

# AN INTRODUCTION TO VIDEO GAME SELF-EFFICACY

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by

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## DEDICATION

This thesis is dedicated to my wife Breeanna, who has  
always supported my endeavors.



I would also like to recognize my family and friends who  
encouraged me along the way.

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## ABSTRACT

### AN INTRODUCTION TO VIDEO GAME SELF-EFFICACY

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Past research has shown that self-efficacy beliefs are an important factor in human action and motivation. Until this study, video game self-efficacy has never been directly investigated. Video game self-efficacy may be a factor in video game addiction, emotional arousal while playing video games, and aggressive behavior related to video game usage. The current study used information gathered from focus groups in conjunction with self-efficacy literature to investigate video game self-efficacy and to create the Video Game Self-Efficacy Scale. The Video Game Self-Efficacy Scale was shown to be a reliable tool that measured video game self-efficacy and was predictive of video game use. Significant correlations were found between video game self-efficacy and gender. High video game self-efficacy was also correlated with frequency of game play and the amount of time spent playing video games.



## CHAPTER I

### SELF-EFFICACY THEORY

Most people believe they have some control over their lives. Self-efficacy theory is a cognitive theory that was founded on this assumption. Self-efficacy is defined as a person's belief about his or her ability to perform a task or behavior (Bandura, 1977). It has also been described as "people's beliefs about their ability to exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1993, p. 118).

Research on self-efficacy has been conducted for over half a century. Upon examining nine meta-analytical reviews on self-efficacy literature Bandura and Locke found that self-efficacy beliefs are an important factor in human action and motivation (Bandura & Locke, 2003). Self-efficacy beliefs influence the activities that a person will pursue and can be correlated with both performance and success. These beliefs also influence how hard a person will try or how much effort he or she will put forth toward accomplishing a task. People with greater levels of self-efficacy will persist longer at a task than individuals who have lower levels of self-efficacy (Bandura & Locke, 2003; Tipton & Worthington, 1984).

Self-efficacy is viewed as both general and domain specific (Bandura & Locke 2003; Schwarzer, 2009). General self-efficacy is a cognitive evaluation of one's general ability to persist in adverse situations (Lightsey, Burke, Davis-Henderson, & Yee,

2006) and is a broad measure of perceived self-efficacy (Scholz, Dona, Sud, & Schwarzer, 2002). Thus, a person's overall sense of self-efficacy is called general self-efficacy. General self-efficacy is a global form of self-efficacy that individuals use to assess the varied situations that they encounter on any given day. People with a high level of general self-efficacy believe that they will succeed in difficult circumstances and that they will overcome challenging obstacles (Schwarzer, 2009; Steyn & Mynhardt, 2008).

Intuitively, self-efficacy cannot be the same for every event or every situation. General self-efficacy is not always predictive of a person's actual self-efficacy for the task that person is performing (Lightsey et al., 2006; Schwarzer, 2009). For example an individual may hold high efficacy beliefs for completing a challenging calculus course and at the same time hold very low efficacy beliefs for following an exercise routine. Self-efficacy is measured at both the general and the domain specific level for this reason. General self-efficacy may or may not correlate with domain specific self-efficacy. Continuing with the previous example, if that person also has high levels of general self-efficacy, then general self-efficacy and mathematical self-efficacy would likely correlate, while general self-efficacy and exercise self-efficacy would not. General self-efficacy and domain specific self-efficacy are not mutually exclusive of one another. Efficacy beliefs may overlap. General self-efficacy beliefs can influence domain specific self-efficacy beliefs, just as domain specific self-efficacy beliefs can influence general self-efficacy beliefs (Bandura, 1977, 1990; Bandura & Locke, 2003; Steyn & Mynhardt, 2008). Domain specific self-efficacy has been measured in many diverse areas such as reading self-efficacy (Durik, Vida & Eccles, 2006), parenting self-efficacy (Kendall &

Bloomfield, 2005), and self-efficacy for finding health related information on the internet (Chu, Huber, Mastel-Smith, & Cesario, 2009).

### Measuring Self-Efficacy

Self-efficacy is measured through the use of self inventory scales. A commonly used and cross culturally validated scale that measures general self-efficacy is the General Perceived Self-Efficacy Scale. It is available in 30 languages and has been administered thousands of times (Schwarzer, 2009). The scale has undergone significant validity testing and reliability analysis. The scale has an inter-item reliability rating of ( $\alpha = .86$ ) that was obtained using a sample of 19,120 participants from 25 countries (Scholz et al., 2002).

A large and diverse collection of domain specific self-efficacy scales have been created to measure self-efficacy as it applies to performing a specific task or carrying out a specific action. For example, if a health professional wants to know the likelihood that a patient will follow an exercise routine, that health worker can administer the Physical Exercise Self-Efficacy Scale (Schwarzer & Renner, 2009). A person's physical exercise self-efficacy is a strong indicator of how well that person will stick with an exercise program (Schwarzer & Renner, 2009). There is a health related self-efficacy scale that measures nutrition self-efficacy and an even narrower scale that measures self-efficacy for eating fruits and vegetables (Mainvil, Lawson, Horwath, McKenzie, & Reeder, 2009). The influence of self-efficacy on performance and motivation is undoubtedly the reason why domain specific self-efficacy scales have been developed and utilized across a vast range of topics. There are scales that measure everything from

writing self-efficacy (Pajares, 2007), to mathematical self-efficacy (Usher & Pajares, 2009), to self-efficacy relating to quality of life for a person with a spinal cord injury (Middleton, Tate, & Geraghty, 2003). The advent of computers has lead to self-efficacy scales that measure self-efficacy for general computer use (Conrad & Munro, 2008) and even more task specific self-efficacy for using a search engine to find information on the internet (Chu et al., 2009). However, one type of self-efficacy that has yet to be explored is self-efficacy for playing video games.

### Video Game Self-Efficacy

There are a variety of reasons why it would be important to know a person's video game self-efficacy. These reasons include research, education, and video game addiction. A video game self-efficacy scale would be a useful tool for researchers studying the effects of playing video games on behavior. Violent video games have been shown to increase aggression and physiological arousal of those who play them. Playing a violent video game can cause a person to be less physiologically aroused by depictions of real life violence (Carnagey, Anderson, & Bushman, 2007). The mechanism that is attributed to the desensitization effect caused by playing violent video games is thought to be similar to the effect that occurs when people are exposed to violent media (Anderson et al., 2003). However, watching television is a passive activity in which the viewer has no control. Unlike television, music, and movies a person has direct control of the action in a video game. That person can make choices and determine outcomes. Do people with high or low video game self-efficacy react to violent video games in the same way?

Video game self-efficacy may serve as a predictor for desensitization effects, ability to learn new games, types of games people play, length of time people spend playing video games and may serve as a first step for understanding video game addiction.

As virtual or computer based learning is incorporated by educational institutions, it will be critical for teachers to gauge the self-efficacy of their students in performing virtual learning activities. A common theme in educational software is that of educational video games. Examples can be found in products such as the Carmen Sandiego software series and the Leapster 2 Learning Gaming System. Nintendo also has a line of educational software games for the Nintendo DS.

Finally, a video game self-efficacy scale could be used by teachers for struggling students who lack academic self-efficacy, but perhaps have a great deal of video game self-efficacy. Theoretically, a teacher could use a student's high self-efficacy beliefs for playing video games to build up self-efficacy in other areas such as math, reading, and writing.

### Gender Differences

Casual observation indicates that males play video games more than females. While research shows this is a correct observation, it is not as large a proportion as the stereotype suggests. According to the Entertainment Software Association (2010), males make up 60% of the game playing population. Males also spend more time playing video games than females. In a study of 231 male and 313 female participants, males reported a mean of 11 hours per week playing video games, while females reported a mean of 4.25

hours per week playing video games (Lucas & Sherry, 2004). A simple explanation for this difference is that females are less interested in video games. Some have speculated that females are less interested in video games because video games are often violent or because video games often lack a strong female protagonist character. However, it is possible that these gender differences can be explained by differences in video game self-efficacy and the interaction of self-efficacy and interest.

Lucas and Sherry hypothesized that females would like mental rotation games less than males because according to some research, males have been found to have stronger mental rotation ability. The hypothesis was found to be true. Females rated non-mental rotation games higher than mental rotation games (Lucas & Sherry, 2004). Another interesting finding in that study was that challenge was the highest ranked explanation given by both males and females for playing video games. Challenge is directly related to self-efficacy. A plausible explanation for the relationship that Lucas and Sherry found can be explained through video game self-efficacy.

### Present Investigation

With the exception of conditioned primates, only humans play video games. In terms of behaviors that have occurred in the history of the planet, this one is brand new, uniquely human, and worth diligent and deliberate study. One purpose of this project is to develop and validate a video game self-efficacy scale. A large body of self-efficacy literature indicates that self-efficacy plays an important role in human behavior and motivation across a wide variety of tasks. Self-efficacy should also play an important role in motivating individuals to play video games. For this thesis, I have two hypotheses.

The first hypothesis is that there are individual differences in perceived self-efficacy for playing video games. These differences are especially but not exclusively gender specific. Males will have higher levels of video game self-efficacy than females. The second hypothesis is that video game self-efficacy will predict differences in the amount of time people spend playing video games. People who regularly play video games will have higher levels of video game self-efficacy than those who do not play. Thus, higher levels of self-efficacy should be consistent with a greater amount of time spent playing video games. To test these hypotheses I reviewed self-efficacy literature, ran focus groups, and created a Video Game Self-Efficacy Scale. The Video Game Self-Efficacy Scale was modeled after the General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995).

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

##### Self-Efficacy Theory

Self-efficacy is a person's belief in his or her ability to succeed at a given task in a given situation. Self-efficacy has been defined as, "people's beliefs about their ability to exercise control over their own level of functioning and over events that affect their lives," (Bandura, 1993, p. 118). Self-efficacy has also been called, "an optimistic self-belief in one's ability to cope with varied life demands" (Lightsey et al., 2006, p. 73). Perceived self-efficacy is an underlying component of social cognitive theory. Self-efficacy theory is based on the assumptions people make about consequences and outcome expectations and the perceived control or ability one has to change them (Bandura, 1977). It is a construct about perceived operative capability (Bandura, 2007). Since perceived capability varies across domains, self-efficacy is best measured at the task specific level (Bandura, 1997). There are numerous self-efficacy scales that measure self-efficacy as it applies to the specific domain in question, some examples are health self-efficacy (Schwarzer & Renner, 2009), exercise self-efficacy (Bandura & Locke, 2003), computer use self-efficacy (Chu et al., 2009), writing self-efficacy (Margolis & McCabe, 2006), reading self-efficacy (Durik et al., 2006), and even self-efficacy for eating fruits and vegetables (Mainvil et al., 2009).



Self-efficacy beliefs vary in strength. A person may hold strong efficacy beliefs for some tasks and weak efficacy beliefs for others. Self-efficacy grows or diminishes through mastery experience. If a person experiences repeated success in an endeavor, that success will translate to a rise in self-efficacy. On the other hand repeated failures will lower self-efficacy (Bandura, 2004; Chan & Lam, 2008; Margolis & McCabe, 2006). A person with high self-efficacy beliefs will stick to tough tasks longer than a person with low self-efficacy beliefs (Bandura, 1977, 1982, 1990). In other words, self-efficacy is what motivates a person to keep trying and keep persisting at a difficult task. If a person does not believe they are capable of succeeding at a task, difficult or otherwise, it is likely they will give up and fail. Hypothetically, a student with high self-efficacy beliefs for performing math will carry that belief into an exam or other measure of mathematical performance. This belief then influences the amount of effort the student puts into the exam. A person with high self-efficacy beliefs for math is less likely to give up on a challenging problem because that person believes that he or she can solve it. A person with low self-efficacy beliefs may give up on the same problem because he or she thinks it is beyond his or her capability. This relationship lies at the heart of self-efficacy theory.

General self-efficacy is a well documented and validated psychological construct (Bandura, 1982; Schwarzer & Jerusalem, 1995; Tipton & Worthington, 1984). One early experiment helped established the validity of general self-efficacy with a unique procedure. Participants in the experiment were unaware that in the previous month they had taken a general self-efficacy questionnaire. They were not told what it was, and it was given with a variety of other measures. Based on the mean score,

participants were placed into either a high self-efficacy or low self-efficacy group. A month later participants were called and asked to participate in another experiment. This part of the experiment had participants hold a book in their non-dominant hand with their arm held straight and parallel to the ground for as long as they could. As predicted by self-efficacy theory those who scored higher in general self-efficacy held their arm out longer (Tipton & Worthington, 1984).

It is extremely beneficial to hold high self-efficacy beliefs. Efficacy beliefs predict a variety of relationships including academic achievement and persistence in scientific pursuits (Bandura, & Locke, 2003). Perhaps for this reason a large amount of self-efficacy literature focuses on ways to improve self-efficacy (Bandura & Lock, 2003; Chan & Lam, 2008; Margolis & McCabe, 2006).

#### Sources of Self-Efficacy

Self-efficacy plays a significant role in human motivation and success; thus, it is important to know where it comes from and how it can be strengthened. Self-efficacy is acquired through all of the following four routes: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977). The four sources of self-efficacy do not manipulate self-efficacy equally. Moreover, they can have different effects in different domains. A recent study analyzed the efficacy beliefs of men and women in mathematics, science, and technology careers. The researchers found that verbal persuasion and vicarious experience seemed to be more important for women than men in these fields (Zeldin, Britner, & Pajares, 2008). For other domains (e.g., ophidiophobia or snake phobia) emotional arousal might be a stronger indicator of self-efficacy for handling a snake than verbal persuasion. On the other hand, vicarious

experience may be a better predictor of self-efficacy for following an exercise routine than emotional arousal, or verbal persuasion. This is because efficacy is shaped by cognition. Social, situational, and temporal considerations are taken into account when making appraisals about one's ability (Bandura, 1977).

Performance accomplishments are generally considered the best source for raising self-efficacy beliefs because they are directly shaped by mastery experience (Bandura, 1982). Mastery experiences play an integral role in the development of efficacy beliefs (Bandura, 1977). The importance of mastery experience is that it is derived from being in control, for example from learning how to play the piano, learning how to write cursive, or learning how to shoot a free throw. Mastery experience is gained by doing and by actively participating, after which efficacy beliefs are established by making judgments about one's performance. Those beliefs can then modify the goals a person sets and may serve as a guide to possible outcome expectations (Bandura, 2004).

Efficacy beliefs are more than just judgments about past performance. Evidence of this comes from the field of sports psychology. High school wrestling is a physically demanding sport. It requires strength, endurance, flexibility, quick reflexes and a focused mind. However, these are not the only traits that make up a good wrestler. One study found that self-efficacy is important as well. When a wrestler was better than his opponent self-efficacy did not play a large role in the outcome. Wrestlers with low self-efficacy were able to win matches based on their superior athletic ability and strength. Conversely, for overtime matches self-efficacy was the only significant determinant of overtime performance (Treasure, Monson, & Lox, 1996). Overtime matches tend to pair evenly skilled competitors: in such cases, neither wrestler may have a distinct strength or

skill advantage. All things being equal, the wrestler with higher self-efficacy will prevail and win the match.

The second source of self-efficacy comes from vicarious experience.

Vicarious experience works through the process of observation and social comparison. Self-efficacy is increased through vicarious experience by the act of observing others, making social comparisons, and gauging one's own ability based on that information (Bandura, 1977, 1993; Usher & Pajares, 2009). In self-efficacy theory people being observed are referred to as models. Vicarious experience has the greatest effect on self-efficacy when the models are peers and judged to be similar to the observer (Zeldin et al., 2008). Though important, vicarious experience is generally not as influential as performance accomplishments for generating and maintaining self-efficacy (Bandura, 1977). Vicarious experience increases self-efficacy when an observer sees a model, especially a similar model, succeed at a task. Subsequently, seeing a model fail at a task will decrease self-efficacy (Chan & Lam, 2008). In a classroom setting, for any individual student both the teacher and the student's fellow classmates are vicarious models for learning. These models influence academic self-efficacy. For example, a student will experience an increase in self-efficacy, and have a greater chance of completing an assignment if they observe a classmate successfully complete the assignment first (Chan & Lam, 2008).

The third source of self-efficacy is verbal persuasion. Verbal persuasion is believed to be most effective at increasing self-efficacy when self-efficacy is already high (Zeldin et al., 2008). If you tell a student they did a good job on a writing assignment, you are helping build the students self-efficacy for writing through verbal persuasion. It is

a noteworthy curiosity that many teaching idioms seem to promote self-efficacy. For example, when a teacher uses the idioms practice makes perfect, or if at first you do not succeed try again, that teacher is using verbal persuasion to promote mastery experience. Verbal persuasion is simply suggestion. It can be positive or negative; it can be encouraging or discouraging. Verbal persuasion is a more effective means of promoting self-efficacy when the message giver has good credibility (Margolis & McCabe, 2006). However, messages can also be discounted because they are perceived to be disingenuous. If a person is having difficulty learning, he may believe that the positive messages he is getting from his teacher are false (Margolis & McCabe, 2006).

Verbal persuasion has also been called social persuasion (Usher & Pajares, 2009; Zeldin et al., 2008). It has been suggested that social persuasion most easily influences self-efficacy in a negative way (Usher & Pajares, 2009). This can happen when verbal persuasion is unpleasant, offensive, or insulting. Social persuasion has the greatest chance of harming self-efficacy when an individual already lacks confidence in a particular domain (Zeldin et al., 2006).

The fourth source of self-efficacy is emotional arousal or physiological state (Bandura, 1977). Emotional arousal is highly subjective and not easy to measure. The effects of emotional arousal on self-efficacy have not been examined as thoroughly as the other three sources of self-efficacy (Usher & Pajares, 2009). This source of self-efficacy derives from one's internal bodily senses. For example, whether one feels relaxed or anxious, or whether one notices their heart racing or their palms sweating. These feelings influence efficacy beliefs because feelings of anxiety and stress generally make tasks more difficult and people are more likely to believe they will have a lower probability of

succeeding (Bandura, 1977). Self-efficacy can be improved through the route of emotional arousal by decreasing negative emotions and anxiety (Usher & Pajares, 2009).

The four sources of self-efficacy are believed to work together to shape perceived self-efficacy. These sources can raise self-efficacy or lower it. Performance accomplishments are considered the strongest means for increasing or decreasing self-efficacy (Bandura, 1977, 1982). However, the influence of the sources of self-efficacy is affected by the domain to which they are applied. Social persuasion may be more important than vicarious experience in some situations, and vicarious experience more important than social experience or emotional arousal in others (Zeldin et al., 2008).

### General and Domain Specific Self-Efficacy

Self-efficacy is both general and domain specific (Bandura & Locke 2003; Schwarzer, 2009). General self-efficacy is a cognitive evaluation of one's general ability to persist in adverse situations (Lightsey et al., 2006). A person with a high level of general self-efficacy believes that they will succeed in difficult circumstances, and that they will overcome challenging obstacles. General self-efficacy is a broad measure of perceived self-efficacy (Scholz et al., 2002). However, when a person is exposed to a novel task or a novel domain his or her self-efficacy may be significantly different than what it generally is. That person may actually have low self-efficacy for the task at hand. Intuitively self-efficacy cannot be the same for every event or every situation.

Self-efficacy is measured through the use of self-efficacy scales. Self-efficacy can be both broad and minutely narrow; because of this, there are a wide range of scales that represent an equally wide range of abilities and efficacy beliefs about those abilities.

The General Perceived Self-Efficacy Scale developed by Ralf Schwarzer and Mathias Jerusalem is a scale that measures general perceived self-efficacy (Schwarzer & Jerusalem, 1995). An example of a question from that scale is, “thanks to my resourcefulness I can handle unforeseen situations.” The General Perceived Self-Efficacy Scale is available in 30 languages. The scale has been cross culturally validated and has an inter-item reliability rating of ( $\alpha = .86$ ) that was obtained using a sample of 19,120 participants from 25 countries (Scholz et al., 2002).

Self-efficacy is often studied in the field of health. When health self-efficacy is investigated, domain specific health scales are used to measure health specific self-efficacy beliefs (Bandura, 2004; Schwarzer, 2009). One such scale measures exercise self-efficacy. In this measure subjects are asked to judge their personal efficacy for sticking to an exercise routine (Bandura, 2004). Self-efficacy scales have been created and used to investigate nutrition, physical exercise, and resistance to alcohol consumption (Bandura & Locke, 2003; Schwarzer & Renner, 2009). Self-efficacy scales are sometimes created to measure very specific efficacy beliefs. A recent scale measured self-efficacy for eating fruits and vegetables. It was found that self-efficacy for eating fruits or vegetables is an important predictor in determining whether or not one will actually eat fruits and vegetables (Mainvil et al., 2009). In fact, during my research on self-efficacy theory I found over twenty articles in the Psycinfo database on self-efficacy and fruit and vegetable intake. Research such as this provides a clear example as to why general self-efficacy is not always the best predictor of human behavior or motivation in every situation.

Self-efficacy has been studied in many other domains as well. Recently a domain specific self-efficacy scale was developed to measure computer self-efficacy. This scale defined computer self-efficacy as an individuals' perception of their ability to perform a computing task and their intentions for future use of computers. The scale used five questions to assess computer self-efficacy. The following question, "How confident are you that you can learn to use search tools to find information on the internet," is an example of a question from that scale (Chu et al., 2009).

### Creating a Self-Efficacy Scale

A crucial variable to consider when constructing a self-efficacy scale is that of ability. Self-efficacy is not a measurement of actual ability. Self-efficacy may coincide with actual ability but it does not have to. It is not how good an individual is at writing or eating vegetables, or exercising. Throughout his many years of writing on self-efficacy Albert Bandura is very clear on this point. Perceived self-efficacy is not a measure of an ability or abilities that a person may hold, rather it is a measure of the confidence he or she can perform an activity under situational demands (Bandura, 1997). Bandura recently addressed the distinction between ability and efficacy as a response to research that claimed the ability to pick up a glass was a measure of perceived self-efficacy for alcohol consumption (Bandura, 2007). He adamantly disagreed and went on to write, that ability is a matter of execution, people with the same ability may perform well or poorly depending on fluctuations in their perceived self-efficacy. Self-efficacy is a measure of what one believes he or she can do, not what one has (Bandura, 2007).



Another central factor to consider when creating a self-efficacy scale is that it is important to have questions which posit gradual challenges, or obstacles that one must overcome (Bandura, 1997). Self-efficacy judgments should be synchronous with the degree of challenge an individual believes he or she can overcome (Bandura, 2007). What this means is that making questions too easy, with little challenge, could have the effect of making everyone seem highly efficacious. The opposite holds true for creating questions with extremely difficult or impossible challenges, where the results could show a group of people with inaccurately low levels of self-efficacy.

Finally, a domain specific self-efficacy scale can capture aspects of general self-efficacy, as general self-efficacy and domain specific self-efficacy can and do overlap (Bandura, 1990). Perceived self-efficacy has generality. General self-efficacy beliefs can influence domain specific self-efficacy beliefs, just as domain specific self-efficacy beliefs can influence general self-efficacy beliefs (Bandura, 1977, 1990; Bandura & Locke, 2003). This could be of concern when creating a video game self-efficacy scale. However, given that domain specific scales better capture domain specific self-efficacy beliefs, it is logical to assume that a video game self-efficacy scale would be a better indicator of actual self-efficacy for playing video games than that of a general self-efficacy scale.

### Video Game Research

Perhaps due to the popularity of violent video games such as the first person shooter Halo, or the gangster-style Grand Theft Auto, research in the domain of video games has often focused on the consequences of playing video games or the potential

effects that playing video games can have on behavior. Some investigations have put a spotlight on the negative consequences of playing violent video games. For example, research has shown that playing a violent video game can have the effect of decreasing the likelihood one will help a person in distress (Bushman & Anderson, 2009). The methodology applied to the study of violent video games parallels that of other media such as movies, music and television. Just as aggression has been linked with viewing violent television shows, multiple studies have linked aggression with playing violent video games (Anderson et al., 2003; Bushman, 1998; Carnagey et al., 2007).

Other research has focused on the potential positive benefits of playing video games. Narvaez, Mattan, MacMichael, and Squillace (2008) hypothesized that people who play a video game with a prosocial condition would express more prosocial attitudes, thoughts, and feelings than those who played a video game with a violent or neutral condition. This was measured by having participants play a video game in which they had to either collect gold, kill a bandit, or heal a character. After playing the game participants were asked to complete a partially written story with 20 words or phrases they thought would happen next. The results indicated that participants who played under the prosocial healing condition completed the story with more prosocial responses than their counterparts who played under the violent kill a bandit or neutral collect gold condition (Narvaez et al.).

Another area of video game research has concentrated on known gender differences in video game usage. A variety of research indicates that males play video games more frequently and for a greater amount of time than females (Lucas & Sherry, 2004; Ogletree & Drake, 2007). According to the Entertainment Software Association

(2010), 60% of the video game playing population is male. Ogletree and Drake (2007) claimed that this gender discrepancy could stem from male and female gender differences. They proposed that gender differences in video game playing could be accounted for by levels of masculinity. To test this hypothesis they measured masculinity using the Bem Sex Role Inventory, and compared the results with the frequency and amount of time participants spent playing video games. No significant differences were found between women gamers and women non-gamers or male gamers and male non-gamers. Males play more video games than females, but masculinity does not appear to affect this relationship (Ogletree & Drake, 2007).

Lucas and Sherry (2004) conducted a thorough study in which they applied the theory of uses and gratification to explain why people play video games and why boys are more drawn to video games than girls. The theory of uses and gratification comes from the field of mass communication. According to Lucas and Sherry, the core of the theory examines why people use media by asking the question, “What do people get out of using media.” The theory states that people develop different reasons for using media based on their needs, perception of problems and solution to problems (Lucas & Sherry, 2004). Lucas and Sherry conducted focus groups to determine the possible uses and gratifications for playing video games. After analyzing focus group sessions, six uses for playing video games emerged: competition, challenge, social interaction, diversion, fantasy, and arousal. These uses were integrated into a 23-item questionnaire and administered to 534 participants who ranged in age from 18 – 24. Challenge was the highest rated gratification for both males and females. The second highest rated gratification for females was arousal. It was rated significantly lower than challenge and

had a moderate effect size. The second highest rated gratification for males was social interaction. However, it was rated significantly lower than challenge and had a small effect size. The authors note that overall, women scored significantly lower than men on video game use motivation (Lucas & Sherry, 2004).

The fact that both males and females cite challenge as their main reason to play video games and that females appear less motivated to play video games should not to be taken lightly. Much of this complex relationship can be explained using self-efficacy theory. One central theme in self-efficacy theory is the concept of challenge and the effect that challenge has on shaping self-efficacy beliefs (Margolis & McCabe, 2006). Self-efficacy is influenced by arousal, challenge, competition, and social interaction, or four of six factors that were discovered to be important reasons for playing video games. Meta-analyses of a wide variety of self-efficacy literature has revealed efficacy beliefs play a significant role in one's level of motivation and performance (Bandura & Locke, 2003). A possible explanation for gender differences in motivation for video game usage is video game self-efficacy. To date, no study has directly investigated the construct of video game self-efficacy and the role it may have in motivating individuals to play video games.

## CHAPTER III

### METHODOLOGY

#### Focus Groups

Information on video game self-efficacy is extremely scarce. Thus, data for this study was initially collected through the use of focus groups. This method was similar to that used by Kendall and Bloomfield when they developed and validated a tool to measure parenting self-efficacy in 2004. Eight focus group sessions were conducted. A total of 54 participants took part in focus group sessions: 30 were female and 24 were male. Participants were students recruited from the psychology department and received extra credit for taking part in the focus group.

Each session was started by asking if any group member knew what self-efficacy meant. Out of the 54 participants only one group member claimed to be familiar with the concept, and that member was unable to provide a definition. Each focus group was informed that self-efficacy is defined as the belief about one's perception of their capability in a given situation. Group members were encouraged to provide examples from their lives of their various self-efficacy beliefs. Group members were not informed of the primary sources of self-efficacy, which are mastery experience, vicarious experience, verbal persuasion, and emotional arousal. Information about the sources of self-efficacy was not disclosed to participants in an attempt to not bias their answers. It was assumed that since these sources are inherent of the purpose of the focus groups,

participants simply needed to know what self-efficacy is, and that people vary in their level of self-efficacy. After a group discussion about the concept of self-efficacy, each group was asked if they had any questions. In all eight focus groups, none of the group members had questions. Next group members were asked the following questions about their video game playing experience:

1. How much do you play?
2. What games do you like to play?
3. What games do you not like to play?
4. Do you believe you have self-efficacy for playing a video game?

These questions were asked because of the link between self-efficacy and action.

Theoretically, video game self-efficacy and the amount of time a person spends playing video games should be related. The questions could also help identify gender differences in video game usage. Focus group sessions were open-ended and discussions lasted between 15 and 45 minutes depending on the group. At the conclusion of the discussion participants wrote a response to the following:

1. Discuss your feelings of self-efficacy as it relates to playing a video game or performing a task on a computer.
2. Do you have a sense of video game self-efficacy at all?
3. Is it high for some types of games and low for others?

It was anticipated that information contained within the answers to the three questions could be utilized in the construction of the Video Game Self-Efficacy Scale.

### Scale Development

The second phase of this project involved composing questions to capture the hypothetical construct of video game self-efficacy. The context of the questions reflected themes from the focus groups and domain specific self-efficacy literature. One approach for creating a new domain specific self-efficacy scale is to use a previously validated self-efficacy scale as the basis for question construction (Middleton et al., 2003). At the same time many self-efficacy scales are created using perceived difficulty for the task as a guideline for creating questions in the scale (Chu et al., 2009; Mainvil et al., 2009; Silvia, 2003). For this project, the questions for the Video Game Self-Efficacy Scale were modeled after those from the General Perceived Self-Efficacy Scale. The following questions are examples from that scale: I can always manage to solve difficult problems if I try hard enough, I can solve most problems if I invest the time, and I can usually handle whatever comes my way. The following questions for the Video Game Self-Efficacy Scale were written to be reflective of those in the General Perceived Self-Efficacy Scale: If I have to play a video game I've never played before I already know I'm going to lose, No matter how challenging the video game is I can beat it if I try hard enough, and I can quickly and easily learn the buttons and controls for a new game. The Video Game Self-Efficacy Scale is shown in Figure 1. There are five genre specific video game questions in the scale they are as follows: when it comes to playing combat based shooting games I generally play well, when it comes to playing racing games I generally play well, when it comes to playing fighting games I generally play well, when it comes to playing music games I generally play well, and when it comes to playing role playing games I generally play well.

<b>Video Game Self Efficacy Scale</b>						
Please use the following scale for the questions below:						
1	2	3	4	5	6	7
STRONGLY DISAGREE	DISAGREE	SLIGHTLY DISAGREE	NEITHER AGREE NOR DISAGREE	SLIGHTLY AGREE	AGREE	STRONGLY AGREE

\_\_\_ If I have to play a video game I've never played before, I already know I'm going to lose.

\_\_\_ If I see a friend succeeding at a video game, it gives me confidence that I can succeed as well.

\_\_\_ If a friend is discouraging me or making fun of my game playing ability, I generally play worse.

\_\_\_ I can quickly and easily learn the buttons and controls for a new game.

\_\_\_ No matter how challenging the video game is, I can beat it if I try hard enough.

\_\_\_ If my friends encourage me, I can usually play better.

\_\_\_ When it comes to playing combat based shooting games, I generally play well.

\_\_\_ When it comes to playing racing games, I generally play well.

\_\_\_ When it comes to playing fighting games, I generally play well.

\_\_\_ When it comes to playing music games, I generally play well.

\_\_\_ When it comes to playing role playing games, I generally play well.

*Figure 1. Video game self-efficacy scale.*

A video game questionnaire was developed for the purpose of distinguishing those who regularly play video games from those who do not. The video game questionnaire was used to correlate video game demographic data with the Video Game Self-Efficacy Scale. The video game questionnaire had participants respond yes or no to the following statements:

1. I consider myself a gamer.
2. I enjoy playing video games.
3. I can think of a couple video games that I'm really good at.



4. I look at video game websites or magazines for game playing hints and strategies.
5. If the game is on the Nintendo Wii I will generally play well.
6. I enjoy playing video games even though I'm terrible at them.

These questions were similar to ones used in other studies (Lucas & Sherry, 2004; Wood, Griffiths, Chappell, & Davies, 2004). The question about the Nintendo Wii was asked because the Wii uses motion based controllers that mimic real life activities such as bowling. It could be that people think they are better at the Nintendo Wii because they believe the Wii reflects general ability rather than specific video game ability.

The final two questions of the video game questionnaire attempt to assess the frequency that participants play video games. The participants were asked both a categorical question and a quantitative question that required them to judge the amount of time they spend playing video games. The categorical question asked participants if they had played a video game in the last day, week, month, or year. The quantitative question had participants approximate the average number of hours per week that they play video games. These questions were used by Lucas and Sherry (2004) when they examined gender differences as related to video game usage. The responses from these two questions were correlated with the total score from the Video Game Self-Efficacy Scale and General Perceived Self-Efficacy Scale. The General Perceived Self-Efficacy Scale was administered to determine the relationship between general self-efficacy, video games self-efficacy and the frequency and amount of time individuals played video games. Self-efficacy influences motivation (Bandura, 1997) and interest for performing a task (Silvia, 2003). Video game self-efficacy and video game usage should be related. General self-efficacy was used to differentiate that relationship.

### Scale Administration

Three surveys were administered to 90 participants: 28 were male and 62 were female. This lopsided gender ratio is a result of the population sample of psychology students. It is representative of the university Department of Psychology, where approximately two-thirds of the students are female, and is consistent with other studies conducted at the university. All participants completed the Video Game Self-Efficacy Scale first, the video game questionnaire second, and the General Perceived Self-Efficacy Scale last.

## CHAPTER IV

### RESULTS

#### Focus Group Findings

Focus groups were used to investigate video game self-efficacy in an effort to divulge information that would not easily be gleaned by other investigative methods. A total of 54 participants took part in focus group sessions: 30 were female and 24 were male. Altogether, eight focus groups were conducted. The following are qualitatively collected themes that emerged from the focus group discussions. The first theme involved participants who stated they were neutral when it came to their feelings of video game self-efficacy because they did not like video games. These participants indicated that since they did not like playing video games, they did not care about their performance or whether they won or lost playing a video game.

Though small in number, an interesting set of focus groups participants were females who had male siblings. Many of these participants stated they used to be good or at least fairly good at a few specific games, but eventually were not as good as their brother(s). They described a gradual decline in their efficacy beliefs for playing video games and stated that they eventually stopped playing altogether. Hypothetically, they used their sibling as a model for their own efficacy beliefs. Over time their personal self-efficacy beliefs changed negatively, because the model against which they were measuring was perceived to be continuously improving.

### Essay Responses

Essay responses were analyzed based upon two criteria: whether participants stated they had video game self-efficacy and the level or strength of those beliefs. Level of video game self-efficacy was broken down into four rating categories: high, medium, low, and variable depending on the game. Participants who answered the essays stating they had high self-efficacy beliefs for some games and low self-efficacy beliefs for others were placed in the category variable depending on the game. Only 52 essays were analyzed as two of the focus group participants' essays were not legible. The resulting sample of respondents was 46% male and 54% female. Forty-five participants indicated they held self-efficacy beliefs for playing video games. Five females and two males indicated no such beliefs. Eighteen of the 23 females holding self-efficacy beliefs indicated that their efficacy beliefs varied based on the type of video game they were going to play; only eight males responded in this manner. Twelve participants rated their self-efficacy level as high regardless of the video game they were going to play; only one of these 12 participants was female. The remaining four female participants rated their video game self-efficacy as being low. It is interesting to note that only one female participant rated herself as holding high video game self-efficacy beliefs, and only one male participant rated himself as holding low video game self-efficacy beliefs.

### Video Game Self-Efficacy Scale

A new measure for video game self-efficacy was created by summing the scores from the eleven video game self-efficacy questions. Questions number one and three are reverse scored. Ninety participants completed the Video Game Self-Efficacy

Scale: 28 were male and 62 were female. The internal reliability and consistency of the Video Game Self-Efficacy Scale as measured by alpha coefficient was moderately high  $\alpha = .79$ . This indicated that the Video Game Self-Efficacy Scale measures a single construct. A reliable scale should have an alpha coefficient of at least  $\alpha = .70$  (DeVellis, 2003). The new measure had a potential range of 11 - 77, and scores obtained in this sample ranged from 17 - 73 ( $M = 48.08$ ;  $SD = 10.82$ ). The alpha coefficient is comparable to those obtained in previous studies using the General Perceived Self-Efficacy Scale, where reliability ratings ranged from a low of  $\alpha = .75$ , to a high of  $\alpha = .91$  (Scholz et al., 2002). For this sample the alpha coefficient for the General Perceived Self-Efficacy Scale, was  $\alpha = .80$ . The difference between male and female video game self-efficacy scores was examined using an independent sample t-test. Males ( $M = 56$ ) had significantly higher levels of video game self-efficacy than females ( $M = 44.5$ ),  $t(88) = 5.34$ ,  $p < .001$ . This supports the hypothesis that males have higher levels of video game self-efficacy. It is also consistent with the results from the focus groups.

Bivariate correlations were computed between video game self-efficacy and hours per week playing video games. Using a two-tailed test and a .05 alpha level, a statistically significant correlation was obtained between video game self-efficacy and hours per week playing video games,  $r(88) = .412$ ,  $p < .001$ . Thus, those with higher video game self-efficacy spent more time playing video games.

Bivariate correlations were also computed between general perceived self-efficacy and hours per week playing video games. This analysis produced no significant results. These findings suggest that general perceived self-efficacy does not correlate with the amount of time one plays video games and that video game self-efficacy does

correlate with the amount of time one plays video games. It also shows that video game self-efficacy and general perceived self-efficacy are independent constructs.

Video game self-efficacy was also analyzed as a function of game playing (played in the last day, played in the last week, played in the last month, or played in the last year) using a one-way ANOVA. There were significant differences in video game self-efficacy across the game play groups,  $F(4, 85) = 6.13, p < .001$ . As depicted in Figure 2, Post-Hoc Tukey comparisons indicated that video game self-efficacy was significantly different between individuals who played a video game in the last day

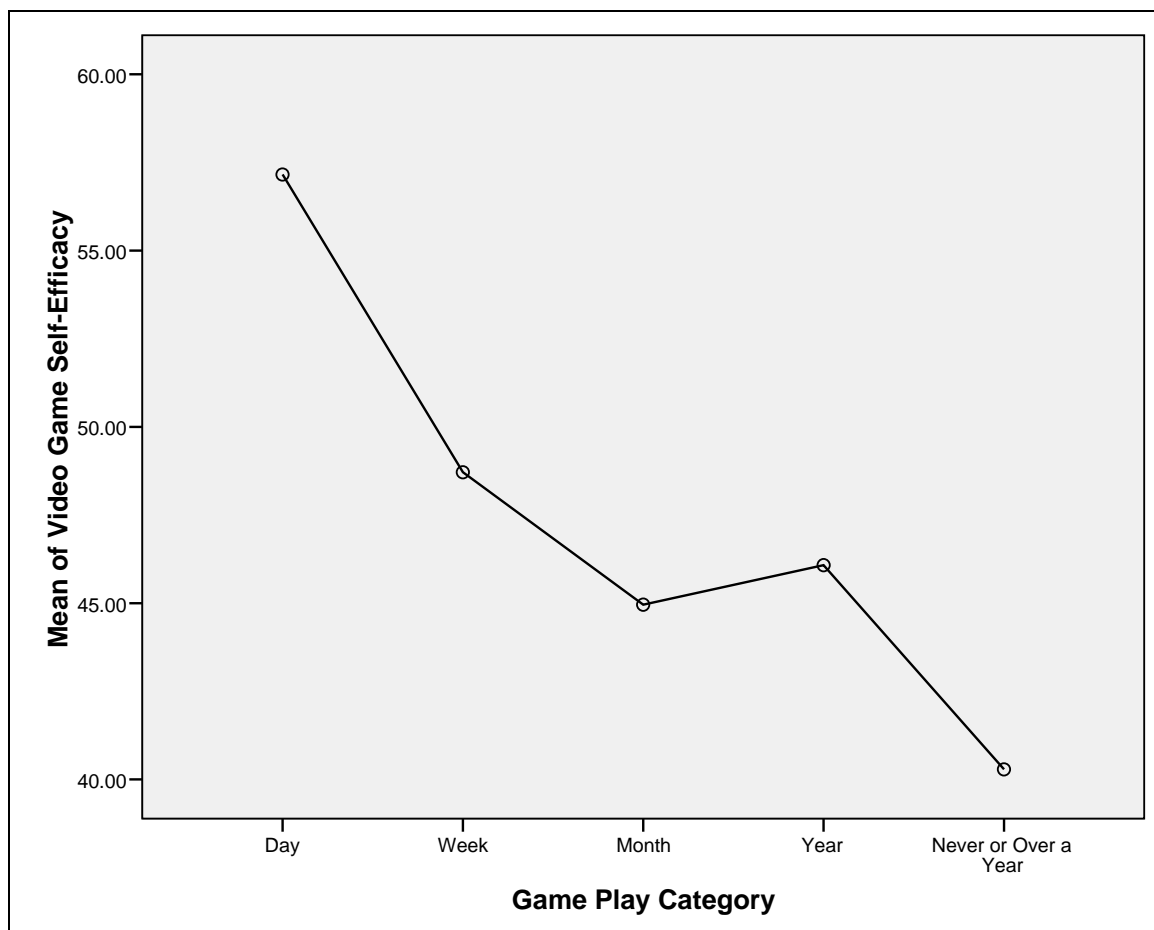


Figure 2. Video game self-efficacy by video game play frequency.

( $M = 57.17$ ), and individuals who played in the last month ( $M = 44.96$ ), or those who played in the last year ( $M = 46.08$ ). A one-way ANOVA comparing general self-efficacy across the game playing categories produced no significant results. Once again, this indicates that general perceived self-efficacy is different than video game self-efficacy and that video game self-efficacy scores correlate with game playing frequency while general self-efficacy scores do not. Further evidence of this relationship was shown by an independent samples t-test. Participants who answered yes to the question, “Do you consider yourself a gamer?” had a higher video game self-efficacy score ( $M = 57.5$ ) than those who answered no to the question ( $M = 45.72$ ),  $t(88) = 4.57, p < .001$ . As expected a person who considered himself or herself to be a gamer scored higher on the Video Game Self-Efficacy Scale than those who do not consider themselves to be a gamer. This is another piece of evidence that implies the Video Game Self-Efficacy Scale is measuring video game self-efficacy.

Both of the hypotheses are supported by the results of this study. There are clearly individual differences in perceived self-efficacy for playing video games. As predicted, males had higher levels of video game self-efficacy than females. The amount of time spent playing video games was strongly correlated with video game self-efficacy and not correlated with general perceived self-efficacy. The overall findings presented in this study demonstrate that video game self-efficacy is a valid construct and that the Video Game Self-Efficacy Scale is a reliable tool that measures video game self-efficacy.

## CHAPTER V

### SUMMARY

#### Video Game Self-Efficacy

An understanding of human behavior within the domain of video game usage requires the consideration of cognitive, social, and emotional mediators that differentiate those who play video games regularly from those who do not. In the social realm, the same variables that govern other human activities also apply to the domain of video games. A player may be mocked, scorned, or praised. A person's status in his or her peer group could change as a result of his or her video game playing skills. A person could make online or offline friends based on his or her game playing ability. If a player is worried he or she will be laughed at or embarrassed, low video game self-efficacy will tend to lead him or her to avoid playing the game, and thus avoid mockery. Video game self-efficacy can be defined as an individual's belief in his or her ability to succeed at playing a video game.

The Video Game Self-Efficacy Scale was designed to be a tool for researchers studying the effects of video games on human cognition, emotion, and behavior. A statistically significant correlation was obtained between video game self-efficacy and hours per week playing video games. The joint nature of the relationship between video game self-efficacy and time spent playing video games was predicted, and is necessary to help establish the validity of the Video Game Self-Efficacy Scale. Had participants



scored high on the video game self-efficacy scale but reported that they did not play video games, the validity of the scale would have justly been called into question. Past researchers have attempted to establish scale construct validity by comparing a newly created scale with similar and dissimilar measures or questionnaires (McAuley & Gill, 1983; Middleton, Tate & Geraghty, 2003). Since there was no preexisting data on video game self-efficacy, convergent and discriminant relationships could only be hypothesized. Convergent validity was established by correlating scores on the General Perceived Self-Efficacy Scale with scores from the Video Game Self-Efficacy Scale. Video game self-efficacy and general self-efficacy were moderately correlated,  $r(88) = .352, p < .001$ . Discriminant validity was established by comparing scores from both scales with video game usage. Video game self-efficacy was predictive of video game usage while general self-efficacy was not.

### Limitations

One limitation in this study is that the sample size was relatively small. Fifty two participants were part of the focus group sessions and ninety participants completed the scales and questionnaire. Another limitation is that the population sample consisted solely of college students who volunteered to participate in the study. Though not a direct limitation, it is worth noting that general self-efficacy in this sample was significantly lower for women than men. Women sometimes score lower than men on general self-efficacy, but it is more common in collectivistic cultures (Scholz et al., 2002). A common mean for the general self-efficacy scale is 29 (Schwarzer, 2009), notably lower than the current study. The male participants in this study had an average score of 34 and the

female participants had an average score over 31, thus both sets of scores were still relatively high. This is not surprising since self-efficacy is a predictor of academic success (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001).

### Recommendations

There are several questions that the Video Game Self-Efficacy Scale can help clarify in future studies. Do video games have the same effect on people with low or neutral video game self-efficacy as they do on people with high levels of video games self-efficacy? Will a person with low video game self-efficacy be desensitized by a violent video game? Does video game self-efficacy have an impact on the emotional arousal one experiences during video game play?

A person with low video game self-efficacy may not care how well he or she plays a video game. That person may devote less attention to the game, or perhaps focus on aspects of the game that are irrelevant to game play. Consequently, that person may have a weaker emotional response while playing than a similar person with high video game self-efficacy beliefs. In contrast, a person with high video game self-efficacy may experience a great deal of emotional arousal while playing a game, especially if that person is struggling to succeed and questioning his or her ability. It is possible that video game self-efficacy mediates desensitization effects of violent video games and aggressive behavior related to playing violent video games. Future research should examine video game self-efficacy as it relates to positive and negative emotion.

Research should also investigate a possible link between video game self-efficacy and video game addiction. Video game self-efficacy is predictive of the amount

of time spent playing video games. It is possible that extremely high scores on the Video Game Self-Efficacy Scale correlate with video game addiction. This may be especially true for individuals who have low general self-efficacy.

Since competition can be detrimental to self-efficacy (Chan & Lam, 2008), it is possible that competition has a role in lowering video game self-efficacy. Further research should be conducted to examine the relationship between gender, outcome expectations, the role of competition, and the effect it may or may not have on the development of video game self-efficacy. Focus group discussions suggested competition was partially responsible for lowering video game self-efficacy for females in households with male siblings. Female participants generally reported that they would lose to their male sibling(s). Females may also be facing a competitive disadvantage as prior research has shown that males are generally better at mentally rotating objects, target directed motor skills, and navigating through a maze (Lucas & Sherry, 2004). As can be seen by walking into any retail video game outlet, the majority of video games cater to the constituent skills of males. However, males are not necessarily permanently better than females at video games and initial gender differences can be decreased with practice (Lucas & Sherry, 2004). The conundrum is that since self-efficacy dictates motivation, there is less of a likelihood that a person is going to practice if he or she already has low video game self-efficacy. Repeated failures decrease self-efficacy, especially when those failures happen early in the process of learning (Zeldin et al., 2008).

The Video Game Self-Efficacy Scale could be used by educators to determine if a game based approach to learning would be beneficial to facilitate their students' academic success. A student may hold low academic self-efficacy beliefs and at the same

time hold high video game self-efficacy beliefs. In this case a teacher could use an educational video game to foster the development of academic self-efficacy.

Hypothetically, this could be accomplished by having the student play an educational video game until he or she has mastered the lesson being presented. The student would then be given the chance to demonstrate what he or she learned from playing the game. Higher levels of academic self-efficacy are correlated with better performance in school (Margolis & McCabe, 2006; Pajares, 2003) and video game self-efficacy could serve as a bridge for the development of academic self-efficacy.

### Conclusion

In social cognitive theory, perceived self-efficacy is one of the predictors of human motivation and action (Bandura, 1990). Self-efficacy develops through four routes: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977, 1997). Video games are a medium that provide easy access to all four of these routes. Video games can produce both positive and negative emotional arousal in those who play them (Hazlett, 2006; Ravaja, Turpeinen, Saari, Puttonen & Keltikangas-Jarvinen, 2008). Watching another person play a video game provides the observer with vicarious experience to make efficacy comparisons. Verbal persuasion influences video game self-efficacy when a player receives feedback from others. Finally, video games are generally performance accomplishment tasks. They provide a player with a constant stream of input. This input supplies the player with ongoing mastery experience to build video game self-efficacy. Not all activities are so innately linked to the creation of self-efficacy. When recruiting participants for this

project two common questions were: Do I have to be good at video games? and What if I'm really terrible at video games? The very nature of these questions implies low video game self-efficacy. Video game self-efficacy may not be the only determinant of one's motivation to play a video game, but it appears to be an important one.

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