games where content and scenarios are based on role playing, character assumption, and group (social) involvement, higher levels of perceived self-efficacy were generally reported. This is significant when viewed from the learning theory and self-efficacy perspectives. Human violence again led to higher levels of perceived self-efficacy than general entertainment, nonviolent sports, and the individuals who did not indicate any frequently played video games. The fact that vicarious experience includes modeling for future action indicates that specific modeling behaviors of human violent content could result in changes of perceived self-efficacy that may influence behavior.

Research question four addresses the type of video game played in relation to an individual's perceived level of self-efficacy based on somatic and emotional reaction. The results indicate an interesting answer to this research question. VGC1 revealed that there are higher levels of perceived self-efficacy in the individuals who play educational content, nonviolent content, sports violence

content, fantasy violence content, and human violence content than the individuals who did not indicate any frequently played video games. There was also a higher level of self-efficacy in the individuals who played educational content, nonviolent sports content, and sports violence than the individuals who play general entertainment content. Human violence game players reported a higher level of perceived self-efficacy than the individuals that play nonviolent sports content, general entertainment content, as well as fantasy content.

Also in answer to research question four, VGC2 revealed there is a higher level of perceived self efficacy in the individuals that report playing general entertainment content, educational content, nonviolent sports, sports violence, fantasy violence, and human violence than the individuals who report no video games played. There was a higher level of self-efficacy in the individuals who played nonviolent sports content and sports violence than the individuals who play general entertainment content video games. The individuals that play human violence content indicated a higher level of perceived self-efficacy than the individuals that play general entertainment content, nonviolent sports content, and fantasy violence content.

The results related to research question four further supports the position that video game exposure can influence perceived self-efficacy. In this series of analyses, the statistical results reveal that somatic and emotional reaction to video game playing produce changes in individual perceptions of self-efficacy. Conceptually, somatic and emotional reaction reveals to individuals whether they

are prepared to take the actions which increase the likelihood of future situational actions. The content that resulted in a higher level of self-efficacy was generally content that offered scenes of challenges that required specific actions for success. For VGC2, all of the content categories that individuals chose rated higher than the individuals who did not indicate any frequently played video games. VGC1 had similar results, not including general entertainment content. This reveals that through the experience of the video game content, individual's level of perceived self-efficacy was based on somatic and emotional reaction. Human violence also rated higher than any other content category, not including sports violence and educational content for both VGC1 and VGC2. Because of video game exposure, somatic and emotional reaction was the basis for increases in individual's perceived self-efficacy.

Research question five asks whether age interacts with the amount of video game play to impact levels of self-efficacy. The results indicated a lack of such an interaction. As an individual matures there is variation in both physical and mental development. Areas of the brain change and develop, which affects certain functions such as reasoning. Because there was no difference between the independent variables, age and exposure to violent video games, and the dependent variable, outcomes of the levels of self-efficacy, there is no evidence from this study that certain age groups differentiate in the development of the effects of violent video play to impact levels of self-efficacy. Although the age range of the participants was from 4 to 27, the most prevalent age of the

participants was 13 to 21 (86.1%). The present results, then, may be due to the lack of overall distribution of ages across the age range.

Research question six asked about sex differences. Males rated the total level of perceived self-efficacy different than female's levels of perceived self-efficacy experienced through involvement and emulation of video game play. Males rated their total level of perceived self-efficacy higher than females. An analysis of covariance was used to test this research question. The "playing" variables (reported hours playing video games per week and reported hours playing video games with friends per week) were used as covariates to take into consideration the fact that males and females may spend different amounts of time playing video games.

To further address research question six, each element of self-efficacy (mastery of experience, vicarious experience, and somatic and emotional reaction) with gender as an independent variable, was also tested with the analysis of covariates using the "playing" variables as covariates in each analysis. The results of each analysis yielded further support for the finding noted above and indicated that males rate their level of perceived self-efficacy higher than females rate their perceived self-efficacy in the categories of mastery of experience, vicarious experience, and somatic and emotional reaction.

The variables of learning and antisocial behavior were also tested, with the analysis including "playing" variables as the covariates, to explore additional differences between males and females. Each of the analyses also supported

the more general finding. Males rate their level of perceived self-efficacy higher than females rate the level of perceived self-efficacy based on learning as well as on antisocial behavior. Therefore, the current video game study indicates that male level of perceived self-efficacy is influenced more than female perceptions of self-efficacy by playing video games. Although the current study does not compare games most frequently played to gender, the content of the most frequently played video games may produce this gender variance. As mentioned previously, the most frequently played video game choices one and two were both considered nonviolent sports content. The study does not provide a true comparison or rationale for the gender difference, however, and more importantly, the study does point out that the perceived level of self-efficacy increased for both males and females.

In summary, based upon the current study evidence, playing video games can be positively correlated with levels of perceived self-efficacy. The assessment and results of the hypotheses and research question data overwhelmingly supports this premise.

Implications

Unlike previous research and studies dealing with violence in video media and its impact on youth, the current study develops a correlation between violent video involvement, increased video game play, and effects on individual perceived self-efficacy. The rationale for this approach is that playing video

games, including violent content, can produce increases in self-efficacy that may be a precursor to antisocial behavior. If the process of violent video exposure to antisocial behavior action can be plotted, interventions can be developed to improve overall behavioral attitudes. The current study indicates that additional research should address the causal relationships reported in this study. The intent of the additional research is to develop an overall process model that defines and analyzes the finite elements included in video media, the game player, and the resulting effect on self-efficacy. The utility of this process model would be as a tool for researchers and practitioners to develop quality of life improvement stratagems.

The current study captures significant data and develops important correlations between video game playing, self-efficacy, and gender. Results indicated a more significant increase in male perceived self-efficacy based on video game playing than did female self-efficacy. Previous research and this study, typically includes both sexes in the analysis. Indications are that limiting the sample population to only male subjects would allow for more accurate, detailed findings. This approach would provide added detail and fidelity in developing a correlation between video games viewed and perceived self-efficacy. The identification and correlation of those factors would be significant in efforts to control potential anti social behavior resulting from violent video games and perceived levels of self-efficacy.

This study also revealed that increased time spent playing video games and the video game content produces a resulting effect on individual's level of perceived self-efficacy. Based on the study results, the degree to which an individual is exposed to video games, as well as the content of the video game, affects the individual's belief of perceived capability. This can result in an emulation of the video content and behavior modification based on the foundations of the social cognitive theory and self-efficacy. In the instance of violent video exposure, the individual can effectively re-enact that which is experienced in the video game based on level of self-efficacy and personal confidence. Increase time spent playing video games and the significant relationship of increased self-efficacy, based on antisocial behavior and learning, demonstrates that individuals can learn certain behaviors from mastering and modeling antisocial actions from the games. The content of the video game and the amount of time the individual is exposed to the video game provides a reciprocal environment in which the individual learns from and could potentially affect his or her behavior

As previously mentioned, self-efficacy is a component of the self-reflective process which allows the individual to analyze an experience, evaluate his or her thoughts, and change his or her thoughts accordingly (Bandura, 2001). In application of this to the results of the study, increased time spent playing video games and content of video games affects the level of perceived capability the individual has about the action and behavior in the video game. The feedback

between the video game content and the individual's cognitions play a role in the self-reflective process. If the individual has pre-existing beliefs, values, and morality, the content's role in the self-reflective process may, or may not affect the outcome of the individual's behavior. If such morality does not exist, the content may affect the self-reflective process. Through the evaluation and analysis of his or her own thoughts about the feedback the video game is giving, the individual's outcome behaviors may mirror what is seen in the content of the video game.

As the individual plays and experiences the video game content, the self-regulatory process allows individuals to take the external sources of influence, which is the video game content, and control his or her interpretation, thoughts, and personal cognitions. This study established a significant correlation between both increased time spent playing video games and increased levels of perceived self-efficacy, and type of video game content played and increased level of perceived self-efficacy. Because of this, the results show the external sources, video game play and content, does influence the individual. Self-regulation comes into play when the individual chooses whether or not, and how to act on certain behaviors seen in the video games. Based on the individuals motivational, social, and moral standards, the individuals will interpret the behavior seen on the video game as acceptable or unacceptable. The correlation between violent content and increased level of self-efficacy is crucial because if the individual lacks the ability to see the content as immoral based on

ones own standards, then the behaviors will not be seen as unacceptable. When the individual self-regulates and distinguishes the actions as bad and unacceptable then the violent content will be unlikely to influence the individual to act out and behave in an antisocial way. The self-reflective process provides an opportunity for the violent content to be filtered out by the individual's own cognitions. The strong foundation for morality and prosocial standard within the individual is crucial for parents, teachers, and researchers to recognize for the intervention against violent and aggressive content video games.

Research Limitations

The current study takes a comprehensive look at the relationship between exposure to violence in video games and self-efficacy. The data that were captured were from a narrow, mid-west, geographic population. This resulted in the study findings being oriented to, and based upon, the social, educational, and economic composition of that group. The nature of the viewing and the resources available for viewing should be evaluated across different segments of society to determine additional influences on the ultimate analysis results. Statistical populations from various sectors of society could provide different level of outcome than revealed by the current study.

The current study does not address additional factors that could influence video viewing habits, behavior development, and self-efficacy. These include socioeconomic status, family composition, parental oversight, ethnicity, and

educational level. The current study could be replicated and expanded to include the additional parameters. This would provide a broader spectrum of exposure, increased qualification of data elements and more robust quantitative analyses.

As with most analyses that employ a questionnaire, the issue arises as to the ability of the participants to comprehend or understand the content of the individual questions. Individual interpretation of the questions could vary among test subjects. In addition, it is possible that the students administering the questionnaires might have explained various questions to younger study participants, compounding the problem. As noted in the methods chapter, the questionnaires were distributed by students who were awarded extra class credit for their participation. All data were based on a self-report measure. The questionnaires were not administered, nor responded to, in a controlled environment. When dealing with a population across a broad spectrum of chronological age and levels of education, a certain error factor should be included within the analysis. The current study does not allow for a "correction error" based on this factor. Although the influence might be slight it is still an unknown. Future study should address and compensate for this limitation.

The categorization of the type, or genre, of video game was based on the categorical system referenced Buchman and Funk (1996) as described in the current study. Although pre-established categories were utilized, there was still a judgment decision on the part of the researcher to place a number of video games into specific categories based on the researcher's opinion. This resulted

in a subjective categorization that may, in some cases, conflict with the game type interpretation of the study individuals or respondents. The current study does not address this limitation and therefore does not account for it. The level of influence, although considered not significant on the part of the researcher, could affect the accuracy of the study results.

Future Research

The interrelationships between violent video media exposure and the development of human behavior patterns in children and teenagers are both complex and dynamic. The current study was based on the assumption that media exposure influences behavior through changes in self-efficacy. New studies should evaluate the implications of this interrelationship from a more detailed analysis that segments individual elements of video media exposure, sensory response, behavior modification, and evolvement of antisocial tendencies. This study reveals a positive correlation between violent video viewing and increases in self-efficacy. The next progressive step is to distinctly assess, in finite detail, the elements that drive the modifications to self-efficacy.

The current study was developed as a preliminary investigation into a concept and not to propose a process model. The findings of the quantitative analysis and the results presented provide the foundation for the development of a process model that includes the interrelated elements presented. The relationships between viewing violent video media, influences on self-efficacy,

and behavior modification lend themselves to a process model based on exposure, influences, linkages, and determination factors.

The study results indicated that viewing violent video games and the relationship to self-efficacy involves communication, learning, and cognition. An attempt was made in the review of the literature to correlate these elements with physical development through an association with the NIMH (2004) brain growth study. The physical development of the brain, compared with the development of cognitive abilities, and the influences on self-efficacy should be studied in more detail. A study of this nature could evolve a pattern of learning and behavior that, when related to physical development, may be predictive of antisocial behavior, based on violent video viewing and self-efficacy.

A finding of the current study is the fact that the level of perceived self-efficacy in males was rated higher than the level of perceived self-efficacy in females. This was true in the areas of mastery of experience, vicarious experience, somatic and emotional reaction, learning from a video game, and antisocial behavior, respectively. The study was designed to assess increases in levels of perceived self-efficacy and did not attempt to identify the causal reason for the gender differences. An analysis of video games viewed, exposure time, and video game genre relative to gender could provide some clarity as to the reasons for this difference. Additional study in this area may provide insight into levels and types of potential aggressive and antisocial behavior.

Although the current study does not produce a process model to explain the intricacies of video viewing and behavior, it does provide the quantitative analysis to support the hypotheses presented and the research question answers. Based on the current study results, sufficient correlations have been provided between violent video viewing and changes in self-efficacy to motivate further study. It is hoped, by this researcher that continued study will be accomplished in this area.

Appendix A
VIDEO GAME ACTIVITY INVENTORY
A University of Dayton Research Study

Page 1 of 2 pages.

Your participation in this research project involving Video Game Playing is much appreciated.

This study is for a graduate thesis project at the University of Dayton in Dayton, Ohio, and the results will be submitted for academic credit. This study is completely anonymous and you will not be asked your name or any other questions that will identify you. Your participation is strictly voluntary and your careful completion of the study survey is appreciated. If you have any questions about this project, please contact Stefanie Galioto at galiotsa@notes.udayton.edu.

As you proceed through this document you will find some questions that are specifically oriented to video games and some that are more general in nature. Please respond to the best of your ability and as accurately as possible.

Preliminary Questions:

- What is your age?
_____ Years.
- What is your gender?
Female _____ Male _____
- How many hours per week, on average, would you estimate that you play video games?
a. <5 hrs b. 6-10 hrs c. 11-20 hrs d. >20 hrs
- How many hours per week, on average, would you estimate that you play video games with your friends present?
a. <5 hrs b. 6-10 hrs c. 11-20 hrs d. >20 hrs
- Please list the video games that you play most frequently with your favorite at the top of the list.
 1. _____
 2. _____
 3. _____
 4. _____

Please continue to the next page:

0 10 20 30 40 50 60 70 80 90 100

Cannot Moderately Confident Confident
Do It That Do It That I Can Do It

Confidence 0-100	
1	Successfully complete an entire video game.
2	Use learned video game knowledge in real life.
3	Use video games to learn.
4	Accurately use a weapon in a video game.
5	Successfully use multiple weapons to defend myself in a video game.
6	Plan an attack in a war type video game.
7	Successfully reach the next level in a video game through practice.
8	Successfully be a "good guy" in a video simulation.
9	Get excited while playing video games.
10	Perform better in a video game when my video game opponent makes me mad.
11	Improve my school performance through video game participation.
12	Learn to be assertive in life by playing video games.
13	Defeat my friends in video game competitions.
14	Control my emotions while destroying my video opponent in the video game
15	Engage in video game actions that are against the law to win the video game.
16	Achieve each required higher level in the video game quickly.
17	Take the part of either the hero or villain in a video game and win.
18	I can vent my frustrations by playing video games.
19	Demonstrate improvement of video game skills when challenged by a video game.
20	Learn to drive a car from a video game.
21	Get a feeling of accomplishment from playing a video game.
22	Learn to fight to beat my opponent in a video game.
23	Learn how to defeat my enemies in video games.
24	Learn strategies to destroy my opponent in a video game.
25	Model my actions to the role of the characters in the video game.
26	Feel good when I beat my friends in a video game competition.
27	Try to get revenge on a video game character even when I fail to win the game.
28	Learn to defend myself in a video game.
29	Imitate the actions in real life of the character I am playing in the video game.
30	Successfully be the "bad guy" in a video simulation.
31	Learn to be aggressive if necessary in a video game.
32	Perform the actions necessary to achieve the end goal or "win" in a video game.
33	Learn how to harm someone in a video game.
34	Learn to fly an airplane through a video simulation.
35	Practice until I win in a video game.
36	Demonstrate skills to protect myself when playing a video game.
37	Master skills through repetitive video game playing.
38	Use video game characters as role models.
39	Change strategies to achieve video game goals.
40	Continue to play a video game even when I lose.

Appendix B

Video Gaming Questionnaire

The purpose of this questionnaire is to gather information related to playing video games. The data gathered will be used as part of a graduate school study that will be submitted for academic credit. All responses are completely anonymous. Do not put your name on this survey. Please respond to the questions as honestly and accurately as possible. Thank you for your participation. Please circle the response letter that applies to you or write a short response as required. If you have any questions about this project, please contact Stefanie Galioto at galiotsa@notes.udayton.edu.

1. Do you play video games?

A. yes B. no

2. How much time do you typically spend per week playing video games?

A. < 5 hours B. 6-10 Hours C. 11-20 hours D. > 20 hours

For the next set of questions, please indicate the extent to which you strongly disagree, disagree, are neutral (neither agree nor disagree), agree, or strongly agree with each of the following statements.

3. When playing a video game I get excited at the challenge.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

4. I think video games can teach people how to react in different situations.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

5. I feel video games can teach me how to shoot a gun.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

6. I feel a sense of achievement when I can win playing a video game.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

7. Violence in video games can teach the player to become violent.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

8. Video games can teach us how to react in situations that are similar to those shown in the game.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
9. Video games can show me how to act in everyday life.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
10. Violence in video games and television is becoming a large enough social problem that there should be more control on their content.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
11. When you play a "bad" character in a criminal or war video game and you shoot guns and kill the enemy, it makes you feel different than when you play a video game that contains little or no violence.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
12. Killing the enemy in a war video game is more justified than killing the enemy in a criminal video game.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
13. If I master an action in a video game, I could do the same action in real life.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
14. When I am successful at playing a video game it builds my self-confidence.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
15. Exposure to media violence results in an increased acceptance of violence as a way of resolving a conflict.
- A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree
16. Video games with violence do not affect the behavior of the person playing the game.

A. Strongly disagree B. Disagree C. Neutral D. Agree E. Strongly Agree

17. When playing a video game I take the role of the:

A. Hero B. Bad guy C. The victim D. The By-stander E. Other

18. What video games and/or types of video games do you enjoy most?

19. What video games and/or types of video games do your friends play?

20. When you were younger, what video games and/or types of video games did your parents not allow or disapprove of you playing?

21. If I were a parent, I would select the following types of video games for my children:

22. Playing video games has helped me in the following ways:

23. What is your age group?

A. 17-18 B. 19-20 C. 21-22 D. 22-30 E. 31 or older

24. What is your ethnicity?

A. African-American B. Caucasian C. Hispanic D. Other

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R007592988