HIGH SCORES: HOW VIOLENCE AND FRUSTRATION IN VIDEO GAMES AFFECT AGGRESSION

by

KEVIN D. WILLIAMS

(Under the Direction of Joseph Dominick)

ABSTRACT

As both the popularity of video games and the reporting of teenage violent acts increase, much has been said regarding the ability of violent video games to influence aggression in their players. Yet, other factors in video games which may contribute to aggressive players have not been heavily discussed in the media or in academia. Using the General Aggression Model (GAM), a 2 X 2 factorial design was conducted with 150 male college undergraduates playing different video games to investigate the impact of 1) the violent content in video games and 2) frustration with playing the game on later measurements of aggressive affect and physiological arousal. Results showed that neither violent content nor frustration affected heart rate. Violent content did not affect blood pressure although frustration increased blood pressure. Individually, both violent content and frustration did increase scores on a scale designed to measure feelings of anger. The combination of violent content and frustration led to the highest scores on the anger instrument. Findings support the GAM and suggest that frustration with gameplay could be just as an effective means, if not more so, of influencing aggression within game players as exposure to violent content.

INDEX WORDS: Video games, Aggression, Violence, Frustration, Mortal Kombat, Dance Dance Revolution, Arousal, Heart rate, Blood Pressure, STAXI, Aggression Questionnaire, Hostility, General Aggression Model, Experiment

HIGH SCORES: HOW VIOLENCE AND FRUSTRATION IN VIDEO GAMES AFFECT AGGRESSION

by

KEVIN D. WILLIAMS

B.A., The University of Georgia, 1996

M.A., The University of Georgia, 2002

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2005

HIGH SCORES: HOW VIOLENCE AND FRUSTRATION IN VIDEO GAMES AFFECT AGGRESSION

by

KEVIN D. WILLIAMS

Major Professor:	Joseph Dominick
Committee:	Dean Krugman Spencer Tinkham Janice Hume W. Keith Campbell

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2005

DEDICATION

I may never be given as much latitude in a publication's dedication as I am given with this dissertation so I will say what I want now. As I write this, you have no idea or care for what I have done or what I am doing. Nor should you have any care. You are a small toddler and such matters should be of no concern to you. With this dissertation I have reached a great pinnacle, but it is dwarfed in comparison to the experience of having you in my life.

When you are a child, I hope that we will have talks and I can share my observations of life with you. I hope that you will find the world a magical and mysterious place and I hope you will hold my hand as we share it together. You have bought so much joy into my life and such a deeper understanding of how important love really is. When you are around, I understand more fully what a blessing heaven truly could be; and when I think of a life without you, I can also imagine the intolerable pain of hell.

When you are a teenager, we will no doubt have arguments over what seems to be monumental things in your life. You may not understand the stubborn decisions I make regarding you. You may even question how much I love you. I'll probably be an aging hipster who seems lame and unknowledgeable about the current world. Still, I hope we laugh together and occasionally you'll hold my hand.

When you are in college or first away from home, you'll become involved with others as your life expands beyond the normal horizons with which you were accustomed. You will find bigger ideas. You may find the love of your life or you may be heartbroken. Maybe you'll miss me a little bit. The good thing about this dissertation is that it will probably be on the Internet for

you to see. So, in a weird way, you could find this document and perhaps we could hold hands on this page.

When you are an adult and are raising your own family, I may not be there to hold your hand. But, I promise you that I will always be near. Hopefully, you will have asked me questions about my life and our family, and you will use those lessons and inspiration in your own life. Hopefully, you will be able to feel me there still holding your hand.

When you were born, you were premature and I was scared of how fragile you were. I would not touch you while the nurses attended you right after your delivery. As your uncle told me from behind the nursery glass window to touch you, I reached out my finger. You grabbed my hand and I felt my old self die away, reborn into your father. You held my hand and life hasn't been the same since.

This dissertation will help me to become a better provider for my family. I dedicate it to your life and the journeys you have ahead of you. Your daddy loves you very much, Alex.

ACKNOWLEDGMENTS

In completing this project, I am reminded that I am most certainly not a self-made man. The opportunity to pursue this degree was provided to me only through the work and sacrifice of those around me. Most notably, my wife has sacrificed much to put me through school. She has shown the dedication, persistence, and understanding that only comes from a person who truly loves you. I may be a tall man but I constantly feel as though I am standing on your shoulders. Thank You.

When I think of the word "blessing," I am always reminded of my parents. I was blessed to be given them as parents. Without their unwavering support and gentle kindness, the path that leads me here would have been obscured. Thanks for letting me make my own decisions. I know you don't totally understand what I do. In spite of that, I hope it makes you proud.

Thanks are also in order to the two assistants who worked with me on this experiment. Hye Jin Yoon was an extremely diligent worker who picked up the material quickly. I enjoyed our little talks about culture and personal matters when we had "down" time. Matt Coleman was a student of mine who proved to be an expert on video games. His expertise in this area flooded over into the experiment, making him exuberant and eager to work every day. His energy and work ethic were always welcome.

To my dissertation committee, I have had a class with all of you; and therefore, this work has been shaped by your mind in some way. You have honored me with your time and your perspective. Dr. Hume has always been there to help me in a pinch and provide guidance when I was unsure of things both academic and personal. She has been both a mentor and a friend. Dr.

Krugman has shown me the value of thought. I have found his small chats into intellectual matters to have been at times more helpful than some full semester courses I have taken. Dr. Tinkham has impressed upon me the belief that a scholar is ever-busy. Even when you have reached the top of your field, your work is not done. Dr. Campbell has showed me that even among heavily producing scholars, Hawaiian shirts are acceptable and may even be necessary (think about that one for a while).

I was told when I began my dissertation that I would be the last student Joe Dominick advised. This is a tremendous honor to me. When beginning my Masters degree in Joe's class, I felt like I had found a professor who I most resembled. I also found the mentor that I wanted to become. This past year, Joe has served as a therapist, an adviser, a colleague, a supervisor, a friend, and an intellectual father-figure. My most sincere desire is that he feels this dissertation honors him. I have nearly worn a hole in his door from knocking on it daily with either a question in mind or just to tell him what progress I was making. I never had an appointment. I usually barged in. Yet, he never turned me away or rushed me off. Our mantra was, "Get me done in 3 years!" I started in August of 2002 and I'm finishing in August of 2005. We kept our promise. Thanks.

TABLE OF CONTENTS

PAGE

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

> "Harris wondered what it would be like to remove all 'vaccines and warning labels from everything in the world and let natural selection take its course.' He talked about the Germans and his favorite video game, Doom."
>
> - regarding the contents of documents written by Columbine shooter, Eric Harris, as reported in Vaughan and Kass, 2001

> "It'll be like the LA riots, the Oklahoma bombing, WWII, Vietnam, Duke [Nukem], and Doom all mixed together." (Vaughan & Kass, 2001)
>
> - Eric Harris, in a document written before the Columbine massacre

> "While the teen-agers [Klebold and Harris, the Columbine shooters] express remorse in some tapes, they spew plans for mass murder in others.
> 'The most deaths in U.S. history,' Klebold says.
> As Klebold says this, Harris kisses the gun he's cradling in his arms. He has nicknamed it 'Arlene' after a character in the Doom video game.
> 'Hopefully,' Harris adds.
> 'We're hoping,' Klebold says. 'We're hoping.'
> 'I hope we kill 250 of you.'" (Luzadder, Vaughan, Abbott, and Bartels, 1999)
>
> - written about a videotape made one half-hour before Harris and Klebold began the Columbine massacre

Background and Justification

Shortly after the Columbine massacre unfolded on April 20, 1999, reports surfaced profiling the shooters, Dylan Klebold and Eric Harris, and attempted to look for an explanation as to how these teen-agers could become such cold-blooded killers on such a massive scale. Reports like those cited above frequently mentioned the boys' shared hobby, heavy playing of the game Doom. Doom is considered a first-person shooter, a game which the player shares the first-person perspective of the main character. The player sees the environment ahead of him and sees his arms extended holding their weapon and firing at oncoming enemies. The *Rocky*

Mountain News (Hubbard & Bartels, 1999) reported that Harris had reconfigured his own copy of Doom, changing it to reflect a dry run of the massacre that would later happen.

In July of 2004, the video game Manhunt was pulled from shelves in London, England, when parents of a murdered boy, who had been beaten with the claw of a hammer and stabbed, claimed his killer was obsessed with playing the game (Glendinning, 2004). The game had previously been banned in New Zealand as well (Blackstock, 2004). The video game Grand Theft Auto (designed by the same company as Manhunt) came under fire in 2003 when two boys told the authorities they were recreating scenes from the game when they shot at vehicles on a highway with a .22-caliber rifle. One man was killed and two others injured in the attack (Frith, 2003).

Lt. Col. David Grossman, U. S. Army (retired) believes and lectures to the public that violent video games such as Doom are teaching players how to kill effectively. Grossman is also a West Point psychology professor, former Army ranger, fire arms instructor for U. S. law enforcement agencies, and author of numerous books on the topic of violence in society, such as *Stop Teaching Our Kids to Kill: A Call to Action Against TV, Movie and Video Game Violence* (1999) and *On Killing: The Psychological Cost of Learning to Kill in War and Society* (1995) which was nominated for a Pulitzer Prize. Grossman claims, "It takes three things for a person to kill: the weapon, the skill, and the will. Video games provide two out of three…They are the moral and psychological equivalent of putting a rifle in the hands of every kid" (Savoye, 2000). Ironically, Grossman's own Army has decided that violent video games can be used as a recruiting tool for future soldiers. A video game, America's Army, which cost the Army more than $6 million to make has enjoyed enormous success while teaching players how uncontrolled breathing can affect sniper rifle proficiency and how to successfully navigate an ambush on a

mountain pass. Deputy director of the game, Major Chris Chambers comments, "Experts told us before we started that a runaway hit in this space is 250,000 registered users in a year…We beat that in the first two months" (Woolley, 2003). At the time of his statement, America's Army had more than 2 million registered users, making it one of the five most popular action games played online.

Neil Postman, chairman of New York University's culture and communications department claims, "It's impossible to single out video games from the many media influences at work in an event such as the Littleton school massacre. The totality of the media, including television, movies, and games, contributes to the culture of violence by depicting it to the young as exciting and as the major means of resolving conflict" (Gelmis, 1999). The majority of the research conducted on the relation between the media and its contribution to violence in society has indeed been focused on the role television and film has played in influencing aggression.

As new communication technologies have developed, the concern over their negative impact on audiences has remained. The scientific study of exposure to media violence began in the 1920's with the Payne Studies (Potter, 2003). These were 13 studies designed to examine the influence of movies on children. As comic books grew in popularity in the 1950's, social psychologist Fredric Wertham denounced the violence portrayed in comics in his book, *Seduction of the Innocent* (1954), an action which would ultimately lead to the creation of the Congressionally backed Comics Code Authority which regulated violence in comics. However, Wertham, like Lt. Col. David Grossman, based most of his arguments on personal opinion and "gut feelings" as opposed to scientifically and systematically studying such effects.

Television also had and still continues to have its time in the spotlight regarding the media violence debate. Concern over violence on television spawned two major studies of the

topic, one being the Surgeon General's Scientific Advisory Committee on Television and Social Behavior in the 1970's and the other being the National Television Violence Studies in the late 1990's (Potter, 2003). The findings of both were similar: viewing violence increases the likelihood that viewers will, under certain conditions, behave aggressively. It is important to note that both studies stressed that "under certain conditions" was the key phrase. There was no grand effect, such as a hypodermic needle or magic bullet effect, which was previously debated around the time of the Payne Studies. This served to bolster the limited effects model that was started in the late 1950's and early 1960's.

Compared to television, much less research has been conducted on the role that video games play in influencing aggression. In one of the first meta-analyses of research on video games' contribution to violence, Anderson and Bushman in 2001 found 35 research reports that included 54 independent samples of participants. Of course the home video game system has not been on the market nearly as long as the television, but one of the first meta-analyses of research on television's contribution to violence yielded 80 studies (Anderson, 2003).

The discrepancy in number of research studies should neither lead one to believe that video games are not popular with the public nor that violence is not prevalent in them. Even while the recession of the late 90's and early 2000's was reducing other industries' profits, the video game industry was full steam ahead. In 2001, despite the recession, the industry experienced a 43% increase in sales, resulting in a $9.4 billion market (Hu, 2002). The amount of time spent playing games has increased since the first game systems hit the home. In the mid 1980's children spent an average of four hours a week playing video games (Harris & Williams, 1985). By the mid 90's, that number increased to 4.5 hours per week for 4th grade girls and 7.1 hours per week for 4th grade boys (Buchman & Funk, 1996). Recent estimates show that

children spend an average of about 7 hours per week playing video games (Gentile & Walsh, 2002). The numbers appear to get larger as age increases. In 1999, 2.5% of entering college men reported playing video games over 20 hours per week (CIRP, 1999). Very few content analyses have been done on the prevalence of violence in video games. A more recent study found that 68% of the 60 most popular games at that time contained some act of violence (Smith, Lachlan, & Tamborini, 2003).

Apart from discrepancies in the number of research reports for both television and video games, there also needs to be an acknowledgment that the two mediums are very different in how the audience interacts with them. Peter Vorderer, a video games researcher at the University of Southern California, argues that research typically conducted to explore the effects of violence on television is not necessarily the best model for exploring the effects of violence in video games, "This is a completely different medium. It is proactive rather than passive, so it fills different needs, uses different portions of the brain" (McNamara, 2004). Carnagey and Anderson (2004) agree, stating that violence on television occurs regardless of what the viewer does but in video games the players are responsible for the violence that occurs within the game.

Much like television shows exhibit an increase in conflict in the storyline to pull viewers closer into the narrative, many video games also raise the stakes with players in terms of conflict or action. Many video games are based on the concept of leveling-up, completing one phase of the game in order to advance to the next level where even more rewards and points are obtainable. Frequently the tension, action, and difficulty in the game can increase as the levels increase. The point is to continue through the game until all levels have been mastered; thus at each level there is an obtainable goal. However, the ease with which one can obtain that goal decreases with each new level. One could almost argue that the mark of a good video game is

the challenge it poses to the player. If the game is too easy, then the player quickly levels through the game and loses interest in it. If the game is too difficult, the player may become frustrated with it and decide that the game is just not worth the headache it is creating. Thus it seems that frustration is an inherent quality of most video games. The game designer wants the game to challenge the player, resulting in more of a time investment with the game, but not seem overly easy to the player.

Because game play is an interactive form of participation rather than the more passive form of watching film or television, other issues than mere exposure to violent content must be considered. There could be aspects of the playing experience itself that affect thoughts, feelings, and actions of the player. If frustration is an emotional state that could be created by the game's difficulty, could this frustration affect a player's feelings of hostility? The frustration of not succeeding in a game or not doing as well as one would have hoped could contribute to this negative emotional state. Much of the press's coverage of the connection between video games and acts of violence and also past scholarly violence research has focused solely on the content of the stimulus material, but with the interactive medium of video games there may need to also be a focus on how game play factors, such as frustration even with non-violent games, affect player's aggression. More investigation is needed to determine how these factors can affect the player.

Purpose of the Study

The current study will choose one variable of the game playing experience, frustration, and investigate its relation to the ability of a video game to inspire aggression in players. A frustrating game will be compared against a non- or low-frustrating game to determine what affect frustration has on feelings of aggression and hostility. The traditional social science

approach to studying media violence will also be employed: comparing the effects of violent content versus nonviolent content. Thus, violent games will be compared against nonviolent games to determine what affect content has on feelings of aggression and hostility. An experimental research design in which subjects play the video games is proposed to investigate these topics. Of particular interest, this design should shed light on how the two variables of content and frustration interact to influence feelings of aggression and hostility.

External validity always comes into question when studying how media affects violence in viewers or, in this case, players. Such experimental studies as the one proposed here cannot ethically explore whether or not subjects actually harm others in society as a result of the experimental treatment. A theoretical framework, The General Aggression Model, will be explained to show how such factors as physiological state, beliefs, and attitudes can contribute to the final decision of whether or not one is violent towards another person or object. This experiment will look at the variables of content and frustration and their impact on physiological state, aggressive beliefs, and aggressive attitudes.

CHAPTER 2

THEORETICAL FOUNDATIONS OF AGGRESSION

Understanding Aggression and Its Related Constructs

Before beginning a discussion on the past academic work pertaining to aggression and the media, it is important to first examine and define the concept of aggression. Scholars typically talk about factors which influence aggression, particularly aggression exhibited by humans, but it must be understood that it is very difficult to experimentally test factors which immediately evoke aggression. This is the result of an ethical dilemma since human aggression is psychologically defined as "any behavior directed toward another individual that is carried out with the proximate (immediate) intent to cause harm. In addition, the perpetrator must believe that the behavior will harm the target, and that the target is motivated to avoid the behavior" (Anderson & Bushman, 2002, p. 28). Other academic works have agreed upon this definition (Bushman & Anderson, 2001; Baron & Richardson, 1994; Berkowitz, 1993; Geen, 2001). It is therefore a very complex and ethically challenging task to plan a study which results in a person being made to believe that they are intentionally harming another human being. Take note that according to this definition, an act which was accidental cannot be deemed aggressive. An act is also not considered aggressive if the instigator believes the target has no motivation to avoid the behavior. This would mean that neither the pain created by a physician's treatment nor the pain created by a sexual dominatrix's whip could be considered an act of aggression because both targets submit to the act.

Many times this definition of aggression is assumed to mean that a person is physically harmed, yet several different forms of aggression exist (Anderson et al., 2003). Physical aggression, typically of the greatest concern, "may range in severity from less serious acts, such as pushing or shoving, to more serious physical assaults and fighting" (p. 83). Verbal aggression "usually refers to saying hurtful things to the victim" (p. 82), such as calling someone ugly or making jokes about his/her mother. Relational or indirect aggression "refers to behavior that is intended to harm the target person but is enacted outside of the target person's view (e.g., behind his or her back), such as telling lies to get the person in trouble or to harm his or her interpersonal relationships" (p. 82).

A related construct to aggression is violence. As was mentioned in the introduction, the popular press often talk about overt acts of violence such as the Columbine massacre. Violence is distinguished from aggression in that violence is "aggression that has extreme harm as its goal (e.g. death)" (Anderson & Bushman, 2002, p. 29). By this rationale, any act of violence is considered aggression but not all aggression can be considered violence. For example, the eye poking and foot stomping portrayed by The Three Stooges is an act of aggression but technically not a violent act since its intent is not extreme harm. Indeed, most comic humor would then fit under the category of aggression and not violence. A shooting or prolonged physical altercation could be considered an act of violence. Again, devising a stimulus-response experiment to provoke an immediate violent act would be ethically challenging since the instigator would have to believe that they are causing extreme harm (possibly death) to a human target, such as in the case of Milgram's study (1963) of response to authority in which subjects believed they may have shocked another person to death.

Hostility is a more complex multidimensional construct composed of several different components, some of which make it easier to ethically manage in an experiment. Hostility can be thought of as having cognitive, affective, and behavioral properties. Cognitively, hostility is "defined as negative beliefs about and attitudes toward others, including cynicism and mistrust" (Matthews, 1997, ¶ 1). In regards to affect, hostility which is "typically labeled as anger refers to an unpleasant emotion ranging from irritation to rage and can be assessed with regard to frequency, intensity, and target" (¶ 1). Behaviorally, hostility can be explained as resulting from "the attitudinal and affective component and is an action intending to harm others, either verbally or physically" (¶ 1). Because hostility has the cognitive and affective components which do not dictate that a subject believe they are physically harming another person, this concept is frequently measured in the aggression literature using various paper and pencil scales (Panee & Ballard, 2002; Ballard & Weist, 1996; Anderson, Anderson, Dill, & Deuser, 1998).

Anger has yet to have a notable clear definition in the literature but Berkowitz's (1990) definition and explanation appears to capture the spirit of the word. Berkowitz explained that anger can be understood in several different ways: as a feeling, as motor/physiological reactions, as a set of behaviors, or as all of the above. In 2004, Berkowitz and Harmon-Jones explained that anger is a "syndrome of relatively specific feelings, cognitions, and physiological reactions linked associatively with an urge to injure some target" (¶ 4). . Berkowitz is concerned that critics may argue that he is explaining irritation or annoyance rather than anger. He comments:

> Indeed, many of the subjects exposed to the aversive treatments in the research summarized here rated themselves as feeling somewhat angry as well as irritated and annoyed (although not at the same level), and these self-reports of irritation, annoyance, and anger were often highly correlated….in my analysis I view irritation, annoyance, and anger as members of the same class of feelings, and I use the term anger to refer to all of them. (Berkowitz, 1990, ¶ 4)

For the purpose of the current investigation, Berkowitz's definition will be used.

This discussion of aggression, violence, hostility, and anger is important because scholars frequently talk about how certain factors can lead to increases in aggression. The terms are often used interchangeably although much of the literature has actually tested whether variables produced increases in hostile thoughts and cognitions, increases in negative affect, or physiological reactions and not actual behavior. Of course, there have been experiments which have measured aggressive behavior, usually through the process of tricking a subject into believing they are delivering an electrical shock or burst of white noise to a human target (Anderson & Dill, 2000; Anderson & Murphy, 2003). It is important that any study addressing factors which influence aggression state accurately whether it is testing actual aggressive behavior or aggression-related constructs. Otherwise, reporting that a certain factor leads to an aggressive outcome when it only points to increases in related factors is an unsubstantiated claim. What could be claimed is that increases in an aggression-related construct could theoretically lead to an aggressive behavioral outcome. As will be discussed, constructs such as hostile thoughts and cognitions, negative affect, and physiological changes are theoretically tied into aggression and have the potential to influence aggressive behavior.

Early Theories of Aggression

Several theories have been put forward to explain how aggression is formed in individuals. Early instinct theories of aggression largely inspired by Freud have for the most part been dismissed (Carnagay & Anderson, 2003). Freud wrote of a person's "death wish" or thanatos, the desire to destroy oneself which could be displaced towards another person in an act of aggression. Freud and Konrad Lorenz made the catharsis idea once again popular (this idea had been in existence since early Greek days). This theory stated that self-destructive or aggressive energy is constantly accumulating in a closed loop energy system. This energy must

be dispersed by observing or taking part in aggressive actions against others. If the pressure of this energy is not diminished, the subject will eventually explode in a rage of self-destruction (suicide) or in an act of extreme violence towards others, such as murder (Carnagay & Anderson, 2003).

Other early theories of aggression include the work on learning done by Thorndike and Skinner (see Chance, 2002, for a basic overview) and the work on frustration originally started by Dollard, Doob, Miller, Mowrer, and Sears (1939). In the case of Skinner's learning theory, all behavior, including human aggression, operates either through classical or operant conditioning. In this instance, aggression is a learned behavior because it has in the past been rewarded. For example, a bully beats up schoolyard children because it eventually leads to them giving him their milk money. On the other hand punishment can lead to aversion from using aggression. In another example, perhaps the child who got beat up gets his older brother to beat up the bully in retaliation. In this sense the bully has been punished for his original behavior and is less likely to enact that behavior against the same target in the future.

Frustration theory will be discussed in further length later as it has been reformulated more recently by Berkowitz (1989). The original work of Dollard et al. (1939) stated the following: 1) "the occurrence of aggressive behavior always presupposes the existence of frustration" (p. 1), and 2) "the existence of frustration always leads to some form of aggression" (p. 1). These two statements caused much debate during their time among scholars studying aggression and inspired research designed to prove the hypothesis wrong. Again, the original proposition of this theory was that *all* aggression stems from frustration and that frustration *must* always lead to aggression.

Strict learning and frustration theories, however, do not explain some findings related to the aggression literature. For instance, how can the reported findings that media content influences aggression be explained by learning or by frustration? To return to our discussion of Columbine, what could it have been about the video game Doom that frustrated Klebold and Harris into shooting up their school? If it is believed that 1) Doom was mostly responsible for the incident, and 2) frustration theory is accurate; then we must conclude that Doom somehow created a frustration in the boys that had to be expressed in an aggressive and violent manner. If Columbine is based strictly on learning theory, playing Doom may have been reinforced with some type of reward (perhaps self-efficacy at being able to master the game); but what explains the adoption of a totally novel behavior (picking up a real gun and creating a real massacre)? That particular behavior was never rewarded or punished in the past. These are merely anecdotal and possibly not the best examples, but they do strike at the heart of the argument: learning theory and frustration were not capable of explaining all the variables that were said to contribute to aggression and cannot explain many of the variables today claimed to be influential to aggression, one being the media.

Recent Theories of Aggression

Seeing that early theories of aggression could not fully explain the formation of aggression, more recent theories were developed which hoped to explain all of aggression's intricacies and show how cognitions, affect, and physiology are related and connected to aggression. Anderson and Bushman (2002) claim that five main theories of aggression are used in explaining most of the recent research: cognitive neoassociation theory, social learning theory (later also known as social cognitive theory), excitation transfer theory, script theory, and social interaction theory.

Cognitive Neoassociation Theory

Berkowitz (1989, 1990, 1993) developed a theoretical model, cognitive neoassociation theory (CNA), to explain how negative affect was related to thoughts and memories and could eventually lead to feelings of anger or fear, triggering a fight or flight response. Berkowitz states, "…the negative affect generated by the aversive occurrence automatically gives rise to at least two sets of reactions at the same time: bodily changes, feelings, ideas, and memories associated with escape from the unpleasant stimulation and also bodily reactions, feelings, thoughts, and memories associated with aggression" (1990, ¶ 16). The foundation of the theory is that associative links are learned and conditioned from past life experiences and interconnect negative affect with thoughts, memories, motor/physiological reactions, and aggressive predispositions. The initial negative affect could be triggered through a variety of aversive events such as provocation, frustration, uncomfortable temperatures, unpleasant odors, graphic or disturbing visual images, or body aches and pains.

Not only is negative affect linked with thoughts but aggressive thoughts, emotions, and behavioral tendencies are all interconnected as well so that one aggressive thought such as "kill" might be associated with "gun" and the thought "gun" may be associated with "use gun." In this case an aggressive concept is associated with an aggressive reaction. Figure 2.1 represents an associative network between concepts and reactions. In this association once one concept is primed, the links are activated and other thoughts, feelings, and behaviors are primed as well.

While CNA does account for a person responding almost instinctually without much forethought (as in a flash of rage), it also allows for higher-order cognitive processes. The person may stop to think about what information they have received, reflect on their feelings, and consider possible consequences of their action. In this instance, the person may evaluate the

situation that they are in, make causal attributions as to why they feel the way they do, consider the circumstances that they are in, and make a rational decision. This is not to assume that they will decide to escape the situation rather than fight. In fact, there is such a thing as instrumental aggression which is "conceived as a premeditated means of obtaining some goal other than harming the victim and being proactive rather than reactive" (Anderson & Bushman, 2002, p. 29). Imagine the scene in many television shows, where a character has to punch and knock out another friend in order to carry him away from a dangerous situation that the friend does not want to leave. The character is not doing this with harm as the ultimate goal but rather as a prosocial action to help the friend leave a dangerous situation.

There is research which supports the CNA model. Using the model, one would expect that a provoked subject would become less hostile towards the person provoking them if they were exposed to an irrelevant pleasant experience. If one experienced a positive event instead of an aversive one, then pleasant cognitive links should be activated, lessening one's hostility. Baron (1984) demonstrated this was in fact the case. Rule, Taylor, and Dobbs (1987) exposed subjects to either an aversive event or to a control group, uncomfortably hot temperatures (91° F) or normal temperatures (70° F) respectively, and then asked them to complete ambiguous story stems (in that either aggressive or nonaggressive endings were both plausible). Subjects in the hot condition used more hostile ideas when completing the story stems than did control subjects.

So far these cited experiments have tested hostility and not aggression towards a particular person. However, in an early Berkowitz experiment aggression towards a human target was investigated (Berkowitz, Cochran, & Embree, 1981). Subjects were made to keep one of their hands in either room temperature water or in painfully cold water as they gave rewards and punishments to a fellow student based on the evaluation of their work. Half of subjects in

each condition were made to think that the punishments would harm the other student. The other subjects were told that the punishments would actually help the other student with their work (by encouraging them to do better). Subjects in the painfully cold water/harmful punishment treatment gave the least rewards and rated themselves as having the strongest feelings of annoyance and irritation. The experimenters concluded that the aversive event of the cold water evoked a will to do harm.

Frustration-Aggression Hypothesis Revisited

Frustration can be considered an aversive event and is therefore subsumed in the CNA model. The earliest formulation of the frustration-aggression hypothesis (Dollard, Doob, Miller, Mowrer, and Sears, 1939) emerged long before Berkowitz began advancing CNA but, as has been stated earlier, ran into several criticisms and scenarios which the theory could not seem to answer. In restating the basic postulates, Dollard et al. claimed: 1) "the occurrence of aggressive behavior always presupposes the existence of frustration" (p. 1), and 2) "the existence of frustration always leads to some form of aggression" (p. 1). The only exception to these rules would be if the frustrated person realized that an act of aggression may bring punishment to either themselves or their loved ones or if the frustrated person did not believe they would be able to carry out the aggressive act. For example, a mobster is frustrating a local business owner by making him pay a protection fee. This should lead to an act of aggression against the mobster but the owner is afraid that the local gang may beat him up or hurt his wife if the payment is not made. Of course as Dollard's group acquiesces, the unwillingness to act aggressively only serves to frustrate the person further.

There were also parameters to the frustration-aggression hypothesis that would affect the strength of the willingness to aggress (Dollard et al., 1939). These included, "(a) the strength of

the drive whose gratification was blocked, (b) the degree of interference with this drive satisfaction, and (c) the number of frustrated response sequences" (Berkowitz, 1989, p. 61). These parameters predicted the following: 1) the greater the anticipated satisfaction of the goal, the more aggressive a person would become when blocked from that goal, 2) as partial gratifications are obtained, the strength of the willingness to aggress will decrease, and 3) the aggressive inclinations caused by frustration can accumulate over a series of goal blockages (Berkowitz, 1989).

The height of criticisms against the hypothesis emerged in the 1970's and were basically a result of how Dollard et al. (1939) defined frustration, "an interference with the occurrence of an instigated goal-response at its proper time in the behavior sequence" (p. 7). Bandura (1973) claimed that frustration-aggression was simply a drive theory that resulted in general emotional arousal and that social learning would dictate how a subject reacted to the arousal. Zillman (1979) objected, "the blockage of a goal reaction, in and of itself … generally will not induce interpersonal hostility or aggression" (p. 139). Zillman believed that aggressive responses to frustration were the result of "the involvement of supplementary factors such as personal attack or the instrumental value of aggressive reactions" (p. 138).

Berkowitz would echo Zillman's concern over the instrumental value of aggression when he reformulated the frustration-aggression hypothesis in 1989. Berkowitz states that the original hypothesis overlooked instrumental aggression in that it "seems to neglect the possibility that aggression can be learned instrumental behavior. People at time attack others, not because they have been thwarted in the past, but because they think this action will bring them some other benefits (other than the infliction of injury)" (p. 62). The early general formulation of the frustration-aggression hypothesis is therefore typically not defended in today's literature. As

Gustafson (1986) notes, “Interest is now focused on under what specific circumstances frustration and aggression may be related” (p. 103).

Berkowitz has gone on to further expound on the circumstances, effects, and parameters of frustration in his attempt to reformulate the theory and subsume it within his CNA model (see Berkowitz & Harmon-Jones, 2004, for a summary of these findings). He contends, “there is also near complete agreement that someone or something, an external agent, must be seen as responsible for the negative event if there is to be anger” (¶ 8). This external agent is usually held responsible for instigating the anger, which is typically often focused on that agent. However, there are examples where there is no apparent external cause of the anger, such as in the case of studies of headaches (Venable, Carlson, & Wilson, 2001; Hatch, Moore, Borcherding, & Cyr-Provost, 1992) which revealed that a number of people afflicted with frequent headaches tend to often be angry or hostile. Research which points to hot temperatures instigating hostility and anger (Rule, Taylor, and Dobbs, 1987; Anderson, Deuser, & DeNeve, 1995) could also be said to have no obvious external agent towards which the subject can direct their anger.

Another parameter debated in the literature concerns whether the frustration needs to be unfair or illegitimate to invoke anger. Frijda (1986) states, “An angering event is one in which someone or something challenges what ‘ought’ to happen” (p. 199). Indeed research and surveys have shown that people’s understanding of their own angering experiences reveals they believe the anger was unfairly or illegitimately provoked: it should never have occurred (Frijda, Kuipers, & ter Schure, 1989; Shaver, Schwartz, Kirson, & O’Connor, 1987). A study by Weiss, Suckow, and Cropanzano (1999) lent support to this belief by experimentally manipulating unfairness in a competition task. Two teams consisting of two people each were competing to rank items

needed to survive on a deserted island. Subjects were led to believe that their partners had either received the answers in advance or that their competitors had received the answers in advance. Results showed that those subjects who believed their competitors unfairly received the answers beforehand were more angry than those who believed they had received the answers.

The belief that frustration must be unfair or illegitimate to provoke anger has not however escaped contrary findings. Averill's (1982, 1983) research revealed that 59% of angering incidents reported by subjects in his study were related to a voluntary and unjustified act. In other words the instigator purposefully and unjustly provoked the incident. However, 12% of the incidents were produced by a voluntary and justified act and 2% were caused by an unavoidable accident or event. Herrald and Tomaka (2002) constructed an experiment where a subject expressed their opinions on a variety of topics to a confederate. The confederate made insulting remarks and personally degraded the subjects in response to their opinions. While subjects reported being angry, they did not believe the treatment by the confederate was improper and further reported that the confederate should not be blamed for their anger.

Dill and Anderson (1995) also examined the contention that only unjustified or illegitimate frustration leads to anger and aggression. In this experiment, subjects were paired with a confederate in a group of two and were given a task (to make an origami bird). The experimenter intentionally demonstrated the task too rapidly, at which point the confederate asked if the demonstration could be slowed down. The experimenter gave a justified response (my professor has tightly scheduled this room and I don't have time to slow down), an unjustified response (I want to get through with this in a hurry because my girlfriend is coming to pick me up and I don't want to make her wait), or a control condition response (I'm sorry. I didn't realize I was going too fast). Dependent variables show that the unjustified subjects had

the highest feelings of hostility, followed by the justified group and then the control group. This meant that a justified frustration leads to more feelings of hostility than a nonfrustrated control group.

So far, parameters have been discussed concerning how and what type of frustration is needed to elicit anger, but little has been discussed regarding the factors of the goal that is trying to be achieved and how those factors play a part in whether anger is elicited. Lazarus (1991) contends that a person has to be seeking a personally significant goal if a blockage of that goal is to elicit anger. Since the goal is personally significant, it can be argued that frustrations intentionally produced should be more likely to elicit anger and feelings of aggression than are thwartings that are perceived to be unintentional. Zillman tested this theory in 1979. In a series of experiments, Zillman found that mistreating subjects resulted in less hostility when the subjects were told that the attacks were unintended. Like many other parameters of frustration, there is also contrary evidence supporting the belief that the goal to be attained does not have to hold personal significance. An early experiment by Walters & Brown (1963) showed that something as simple as promising children the opportunity to view an enjoyable film and then telling them the projector had broken can serve as an adequate solicitor of aggression.

In summary, although there is mixed evidence, it can be argued that the process of aggression resulting from frustration is heightened when there is an external agent which can be blamed for the frustration. Aggression is also heightened when frustration appears to be unjustified or illegitimate and when the end goal is personally significant to the person. Again, these are instances when aggression may be at its peak when aroused by frustration. It is not to say that these conditions must be met to elicit any amount of aggression. The study of what other circumstances are necessary for frustration to lead to aggression continues. Throughout his

career Berkowitz struggled to determine if aggressive cues were necessary in order to elicit aggression from frustration (1965) or if aggressive cues merely served as facilitating factors (Berkowitz, 1969, 1978). This question led experimenters to test the impact of both frustration and aggressive media content on aggression.

The Role of Aggressive Models and Frustration on Aggression

Although the following experiments were more focused on the effects of aggressive cues, and not aggressive media content per se, all used aggressive content as a variable in their study. This chiefly was to provide a model of aggression for subjects to imitate, but helps to give insight into how frustration and aggressive media content coalesce to elicit aggressive responses.

Hanratty, O'Neal, and Sulzer (1972) argued that frustration could increase the likelihood that aggressive behaviors would be displayed if those behaviors had been learned through observation. In their experiment, one-half of the subjects (30 male youngsters total) were shown a short film depicting an adult aggressing against a female clown. The other half of the subjects were shown no film. Within each half of subjects, the group was divided into three further groups representing the frustration manipulation. Hanratty et al. defined frustration as a "withdrawal of an anticipated reinforcer" (p. 31). The children were shown an attractive display of toys and asked to pick their favorite. The experimenter then told the child that he could win the toy if he and a partner performed well on a task. The task was to arrange six plastic milk bottles according to the color of their caps to match another carton of bottles that the experimenter has previously arranged. The experimenter told the child he was leaving to explain the game to the child's partner who was out of sight in another room (there actually was no other partner). Upon returning the experimenter explained to the child that while he had performed

well, the partner had performed poorly; thus, the child would not receive the toy that was anticipated.

One third of the subjects were told that their partner was a clown (called the frustrator target). One third were told the partner was another child (nonfrustrator target), and one third served as a control group (no-frustration). The control group was not shown the toys but was told to arrange the milk bottles as part of the study. After performing the task, the subjects were led to a room where a human clown was sitting motionless and quietly with a mallet and toy gun lying on the floor nearby. The experimenter explained that he had to fill out some paperwork in the corner of the room and the child could play while he waited (which equated to 5 minutes), doing whatever he liked. The experimenter was actually observing and counting the child's aggressive behavior and noting whether it mimicked the behavior seen in the original film clip. Results showed that viewing the film increased the imitative aggressive behavior of the frustrated subjects (both frustrator and nonfrustrator target groups) but had no effect on the imitative behavior of the control subjects. Hanratty et al. concluded, "Indeed, subjects who witnessed an aggressive model imitated his actions only if they had been frustrated" (p. 32). It was commented on later that the "combination of aggressive modeling and frustration appears to serve as a potent elicitor of subsequent aggressive behavior" (p. 33).

Savitsky, Rogers, Izard, and Liebert (1971) attempted in part to replicate the findings of Hanratty, O'Neal, and Sulzer (1972), conducting an experiment where boys were shown a film of a person behaving aggressively towards a human clown. Half of the subjects were shown the film and half were not. After the boys viewed the film or, as in the case of the no-film group, entered the laboratory; the boys were shown an attractive display of toys and told to choose one that they liked the most as payment for their help. The boys were then led away from the toys

and the frustration group was told by the experimenter that there were not enough toys for everyone and he would not be able to receive one. The nonfrustration group was not told anything.

All of the subjects were then led to a room similar to Hanratty's: occupied by a motionless, quiet clown with a mallet and toy gun lying nearby. The same explanation and observation as performed by Hanratty followed. Results showed that viewing the aggressive film led to increased aggressive behaviors when compared to the no-film condition. However, frustration was not found to lead to increased aggressive behaviors when compared to the nonfrustration group.

Gustafson (1986) wanted to know if aggressive cues, such as aggressive films, were necessary or merely facilitative when eliciting aggression from frustration. Twenty male military recruits were exposed to one of two video films. These films had been pretested in a pilot study to be either very high or very low in aggressiveness but equal in activity and excitement. All subjects were then told about a task they would have to perform.

The subject's task was to supervise another subject (who did not really exist) on a visual scan test. The nonexistent subject was supposedly shown a field of blue dots with 1 to 6 red dots mixed in and was supposed to report the number of red dots. The experimenter was supposedly given the response (which did not really exist) and informed the true subject if the judgment was correct or incorrect. The true subject's task was to press a button labeled "correct", a button labeled "incorrect", or to press any one of 10 shock buttons giving an electric shock to what was believed to be a real person (intensity of the shock increased with the first button representing low shock and the tenth button representing an uncomfortable shock). Dependent variables were the number of shocks given, shock intensity, shock duration, and response latency.

The subject's frustration was manipulated by informing him that he would receive immediately around $70 if his partner made no more than 15 incorrect responses. The money was shown and frustration was expected to increase as the nonexistent subject's incorrect responses increased. The experimenter demonstrated the exercise to the true subject in order to show him that determining the number of red dots was rather easy. After the supervision task the subject was asked to rate on a 7-point scale their level of frustration when the money was lost.

Results concluded that aggression increased as a function of frustration, given high levels of frustration and exposure to the aggressive film. Control subjects going through the same manipulation of frustration without aggressive cues did not show increases in aggressive behaviors. This meant that only subjects exposed to the aggressive films increased their aggression; thus, the aggressive cue was necessary and not merely facilitative. This can also be interpreted to mean that the combination of aggressive content and frustration results in an additive (cumulative) effect. As finishing this discussion of frustration also closes the discussion of the CNA model, other major theories of aggression can now be investigated.

Social Learning Theory

Social learning theory states that aggression is learned by humans much like that of any social behavior, either through direct experience or through observational learning. Promoted chiefly by Albert Bandura (1977), social learning theory basically argues that all behavior cannot be learned only through simple trial and error. Early radical behaviorists had suggested that behavior was learned through conditioning and through direct experience only. Behaviors were acquired because they had either been rewarded or punished. Bandura argued that if this were true, learning would be a slow, inefficient process of acquiring knowledge about the world we live in and how to behave in that world. Bandura argues instead that other than trial and error,

people are also able to learn by watching others' behavior and noting whether that behavior is either rewarded or punished. In this manner, people can learn how to behave in certain situations even if they have never been in that particular situation before. If the behavior is rewarded or reinforced, the viewer is much more likely to perform or engage in that behavior in the future. The opposite is true if the viewer witnesses that the behavior is not effective in attaining a goal or if it is punished.

Because of imitation and reinforcement, people can develop habitually occurring types of behavior (Bandura, 1977; 1986; Huesmann, 1997). Not only would people learn specific behavioral responses but also acquire a knowledge set or a base of rules to use when interpreting, comprehending, and evaluating particular situations they encounter, such as conflict (Anderson & Huesmann, 2003; Huesmann, 1988, 1998; Huesmann & Miller, 1994).

Bandura has specifically worked in the field of learning aggression through modeling. Among the most famous are the classic Bobo-doll studies (Bandura, Ross, & Ross; 1961). These studies consisted of children imitating a film they had seen of one of Bandura's students beating up a Bobo-doll. From the studies came the concern that children would imitate what they saw on television. Social Learning Theory acknowledged the ability to learn behavior from observing symbols in society. Through the use of symbols, "people process and transform transient experiences into cognitive models that serve as guides for judgment and action. Through symbols, people give meaning, form, and continuity to their experiences" (Bandura, 2001, p. 267). Social learning theory would also become known as social cognitive theory given Bandura's growing acknowledgement that cognitive capabilities played a part in how quickly someone learned from observed models.

In Bandura's view, one of the most powerful providers of symbols was the media. Bandura states, "a vast amount of information about human values, styles of thinking, and behavior patterns is gained from the extensive modeling in the symbolic environment of the mass media" (2001, p. 271). As one of Bandura's chief research areas was the learning of aggression, television caused him immediate concern:

> In television representations of human discord, physical aggression is a preferred solution to interpersonal conflicts; it is acceptable and relatively successful; and it is socially sanctioned by superheroes triumphing over evil by violent means. Such portrayals legitimize, glamorize, and trivialize human violence. (p. 276)

These portrayals may also have a higher likelihood of being learned if they are glamorous and appealing to viewers. According to social learning theory, the probability of a behavior being learned can depend on how similar or attractive the violent character is to the viewer, how the viewer identifies with the model, and how rewarding the violent behavior is to the violent character (Bandura, 1977). This may seem like it puts a heavy cognitive load on the viewer, constantly evaluating every individual character and the consequences of their action and choosing which characters to imitate; however, much of social learning occurs without the intention to learn and without recognition that learning is occurring (Anderson et al., 2003). In this sense, the flood of violent imagery in television, video games, and other media provide ample unintentional opportunities to "learn" aggressiveness.

Excitation Transfer Theory

The backbone of excitation transfer theory (Zillman, 1983) is that arousal provoked by one situation dissipates slowly and can therefore "carry-over" to another event. Media violence has been known to increase indicators of arousal such as heart rate, blood pressure, and skin's electric conductivity (Anderson et al., 2003). Arousal can increase aggression via two methods. First, arousal can heighten and strengthen whatever the dominant action tendency is at that

moment. This means that if arousal occurs at the same time that a person is trying to aggress or fight against another, heightened levels of aggression can occur (Geen & O'Neal, 1969).

A second method in which arousal can increase aggression is through excitation transfer or misattribution of arousal. In this case a period of arousal occurs followed by a short break. After the short break another event occurs that makes the person angry. The residual arousal, however, only adds to and heightens the level of anger felt even if the original arousal had nothing to do with the angering situation. In this case if a person who is provoked misattributes the arousal to the provocateur, the willingness to act aggressively toward the provocateur increases (Zillman, 1971, 1982). Cantor, Zillman, and Einsiedel (1978) found that prior viewing of an arousing erotic film increased the frequency which subjects delivered a noxious noise burst to someone they thought was provoking them. Anderson and Bushman (2002) also note that, "excitation transfer also suggests that anger may be extended over long periods of time if a person has consciously attributed his or her heightened arousal to anger" (p. 32). In this sense, even after the original arousal has dissipated, the person remains in a state ready to aggress as long as they still believe themselves to be angry.

Excitation transfer theory would dictate that people would be more likely to react violently immediately after watching a violent movie or playing a violent video game. Anderson et al. (2003) note that frequent situations where a provocation or angering event occur immediately following violent media viewing could lead to more aggressive encounters (social conflict or fighting). This can in turn mold and shape a person's self-image, perhaps making him think that he is chronically aggressive or angry. Research has showed that playing a violent video game for 10 minutes increases the player's likelihood to automatically view themselves as

an aggressive person (Uhlmann & Swanson, 2004). This study also showed a positive link between past exposure to violent video games and aggressive self-views.

Huesmann's Script Theory

Combining aspects of CNA and social learning theory, Huesmann (1986, 1998) proposed that people's behavior is governed by the learning and practice of scripts. These scripts are "sets of particularly well-rehearsed, highly associated concepts in memory, often involving causal links, goals, and action plans" (Anderson & Bushman, 2002, p. 31). Script theory works very similarly to CNA in that certain concepts become linked to each other in one's memory (Anderson, Benjamin, & Bartholow, 1998; Berkowitz, 1993; Collins & Loftus, 1975). Each concept has a certain activation threshold. The energy needed to activate these concepts can travel via any of the links that has been made between the concept and others. When the threshold is exceeded, the concept is activated and becomes available to guide behavior. The activation also begins sending its energy from that activated concept to other concepts linked in the network.

Sometimes concepts that are similar can become activated at the same time (such as "shoot" and "gun"), which serves to strengthen their association. As associations become strongly linked, they form scripts, which can be thought of as a unified concept in memory. As the activation of the script occurs more frequently, the accessibility of the script strengthens. The number of paths connected to the script increases thus strengthening the paths or links themselves. Because of this strengthening and increasing, it can by hypothesized that as a person views more violence through television or video games, the script for using violence to solve a conflict becomes more accessible. Someone who views large amounts of violence in the media

may even have the script chronically accessible. In this way, script theory is very similar to social learning.

Once the script is accessible, a person can call on that script to determine their response and behavior in a given situation. Out of all the scripts that are activated, the person selects one that most accurately reflects their current situation and then chooses their role in carrying out that script. For example, a gang member (Joe) is taunted by an opposing gang member (John). Joe's first thought is revenge, which means violence, which means threaten, which means gun. This situation has occurred many times before and Joe has learned this reaction as a unified concept or process (a script). He decides to enact the script by brandishing his gun at John and threatening him with violence.

Recent research supports the belief that scripts aid one in coming up with aggressive responses. Bushman and Anderson (2002) conducted an experiment in which subjects were asked to finish an incomplete storyline. They argue that this story completion task is basically a script completion task. They found that playing a violent video game increased the amount of aggressive content used to complete the stories. Likewise, Dill, Anderson, Anderson, and Deuser (1997) found that subjects who were rated as being aggressive were more likely to use aggressive content in completing similar story stem tasks than subjects rated as being nonaggressive.

Social Interaction Theory

Social interaction theory (Tedeschi & Felson, 1994) basically states that a perpetrator uses violence against a target as a way to influence the behavior of the target. For example, a bully threatens violence against another child in order to get that child to hand over his milk money. Anything of value (money, sex, information, free favors, etc.) could be the end goal of

the person who is seeking to coerce behavior from the target. A spy might torture another spy for information. A man may rape a woman because of his need for power/sex. Revenge, or retribution for some past wrong, could also be another valuable goal. A person could also attempt to coerce behavior from a victim in attempts to raise the their own social status or identity or even to raise their own self-concept. Perhaps the bully threatens people so as to obtain a reputation of being the toughest kid on the playground.

This theory calls to mind the earlier discussions of instrumental aggression which is aggression that may not be evoked out of passion but rather by higher-level cognitions or rationales. This is not to say that even hostile aggression could not be rationalized by social interaction theory. Perhaps someone like a vigilante, similar to fictional superhero characters like Batman or The Punisher, attacks others so as to reduce the likelihood of that person engaging in violence in the near future.

Social interaction theory also can be used to explain some of the latest research which points to aggression being derived from threats to high self-esteem. For a long time, it was believed that aggression typically came from those with low self-esteem; but recently it has been revealed that aggression may be linked to people who experience threats against their own unstable and unsubstantiated high self-esteem (narcissism) (Baumeister, Smart, & Boden, 1996; Bushman & Baumeister, 1998; Baumeister, Bushman, & Campbell, 2000).

GAM: Subsuming the Many Theories

As in many sciences, what was needed in the study of aggression was a unifying model or theory that could integrate and subsume the various many theories that had been and are being used to explain aggression. Many of the theories borrowed from other theories and used others as their foundations. Script theory, for instance, borrowed from both social learning theory and

from the CNA model. A model was needed that would not overlook the separate theories of aggression but would bind them together, integrating and making sense of them.

The General Aggression Model (GAM) was developed and revised to achieve this goal (Anderson & Bushman, 2002; Anderson, 1997; Anderson, Anderson, Dill, & Deuser, 1998; Anderson, Deuser, & DeNeve, 1995; Bushman & Anderson, 2001; Lindsay & Anderson, 2000). This model was seen as advantageous to using past separate theories in four ways (Anderson & Bushman, 2002). First, the GAM was designed to be more parsimonious than past theories. Second, the GAM accounted for the explanation of aggression that had multiple motives, one of which could be the result of higher-order cognitive rationales, such as aggression that was based on both hostile and instrumental aggression. Third, the authors argue (based on Tate, Repucci, & Mulvey,1995) that many current treatments for the chronically aggressive are ineffective because they are based on one specific theoretical cause or because they focus on only one specific type of aggression. However, using GAM should provide a more comprehensive method of treating those individuals since it incorporates many theoretical rationales and accounts for many different types of aggression. Finally, GAM focuses on multiple paths through which aggression can be learned and will therefore provide children's authority figures with better insights and practices in regards to child rearing and protecting children from becoming aggressive.

GAM: How it Works

The most current thorough explanation of GAM can be found in Anderson and Bushman (2002). The GAM works through three main mechanisms: inputs, routes, and outcomes. These three mechanisms represent a cycle, moving from inputs to routes to outcomes (which can later influence inputs). Each cycle represents an individual's current social interaction, called an episode, and is the focus of the GAM. Figure 2.2 gives a graphical map of how the GAM works.

Inputs – Person Factors

Inputs are the first step in the GAM and consist of incoming information about the aggressive episode at hand. They are composed of two main ingredients: person factors and situation factors. These factors shape and influence how the information is gathered and gives the situation a context. Person factors can be described as personality traits, gender influences, general beliefs and attitudes regarding the world, personal values, and scripts inherent in the person. The person brings the accumulation of these factors into every encounter they have.

Research has shown that certain traits may make individuals more likely to aggress than others (Crick & Dodge, 1994). Often this is the case when people attribute others' behavior to hostile intent (hostile attribution bias). As has been discussed, it could also be that a threat to an unstable high self-esteem could result in aggression. Gender has also been found to account for differences in aggressive tendencies. These may be the result of different socialization and learning experiences encountered while growing up (White, 2001). Research (Osterman et al., 1998; Block, 1983; Cairns, Cairns, Neckerman, Ferguson, & Gariepy, 1989) has shown that males typically prefer direct overt aggression (such as physical or verbal) while females prefer forms of indirect aggression (harming personal relationships).

In addition to a person's gender and personality traits, an individual also brings his own belief, attitude and value system into every aggressive episode he encounters. Chief among the beliefs that are related to aggression is a person's self-efficacy. In short, does the person in the aggressive episode believe that he can carry out the specific aggressive acts? Does the person believe that he is a good fighter and has a good likelihood of not getting beaten up in this situation? Will beating up the other person result in the desired goal? Does aggression solve the problem at hand? The answers to these questions may in fact come from upbringing. Family

experience has been shown to be a great instiller of these aggressive beliefs (Patterson, DeBaryshe, & Ramsey, 1989; Patterson, Reid, & Dishion, 1992). Family or cultural experiences may have instilled a value system which prefers violence as a method to solve problems. Huesmann and Guerra (1997) have shown that these aggressive beliefs predict future levels of aggression.

Positive attitudes towards aggression and violence may also enhance and prepare some for future acts of aggression. In particular, positive attitudes towards committing aggressive acts towards other specific populations increase the likelihood of aggressing against those groups. Malamuth, Linz, Heavey, Barnes, and Acker (1995) found that attitudes regarding violence against women are positively correlated to sexual aggression against women. Finally, as previously discussed with script theory, people approach social interactions with certain sets of scripts that they engage to direct their behavior in that encounter. These learned aggressive scripts could make a person more willing to aggress (Huesmann, 1988, 1998).

Inputs – Situation Factors

Situation factors include those things in the environment when the episode occurs and are not controlled by the person. These factors may include aggressive cues, provocation, frustration, pain and discomfort, and incentives to aggress. Aggressive cues, also important in CNA, prime aggressive thoughts and cognitions. For example, an opponent possessing a gun could prime aggressive thoughts related to the gun. In fact, research (Berkowitz & LePage, 1967) has shown that the presence of a gun increased aggressive behavior in angered research subjects. This weapons effect has also been supported by the evidence that pictures or words related to weapons prime aggressive thoughts (Anderson, Benjamin, & Bartholow, 1998).

Aggressive cues also explain how exposure to violent movies, television, and video games can be linked to increased aggression (Anderson & Dill, 2000; Bushman, 1998).

Provocation and frustration can be situational factors which increase the likelihood of aggressing. In fact, Berkowitz (1993) and Geen (2001) state that provocation may be the most important single cause of human aggression. Some examples of provocation include taunting, insults, shows of physical or verbal aggression, or impeding someone attempting to attain an important goal. This last example of provocation could also be seen as a frustration, which is also a situation factor in the GAM. As previously discussed, other important factors such as the justification for the frustration, the fairness of the frustration, and the external cause of the frustration affect frustration's influence of aggression. The appeal of the goal, or the incentive, can also increase aggression. Anderson and Bushman (2002) note, "By increasing the value of an object, one changes the implicit or explicit perceived cost/benefit ratios, thereby increasing premeditated, instrumental aggression" (p. 38). Increasing the value of the goal could therefore also affect frustration when that goal is blocked. Even though frustration is an important factor behind aggression, there is little evidence explaining how the process works. Anderson and Bushman (2002) echo this by claiming "whether such frustration effects operate primarily by influencing cognitions, affect, or arousal is unclear" (p. 37).

Being in pain or discomfort has also been shown to increase the likelihood of aggression (Berkowitz, 1993). This explains the already mentioned study of Berkowitz, Cochran, and Embree (1981) that found soaking a hand in a bucket of ice water increased aggression. Anderson, Anderson, Dorr, DeNeve, and Flanagan (2000) believe discomfort increases aggression primarily by increasing negative affect but acknowledge that there may be cognitive and arousal processes responsible as well. Thus, being hit with a punch could increase

aggression or being in a cold movie theater watching a slasher film may also increase aggressive feelings.

As can be imagined, person and situation factors are mutually influential. Enmeshed person factors can affect situation factors which only reinforce person factors. For example, if people have aggressive and negative views about themselves and about the world around them (person factors), they may seek out others who are similar and build relationships with them. These peers would provide situational aggressive cues to the person. Gang membership would be a good example of this process. A new recruit believes that one can only attain goals in life through violence so he joins a gang to further his goals. The gang members, the weapons, the provocation by rival members all serve as situation factors that could increase the recruit's aggressiveness. The longer the member stays in the gang, the more violence he is exposed to which serves to harden the member towards the use of violence as a means to achieve goals.

Routes - Cognition

Routes (or internal states) are the means through which the input information is filtered. When an individual encounters an aggressive episode, their internal state of mind may impact their appraisal of the situation in which they find themselves. These internal states are also influenced by the input variables. In essence, the input variables affect the internal state of the person which impacts their appraisal of the situation which can influence their end behavior. According to the GAM, there are three main routes via which internal states can be influenced: cognition, affect, and arousal.

Cognition in this model refers to the ability of a person to access aggressive constructs in his mind. As a construct is accessed and brought to mind more often, the threshold to trigger that construct decreases; therefore, frequent triggering of the construct can result in it being

chronically accessible. Constructs can also become temporarily accessible if influenced by a situation input. Playing a violent video game may lower the threshold for an aggressive construct and make it more accessible for the time period in which the person is playing the game. Indeed, researchers have found that such factors as media violence prime aggressive thoughts (Anderson & Dill, 2000; Bushman, 1998).

Similarly, situation factors can also influence the accessibility of scripts held by individuals (Huesmann, 1986). Like cognition, these scripts also become more easily accessible and they are more frequently triggered. Activating these scripts can impact a person's judgment of the aggressive episode resulting in swaying their behavior to a more aggressive response.

Routes - Affect

Input variables not only influence cognitions but also can impact a person's affect which can also impact behavioral response. Affect refers to the state of mind of the person or how they feel when the episode occurs. This review has already discussed how pain and discomfort can influence affect, resulting in increased hostility and anger (Berkowitz, 1993; Anderson, Anderson, Dill, & Deuser, 1998). Research has also found that exposure to violent movies can also increase feelings of hostility (Anderson, 1997; Bushman, 1995; Bushman & Geen, 1990; Hansen & Hansen, 1990). It may also be the case that having firmly enmeshed personality traits can influence behavior. For example, subjects with high trait hostility also tend to have high state hostility (Anderson, 1997; Anderson, Anderson, Dill, & Deuser, 1998; Bushman, 1995); therefore, those people with higher trait hostility may be more likely to aggress in situations because their resulting higher state hostility colors their judgment of the current aggressive episode. This does not necessarily mean that a person with high trait hostility has no control over their responses, but research does point to the fact that there are certain automatic

aggression-related motor programs that can be activated (Berkowitz, 1993). An example of this type of automatic response can be found in the research on infants that notes unexpected pain typically results in an automatic facial response which indicates anger (Izard, 1991). This is an inherent response.

Routes - Arousal

Anderson and Bushman note that arousal can influence aggressive behavior in three ways, two of which have already been discussed. First, arousal, even from an irrelevant source, can enhance the dominant aggressive tendencies. In other words, if a person is likely to aggress against someone, any type of arousal only serves to increase that propensity (Geen & O'Neal, 1969). Second, excitation transfer dictates that prior arousal can be misinterpreted as anger when introduced to an aggressive situation. For example, dancing at a club increases one's arousal. While going to the bar in between songs, a person drops their drink onto another person. The arousal caused by dancing could be misinterpreted into anger at the person who spilled their drink and a fight could erupt. Although not tested at this point, a third method is conceivable in which arousal could be so extreme or so minimal that an uncomfortable state could be created. This relates to our past discussion of affect and how uncomfortable or painful states impact affect. It could be that being highly nervous or being on amphetamines makes one feel aggressive or being extremely tired and sleepy increases one's hostility or grumpiness.

Outcomes

Outcomes refer to the final process of decision-making when put into an aggressive situation. This represents how the person decides if they are going to respond aggressively or not. There are two ways this can occur: immediate appraisal or reappraisal. Immediate appraisal occurs when someone rushes to judgment. It is a quick process which is rather effortless and

spontaneous. Present internal states, influenced through routes and input variables, may affect this quick inferential decision-making process. If someone lacks time or cognitive resources to process the information accurately, they also may make an immediate appraisal.

The other outcome process is reappraisal. Reappraisal occurs when a person considers the information and the context in which the event occurs. In a way, it is a process of cycling through the information, considering what has just happened and what would occur if one decided to become aggressive. Considering the past dance club example, if the person on whom the drink was spilled suffered from a hostile attribution bias (person factor), it could be the case that they make an immediate appraisal ("that guy just provoked me") and a fight could start. However, the same person could instead realize that people are standing shoulder to shoulder near the bar, some even pushing to get to the front, and that could be the reason the drink was spilled. This could trigger a reappraisal of the situation resulting in a nonaggressive reaction.

Of course, it is not guaranteed that all reappraisals will not end in aggression. It simply means that one dedicates time and cognitive resources to deciding how to respond. Often people state, "the more I thought about it, the angrier I got!" This is a reappraisal effort.

Anderson and Bushman also point out that each violent episode is not independent of all others. They are all linked. Every time someone is in an aggressive encounter, they gain information which can be used at a later time. In this manner, each outcome becomes an influence on input variables in the next episode. For example, deciding to fight and successfully winning a fight against a much bigger opponent may serve to increase one's fighting self-efficacy. They now believe that they are a much better fighter. This becomes part of their person factor makeup in the GAM and the cycle repeats itself. Focusing on one episode may give the impression that GAM is best suited to explain only short-term effects and influences, but

the cyclical nature of the GAM could explain long-term effects. It has already been discussed how repeated exposure to violence makes aggressive constructs more easily accessible and results in these links being strengthened. This may result in automating these constructs, further desensitization to violence, and ingraining the aggressive attitudes and beliefs in the person.

Concluding

This review has taken the reader through the theoretical underpinnings of aggression from the early explanations to more current understandings. The next step is to understand how the media is related to and influences aggression. GAM explains many details and research findings related to factors that influence aggression. Anderson and Bushman (2002) specifically mention media content claiming that violent media can impact all components of the GAM. For this study, particular attention will be paid to video games and how playing these games can affect aggression. Further attention will focus on the aspects of violent content and frustration with game play and their impact on aggression.

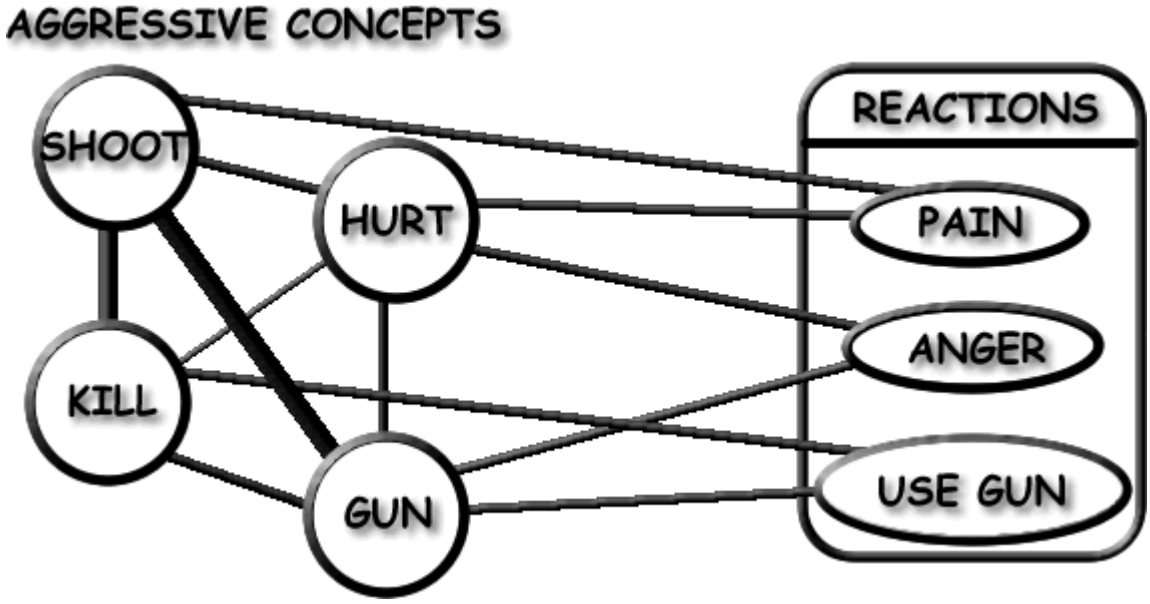


Figure 2.1. CNA Model

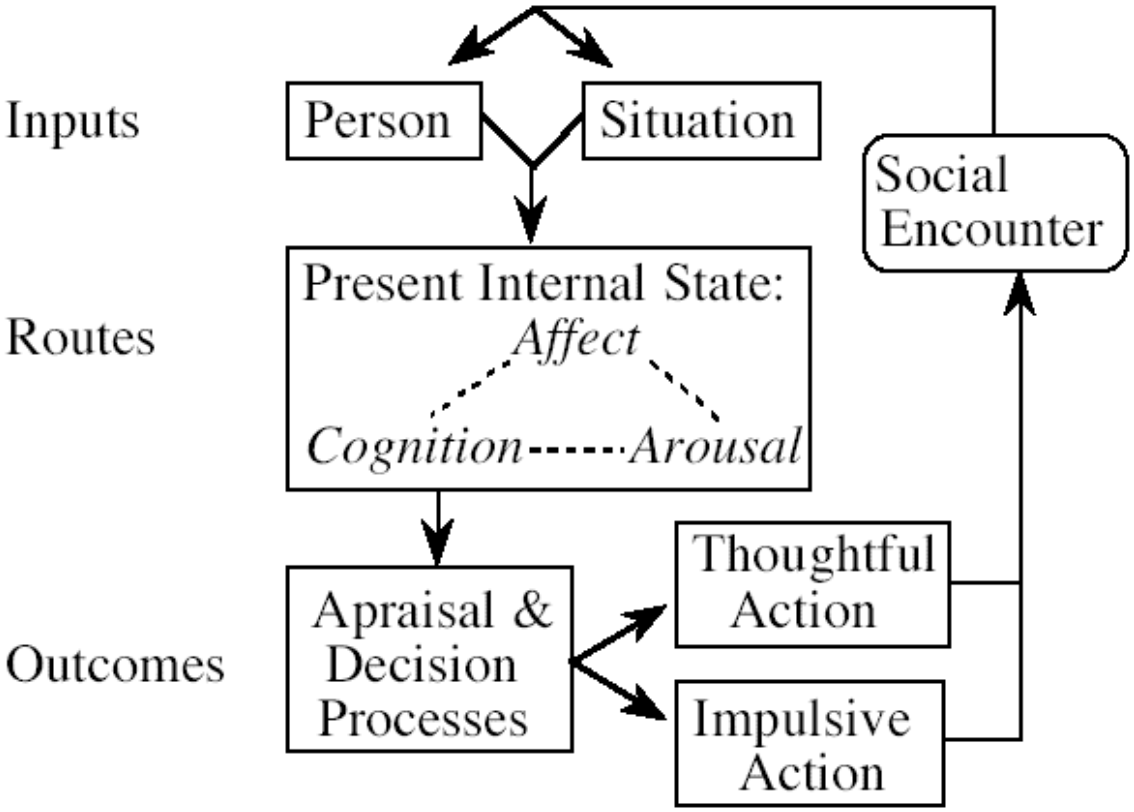


Figure 2.2. General Aggression Model

CHAPTER 3

UNDERSTANDING THE RESEARCH ON VIDEO GAMES

Past Work Involving Media Violence

With the arrival of each new media technology usually also comes the expressed concern about the influence the new technology will have on children (Sherry, 2001). For example, concern was expressed about the impact film would have on children with the Payne Fund studies which began in 1928 (Sparks, 2002). During the comic book's height of popularity in the 1950s, social psychologist Fredric Wertham published *Seduction of the Innocent* (1954) alerting parents to the negative impact the medium was having on children. This discussion also developed with the advent of the television and currently with the Internet and video games.

Perhaps the greatest concern with much research devoted to it is the belief that media violence inspires aggressive behavior in its viewers. Bushman and Anderson (2002) claim that by 1975 evidence was sufficient to conclude that media violence was positively related to aggressive behavior and that even short-term exposure to media violence was enough to lead to increases in aggressive behavior. This date is used because it is the year one of the first meta-analyses was performed on the topic. At that time 80 studies had been published on the impact of media violence on children. The meta-analysis argued that the positive relation between media violence exposure and aggressive behavior clearly existed in both the real world and in laboratory environments. Meta-analytic research has confirmed that the effect media violence exposure has on future aggressive behavior is comparable in size to those of cigarette smoking on cancer and lead paint exposure as a child to IQ (Uhlmann & Swanson, 2004).

In particular, television has been revealed as contributing heavily to the media violence problem. Indeed, entire books have been written that merely list all the previous television violence studies (see Kelly, 1999). Deselms and Altman (2003) state that viewing violence on television increases viewers' aggressive behavior and desensitizes viewers to future acts of violence. Dominick and Greenberg (1972) write that the more television programs with violent content a child watches, the more accepting of aggressive behaviors the child becomes. Research also finds that trait aggression, along with self-reported, peer-reported and teacher-reported aggressive behavior is correlated to exposure to violent television programs (Uhlmann & Swanson, 2004). Finally, Paik and Comstock (1994) performed a meta-analysis that reviewed 217 studies and found that exposure to violent television is significantly correlated to aggressiveness and antisocial behavior.

Video Games Versus Television

With the advent of the home video game system, more discussion arose about the harmful effects of video game violence on children. Many years have passed since the introduction of those first video game home systems (the popular Atari 2600 system was released in 1977), yet the published research on violent video game effects has remained somewhat small. Sherry (2001) argues that unlike the controversy over television violence, the existing research on video games is not nearly as compelling. He notes that researchers cannot agree if violent video games have an effect on aggression.

However, many researchers believe that playing violent video games should have an equal if not greater impact on children's aggression. This belief is held because of the differing characteristics inherent in the mediums. For example, Anderson and Dill (2000) argue that video games could be more harmful than television because the participants identify more easily with

video game characters than with television characters. Past research has shown that identifying with a violent character increases the effect of media violence and the amount of aggression directed toward a victim (Leyens & Picus, 1973; Dill & Dill, 1998;Huesmann, Moise-Titus, Podolski, & Eron, 2003; Perry & Perry, 1976; Turner & Berkowitz, 1972). Players feel more identification with characters because they are controlling their actions and are responsible for the character's next moves.

This level of control leads to another reason why scholars believe video games may pose more of a threat than television. Dominick (1984) suggests that television is basically a passive experience, whereas video games are highly interactive and require intense concentration. Anderson and Dill (2000) along with Scott (1995) agree that video games are a more active medium than television. This active involvement and constant attention may enhance the learning of aggression (Irwin & Gross, 1995; Unsworth & Ward, 2001). In fact, research has shown that learning is enhanced when people are actively involved rather than passively involved with the material (Atlas, Cornett, Lane, & Napier, 1997; Berkowitz, 1974; Onion & Bartzokas, 1998).

The interactive nature of video games also allows the player to be rewarded for their aggressive action. Dill and Dill (1998) note:

> Although the violence observed on television and in the movies is reinforced vicariously (i.e., the violent behavior of the actor is rewarded), video-game violence is directly rewarded. That is, the person playing the game behaves aggressively and is rewarded (with points, sound effects, access to new levels of the game, etc.) for doing so. (p. 411)

Bandura (1973, 1983) has demonstrated that aggression is likely to increase when it is rewarded; therefore it should be no surprise that, compared to television, video games have a higher frequency of violent scenes (Anderson & Dill, 2000; Dill & Dill, 1998; Geen, 2001). Funk,

Buchman, Jenks, and Bechtoldt (2003) add that not only can the use of rewards in violent video games influence the development of proviolence attitudes, but the violence in games is also usually justified and presented as being fun. The authors also are concerned that violence in video games is considered by players to not be real and therefore the victims do not truly suffer, which further dehumanizes the victim. The player is also not physically injured when their game character is wounded or killed leading the player to believe that there is no pain or harm in being the aggressor.

Should the public be as concerned about the harmful impact of video games as they are for the harmful impact of television? After all, television is a much more pervasive medium than home video games. Are all video games harmful for children? Are children only attracted to violent video games? Providing research on the popularity of, frequency of play, prevalence of violence in games, and consumer preference for violent games will help to show that the medium of video games is still gaining in popularity and the amount of violence in popular games is nothing to ignore.

Video Games in the Home

Popularity of Video Games

The popularity of home video games continues to grow. It can be argued that the Nintendo Corporation did much to increase the popularity and diffusion of these games during the early years of the home video game system. In the 12 years from 1983 to 1995, Nintendo sold an average of three games every second, totaling one billion games. To put it into context, that would be one game for every teenager on the planet or one game for every person in North America, Europe, and Japan. If laid end to end, the games would reach around the equator two and a half times (Dill & Dill, 1998). By the year 2000, there were 100 million Gameboys

(Nintendo's hand held playing system) and 75 million Sony Playstations in the home. How does that translate into financial gain? In 2000, annual worldwide game sales were at $20 billion (Gentile, Lynch, Linder, & Walsh, 2004). In recent years, the annual sales of video games have consistently outpaced movie ticket sales (Elmer-Dewitt, 1993; Hettrick, 1995; Bartholow & Anderson, 2002). According to a Kaiser Family Foundation (2005) report, 83% of young people 8 to 18 years old have a home video game system, and a majority (56%) have two or more. Almost half (49%) have one in their own bedroom.

Frequency of Play

Reports of frequency of video game play vary widely. A 1999 report (as cited in Kirsh, 2003) found that 8 to 18 year olds played video games, on average, between 1.2 and 7.5 hours per week. When surveying college undergraduates, Anderson and Dill (2000) found the average playing time to be 2.14 hours per week. In a study by Cooper and Mackie (1986) fourth and fifth grade students reported playing an average of 42 minutes a day (4.9 hours per week). This is close to a 2005 report (Kaiser Family Foundation, 2005) which found that 8 to 18 year olds played an average of 49 minutes a day (5.72 hours per week). Buchman and Funk (1996) found that fourth through eighth grade boys played an average of 5 to 10 hours per week, and fourth through eighth grade girls played 3 to 6 hours per week. The Cooperative Institutional Research Program (CIRP, 1998, 1999) found that in 1998, 13.3% of men entering college played video games at least 6 hours per week while they were high school seniors. That figure increased to 14.8% in 1999. The percentage of those who played more than 20 hours per week rose from 2% in 1998, to 2.5% in 1999. Finally, while citing past work (Gentile & Walsh, 2002) that the average American child of 2 to 17 years old played video games for 7 hours per week; Gentile, Lynch, Linder, and Walsh's (2004) own study found that eighth and ninth grade students played

an average of 9 hours per week. While the numbers on frequency of play do vary, it would be hard to argue that video game play is not a major activity in the daily lives of youth. Now that it has been revealed how popular games are with youth and how much time is spent with video games, it is important to understand how much violence exists in these games and whether violence is an attracting characteristic of these games.

Prevelance and Preference for Violence in Games

In one of the earliest studies of the relationship between video games and aggression, Dominick (1984) argued:

> There are, however, some differences in the nature of violence that is portrayed in videogames and on television. Videogame violence is abstract and generally consists of blasting spaceships or stylized aliens into smithereens. Rarely does it involve one human being doing violence to another, as is often the case on conventional television. Videogame violence might perhaps be more closely related to the abstract violence in some TV cartoons. (p. 138)

At that time, Dominick was correct. Popular video games usually showcased geometric weapons firing at other geometric invaders or pie-shaped characters eating pixilated ghosts. However, the graphics of today's video games and the content are a far cry from that of the early 1980s. It should be noted however that research has pointed to low reliability in rating violence in video games, particularly in games with moderate levels of violence or those containing cartoon violence (Funk, Flores, Buchman, & Germann, 1999; Walsh & Gentile, 2001). Still, many studies have indicated a high amount of violence in video games. Scott (1995) argues that a majority of video games are violent and depict death and destruction. In 1991, Provenzo wrote that 40 out of the 47 most popular games were violent in nature. In 1998, Dietz compiled a list of the most rented games from four video game rental stores and compared that with a gaming magazine's top ranked titles to come up with a list of the most popular games at that time. She found: 1) 79% of the games included some type of aggression or violence, 2) nearly half had

violence or aggression targeted specifically at other characters, 3) 21% included some form of aggression or violence directed specifically at women. A later content analysis in 2001 (Children Now, 2001) found that 89% of games contain some violent content with half containing serious violent content towards other game characters. Research has shown that when subjects were asked to imagine that they were playing a game and report how the game made them feel, the predominant response was angry, hostile, and aggressive (Mehrabian & Wixen, 1986). Note that the date of that study is encompassed in the era when video game violence was thought to be abstract.

It is one thing for scholars to rank the most popular video games and analyze how many are violent, but research has also been conducted in which children reported their favorite games and the role violence had in them. When surveying adolescents, Funk (1993) found that 50% reported at least one violent game to be among their favorites. Gentile et al. (2004) asked teenagers to rate the violence in their three favorite games. 62% were rated as being violent, and 37% were rated as being above the midpoint of a 7-point scale when rating violence. Games rated as mature (M) by the Entertainment Software Rating Board are among the favorites of many players. 87% of boys play M-rated games and 78% list an M-rated game among their favorites (Walsh, Gentile, Gieske, Walsh, & Chasco, 2004). Labeling the games as mature may in fact increase interest in the games. Past research has shown that ratings and warning labels tend to increase interest in violent media (Bushman & Stack, 1996). For many children violence is a preferred characteristic when choosing games. For example, boys have reported that violence is a primary reason they enjoy playing video games (Barnett et al., 1997).

The preceding literature should indicate that video games are both highly popular and prevalent throughout society. It should also point to the fact that the majority of video games are

also violent in some nature. The days of abstract shapes accompanied with "blip" and "beep" sound effects are gone, replaced with games such as Mortal Kombat and Resident Evil, where bodies are dismembered in bloody detail accompanied with realistic stereo sound. Based on past research concerning television and film violence, we know that this aggressive content should affect human variables related to aggression. Of interest to the current study, the effect of violent video games will be explored in relation to human arousal, personal affect, and aggressive behavior (all relationships that were described in the prior chapter).

The Effect of Violent Video Games on Arousal

Research has shown that a person's blood pressure increases when they are exposed to sexual or aggressive content, or are engaged in an aggressive encounter (Calvert & Tan, 1994; Zillman, 1971). Although aggression is common in video games, it has also been shown that simply playing a video game increases blood pressure as well as other autonomic nervous system functions. Segal and Dietz (1991) found that compared to resting rates, heart rate, blood pressure, and oxygen consumption increased after playing a video game. Compared to watching television, reading, or listening to music; Kubey and Larson (1990) reported that children's arousal levels were significantly higher after playing video games. Interestingly, Panee and Ballard (2002) found that diastolic blood pressure (DBP) increased moderately throughout the process of playing a video game while systolic blood pressure (SBP) decreased significantly throughout the same process. DBP, according to the medical reference website http://medical-dictionary.com/, is "the pressure exerted on the walls of the arteries when the heart is in the relaxation phase (diastole)." According to the same source, SBP is "the pressure exerted on the walls of the arteries during the contraction phase of the heart." When subjects were allowed to play video games for a long period of time, Ballard, Panee, Engold, and Hamby (2001)

discovered that SBP decreased significantly at the beginning of play and increased significantly as soon as game play stopped.

Scholars have also looked for differences in arousal levels when comparing violent video games against nonviolent games. Murphy, Alpert, and Walker (1992) reported that playing violent video games tends to increase heart rate, SBP, and DBP compared to playing nonviolent video games. Playing a violent virtual reality game significantly increased heart rate when compared against a control group (Calvert & Tan, 1994). In Fleming and Rickwood (2001), playing a violent video game led to a significantly higher heart rate than playing a nonviolent game. Even when varying violence levels within the same game, it was found increasing the violence increased arousal. Ballard and Weist (1996) had subjects play the game Mortal Kombat, in which the gore level can be adjusted to low or high. Subjects playing under the high gore level had higher heart rates and SBPs than those with less gore.

There has, however, also been contradictory evidence regarding the effect video games have on arousal. Winkel, Novak, & Hopson (1987) exposed subjects to either a very aggressive game, an aggressive game, a nonaggressive game, or to no game at all. The scholars found that after game play the mean heart rate did not vary between the control group and any of the video game conditions. Irwin and Gross (1995) found similar results when measuring heart rates of those who either played an aggressive game or a nonaggressive game. Panee and Ballard (2002) trained students to play a military-style video game by using either violence (aggressive priming) or stealth (nonaggressive priming). After training, subjects were left to play a round of the game on their own. Priming condition did not result in significantly different rates of SBP, DBP, or heart rate. Lynch (1994) hypothesized that playing violent video games would produce greater increases in heart rate and blood pressure in adolescent males than those playing nonviolent

games. He studied these cardiovascular differences between 76 hostile and non-hostile participants but found no differences between the two groups. Even with these contradictory reports, a recent meta-analysis found an average effect size across studies between violent game play and physiological arousal to be around .22 (Anderson & Bushman, 2001).

The Effect of Violent Video Games on Affect

Bushman and Anderson (2002) argue that "repeated exposure to violence can make hostile knowledge structures chronically accessible, essentially creating an aggressive personality" (p. 1680). This aggressive personality can also be labeled as *angry* or *hostile*. In Bushman and Anderson's study, subjects played either a violent video game or a nonviolent video game and were then asked to complete a set of narratives. In these narratives subjects were faced with a situation that could be solved either peacefully or aggressively. When asked how the main characters in these narratives felt, the subjects who had played the violent video game reported more anger and hostility in their characters than did those who played the nonviolent game.

In the aforementioned study by Panee and Ballard (2002) involving training that was either aggressive priming or nonaggressive priming, it was found that those in the aggressive priming condition reported significantly more hostility after playing than those in the nonaggressive priming condition. This is similar to other works by Ballard (Ballard & Lineberger, 1999; Ballard & Weist, 1996) which also found more hostility after playing a highly aggressive game when compared to a less aggressive game. Anderson and Ford (1986) had subjects play either a highly aggressive game, a mildly aggressive game, or no game at all (control). Hostility was found to significantly differ between the groups with subjects in either of the game conditions more hostile than those in the control group. The authors conclude that

playing aggressive video games can have short-term negative effects on the player's emotional state.

Experiments have also been conducted which resulted in finding no link between playing violent video games and increased hostility. Anderson and Dill (2000) had subjects play either a violent game or nonviolent game in their study. They found no significant main effect for game type on state hostility as measured by a self-report questionnaire. Scott (1995) used a similar questionnaire as a pre- and post-test measure and hypothesized that as violence in video games increased, self-report of hostility should also increase. Having subjects play either a nonaggressive, moderately aggressive, or highly aggressive game, Scott found no significant difference between overall change in aggressiveness and level of game violence and no significant difference between total aggressiveness change and game violence level. When subjects rated how they felt on a "feeling thermometer" (ranging from not at all aggressive to extremely aggressive), Uhlmann and Swanson (2004) found no significant differences between groups that played either a violent game or nonviolent game. The study also used another self-report questionnaire, and again no significant differences were found. Fleming and Rickwood found no significant differences between groups on the self-reported measure of aggressive mood when subjects were made to play either a violent video game or nonviolent video game. Even with these contradictory results, a meta-analysis by Anderson and Bushman (2001) concluded that violent video games increased aggressive affect in males and females, children and adults, and in experimental and nonexperimental studies.

The prior results, even though conflicting, have tested the effect of violent video games on state (temporary) feelings of aggressiveness; but can exposure to video games affect trait hostility (how someone feels in general)? Indeed research has shown that "exposure to violent

media may also exert an influence on automatic associations with the self" (Uhlmann & Swanson, 2004, p. 42). This is to say that frequent exposure to violent media may affect how a person views himself, causing the person to associate himself with aggressive traits and actions. Uhlmann and Swanson found that when subjects played either a violent game (Doom) or nonviolent game (Mahjongg), the violent condition rated themselves as more aggressive in general on an implicit association questionnaire than those who played a nonviolent game. This suggests that exposure to violent video games not only increases state feelings of aggression but may also influence trait feelings of aggression. There is still, however, a conceptual leap from feeling aroused and feeling angry to actually engaging in aggressive behaviors.

The Effect of Violent Video Games on Aggressive Behavior

The General Aggression Model would predict that short- and long-term exposure when combined with increased arousal and negative affect could result in aggressive behavior (Anderson & Dill, 2000). It has been found that trait aggression as well as self-reported, peer-reported, and teacher-reported aggressive behavior has correlated well with exposure to violent television shows and video games (Ulhmann & Swanson, 2004; Fling et al., 1992; Lin & Lepper, 1987). Correlational research however does not give us as clear a picture of the cause and effect relationship of violent video games and aggressive behavior as does experimental research.

Many of the experiments designed to test aggressive behavior actually rely on the perception that a subject is harming another when, in fact, the subject has been tricked because no other subject really exists. One example is the noise burst situation in which one subject is led to believe that their pressing a button delivers a painful sound to another competing subject. Again, no other subject actually exists. In Anderson and Dill (2000) subjects were led to believe they were in a competition to press a button faster than their opponent. If the subject won, they

delivered a noise burst, which they could vary in intensity and duration, to the opponent. This study found that those who had played a violent video game prior to the competition delivered longer noise bursts than those who had played a nonviolent game. A similar design was used by Anderson and Murphy (2003) when they found that subjects who played a violent game delivered louder noise bursts than those who played a nonviolent game. When subjects were asked to set the level of intensity of the noise burst before a similar reaction time task, subjects who had previously played a violent game set the intensity at higher levels than those who played a nonviolent video game (Bartholow & Anderson, 2002).

Another experimental design procedure used to assess aggressive behavior involves letting children exposed to violent media engage in "free play" after viewing such content. In this design, children are unrestrictedly allowed to play with toys or other people and their aggressive behaviors in that play session are counted. An excellent example of this design can be found in Irwin and Gross (1995). In this experiment, children were allowed to play either a violent game or a nonviolent game and then were led to a free play room which consisted of both toys and a confederate subject. Results showed that children who had played the violent video game showed more verbal and physical aggression towards objects in the play room than those who played the nonviolent game. Children who played the violent game also showed more verbal aggression towards the confederate during free play than those who played the nonviolent game. As was previously discussed, a coloring competition between the subject and the confederate resulted in manipulating frustration within the subject. It was found that of the children who were frustrated, those who played the violent video game showed more physical aggression towards the confederate after the frustration manipulation than those who played a nonviolent video game.

As was the case with arousal and affect, contradictory evidence has been found when studying the effect of video games on aggressive behavior. Deselms and Altman (2003) had subjects play either a violent or nonviolent game and found no main effect of content on measures of aggression. A similar finding was that of Winkel, Novak, and Hopson (1987) who found that aggressive behavior and heart rate did not significantly vary whether a subject played a violent, or nonviolent video game. An early study by Dominick (1984) added light to the subject. Subjects answered questions concerning hypothetical situations which involved conflict. For example, "Somebody picks a fight with you on the way home from school. What would you do" (p. 140)? An aggressive response was deemed to be "hypothetical aggression." Dominick found that hypothetical aggression was significantly related with time spent playing video games in an arcade, but that correlation disappeared when school performance was partialed out. This suggests other factors at work moderating the effect of violent content on future aggression.

Still, several meta-analyses tend to support the belief that violent video games are linked to aggressive behavior. A meta-analysis by Anderson and Bushman (2001) examined 35 research reports which included 54 independent samples and reported that the effect size was .19. This effect size is as strong as the effect of condom use on risk of HIV infection, greater than exposure to asbestos and contracting laryngeal cancer, and greater than consuming calcium and increased bone mass (Carnagay & Anderson, 2004). John Sherry (2001) conducted a meta-analysis with 25 studies and found an effect size of violent video games on aggression to be .30, larger than that of Anderson and Bushman's study but still smaller that the effect of violent television on aggression. Another interesting point of Sherry's study was the fact that he found that effect size is moderately correlated with the year in which the study was performed. It would appear that effect sizes have increased over time. Given that video game studies go back

to the mid 1970's, correlational work may also help explain what long term consequences there are for violent video game playing.

Consequences of Long-Term Exposure to Violent Video Games

The General Aggression Model (GAM) suggests that each time someone plays a violent video game, they in effect rehearse an aggressive script which teaches and reinforces aggressive behavior towards another, positive attitudes towards using violence, and the belief that violence is an effective, appropriate way to resolve conflict (Anderson & Dill, 2000). Thus, a positive correlation should exist linking exposure to violent video games to aggressive characteristics.

Anderson and Dill (2000) explored this relationship between long-term exposure to video game violence and aggressive behavior and delinquency. The duo found that aggressive delinquent behavior (such as assault) and nonaggressive delinquent behavior (such as grand theft auto) was positively related to both trait aggression and exposure to video game violence but the strength of the relation to aggressive delinquent behavior was better. Gentile, Lynch, Linder, and Walsh (2004) found that exposure to video game violence and amount of video game play were both positively associated with adolescents' trait hostility, the frequency in which they got into arguments with their teachers, the likelihood of being involved in a physical fight, and were negatively linked to school grades.

Funk has examined the role long-term exposure to video game violence has had on empathy towards others. In 2003, Funk, Buchman, Jenks, and Bechtoldt found that long-term exposure to violent video games was associated with lower empathy as well as lower self-perceptions in areas including self-esteem, behavioral conduct, social acceptance, and academic achievement. Again in 2004, Funk, Baldacci, Pasold, and Baumgardner found that exposure to video game violence was associated with lower empathy and strong proviolence attitudes. These

findings suggest that as one becomes more exposed to video game violence, their empathy towards others decreases while their proclivity towards violence increases. However, one must remember that correlation does not necessarily prove causation. As the video game industry evolves and home systems become a standard in homes (much like the television is now), more research will be done to determine its impact on the behavior of players. However, even though research on video games has been conducted for nearly 30 years now, academic scholars are still not in agreement over the role that violent video games play in the adoption of aggression.

Justification of the Current Study

Mark Griffiths' (1997) review of the literature on video games and aggression argues that the question of whether video games produce aggressiveness cannot be answered presently because there is so little literature, much of which is conflicting. Past meta-analyses, such as Bushman and Anderson (2002) and Sherry (2001), have only found around 30 to 35 studies focusing on video games and aggression. Sherry believes that the existing research on the topic is not nearly as compelling as the research which has been conducted with television violence. For example, Sherry points out that Dill and Dill's literature review (1998) claimed that there is clear evidence of a causal relationship between video game play and aggression; however, a year later the same journal published another literature review that argued methodological fallacies in the literature prevent scientists from reaching a clear conclusion. Griffiths points out that there needs to be more systematic research regarding the effect violent video games have on aggression. The current study seeks to add to the existing collection of video game research on violence which Dill and Dill state is "clearly warranted" (p. 424).

As was explained in the last chapter, frustration has been linked to aggression as well. This is especially interesting given that video games are often based on frustrating the player: the

point of the game is to overcome obstacles that have been put into the game to block the player from obtaining the end reward or goal of the game. While frustration has been manipulated in studies that also exposed subjects to violent content (Hanratty, O'Neal, & Sulzer, 1972; Savitsky, Rogers, Izard, & Liebert, 1971; Gustafson, 1986), no study has been found that in one activity combined the manipulation of exposure to violent content with the manipulation of frustration. Therefore, a study simultaneously investigating both violent content and frustrating features of a game is clearly warranted.

Hypotheses and Research Questions

In reviewing past research several hypotheses and research questions can be generated when investigating the combined role of exposure to violent video games and frustration with game play. For example, the majority of research concludes that exposure to violent video games should increase measures of arousal (again the most common being heart rate, systolic blood pressure, and diastolic blood pressure). It is also shown in past literature that frustration can result in aggressive characteristics. This should mean that frustration affects arousal in much the same way. The following hypotheses are therefore generated.

H1: Compared to a nonviolent game, a violent game should lead to increases in physiological measures including heart rate, systolic blood pressure, and diastolic blood pressure.

Our findings on this hypothesis will serve to confirm or contradict past evidence. However the next hypothesis has never been generated in published literature.

H2: Compared to a low/non-frustrating game, a frustrating game should lead to increases in physiological measures including heart rate, systolic blood pressure, and diastolic blood pressure.

Past research has also shown that exposure to violent video games should increase measures of state hostility. This evidence brings us to the following hypotheses.

H3: Compared to a nonviolent game, a violent game should lead to increases in state hostility.

H4: Compared to a low/non-frustrating game, a frustrating game should lead to increases in state hostility.

Gustafson's (1986) work has concluded that aggression increased as a function of frustration, given high levels of frustration and exposure to the aggressive film. He found that only subjects exposed to the aggressive films increased their aggression; thus, the aggressive cue was necessary and not merely facilitative. This suggests that the combination of both violent content in video games and frustration results in an additive effect. Based on that premise, the following hypotheses can be generated.

H5: The combined effect of violent content in video games and frustration should lead to the highest levels of physiological measures of arousal among subjects including heart rate, systolic blood pressure, and diastolic blood pressure.

H6: The combined effect of violent content in video games and frustration should lead to the highest levels of state hostility among subjects.

On the opposite side of the spectrum, the following hypotheses are generated.

H7: The combined effect of nonviolent content in video games and low/nonfrustration should lead to the lowest levels of physiological measures of arousal among subjects including heart rate, systolic blood pressure, and diastolic blood pressure.

H8: The combined effect of nonviolent content in video games and low/nonfrustration should lead to the lowest levels of state hostility among subjects.

What has not been discussed in the literature is which variable is more powerful: content or frustration. There is no immediate theoretical basis to determine which would affect aggressive characteristics more: the combination of nonviolent content but high frustration or

violent content with low/non-frustration. Therefore the following research questions are presented.

R1: How would those playing a nonviolent video game that is high in frustration compare against those playing a violent video game which is low in frustration on physiological measures including heart rate, systolic blood pressure, and diastolic pressure?

R2: How would those playing a nonviolent video game that is high in frustration compare against those playing a violent video game which is low in frustration on measures of state hostility?

In the next chapter, an experimental design is proposed to investigate the preceding hypotheses and research questions.

CHAPTER 4

METHODOLOGY

Design and Operational Definitions

An experimental study to test the previous hypotheses was conducted which had subjects play one of four video games: 1) a violent and frustrating video game, 2) a violent and low/nonfrustrating video game, 3) a nonviolent but frustrating video game, and 4) a nonviolent and low/nonfrustrating game. These four categories are also known as the four conditions of the study. The independent variables for this study were violent content and frustration. Both independent variables consisted of two levels. Content in the video game was rated in a pilot study as either being high or low in violence. Likewise, game play was rated in a pilot study as either being high or low in frustration. This study is therefore a 2 X 2 factorial design.

Dependent variables for the study were physiological arousal and state hostility. Arousal was split into three separate measurements: 1) heart rate, 2) systolic blood pressure, and 3) diastolic blood pressure. State hostility was measured using two different self-report questionnaires which included state hostility subscales. The scores on those subscales were recorded as measures of state hostility.

Subjects

Subjects were 150 male college undergraduates at a large Southeastern university. The undergraduates were recruited from introductory psychology or mass communication courses. There is no evidence to suggest that students majoring in mass communication courses would differ in their playing habits from that of psychology majors. All students received course credit

for their work. Those wishing not to participate or were not eligible to participate had the option of completing some other task for the same amount of credit. Subjects from the psychology courses were recruited using the psychology department's online sign-up board that lists ongoing research. This online board allowed them to pick the date and time that they chose to participate. The experimenter asked subjects from the mass communication courses during their class if they wanted to participate. Those willing to participate were shown possible dates and times, and they signed their names next to an available slot. The experiment consisted of two different phases taking place over two different times. Subjects were not given full credit unless they completed both phases. Data analysis for this study only includes those who participated in both phases.

Justification of Using this Population

The college male is an appropriate target for a study on the impact of video game violence on aggression. In past psychological studies, men have been identified as behaving more aggressively than women (Calvert & Tan, 1994). Also, it has been suggested that men may be more affected by video game violence than women (Bartholow & Anderson, 2002). This could be a consequence of more exposure to video game violence. Research notes that men spend more time playing video games in general than women (Gentile, Lynch, Linder, & Walsh, 2004), and that men prefer and do play violent video games more so than women (Anderson & Murphy, 2003; Funk, Buchman, Jenks, & Bechtoldt, 2003; Uhlmann & Swanson, 2004). For these reasons, the experimenter thought it sufficient to only study males and leave the study of gender effects for a later time.

The age representing the typical college male is also an appropriate target for this study. Panee and Ballard (2002) note that this age sample has practical implications since most of the

media's attention on the negative effects of video games has focused on this age group. The authors also comment that "the empirical evidence regarding television has generalized well across age groups and cohorts, so it is likely that these findings will hold up similarly" (p. 2470). Sherry (2001) found a correlation of .2 between effect size and subject age suggesting that older subjects were affected more by violent video games than younger subjects. These results and comments support the use of college-aged subjects in this experiment.

Pilot Testing to Determine Appropriate Video Games

Selecting the Games

Critical to this study was the selection of games that would vary in violent content and could also be manipulated to aid in increasing or decreasing frustration. Many video games now have an option which allows the player to change the difficulty level of the game. The author has been an avid video game player since owning his own Atari 2600 system in the early 1980s, and began previewing games for the current study in late 2004 by renting them through a local movie/video game rental store. In an experimental setting, one often wishes for the treatments to be identical except for the variable that is to be manipulated. In a perfect setting, one would create two versions of a game that was identical except that one contained violence and one did not. However, the author wanted to maintain ecological validity by using video games that were currently top sellers on the market since these are often the ones criticized in the media for contributing to violence.

The author quickly realized through his previewing that obtaining a marketed video game where one could completely "turn off" the violence could not be achieved. Therefore, the author looked for separate video games that could be matched on several differing variables. The games needed to be visually similar as well as having game play characteristics that were similar.

The Video Game Rating Sheet (1985), was found on Craig Anderson's website, http://www.psychology.iastate.edu/faculty/caa/Scales/Scales.html, which included such characteristics as difficulty, enjoyment, frustration, excitement, pace of the action, violent content, and violent graphics. This instrument has been used in past studies to equate games (Anderson & Dill, 2000; Anderson & Ford, 1986; Anderson & Morrow, 1995).

Previewing games with these characteristics in mind, the author chose to test two video games that he believed would match best, Mortal Kombat: Deception (MK) and Dance Dance Revolution Max 2 (DDR). MK is considered a fighting game pitting two characters against each other in a martial arts contest. Blood often gushes as a player is punched, kicked, or attacked with a weapon. The game is famous for its fatality, which gives the winning character the opportunity at the end of the match to kill the other opponent using violently graphic means (for example pinning their feet to the ground using knives and then ripping their torso off at the waist). DDR is considered a dancing game and is usually played with a dancing pad. The object of the game is to step in the direction that arrows point to on screen at the precise moment that the arrows scroll to the top of the screen. For the current study, the dancing pad was not used since physical activity could increase heart rate simply from exercise. The standard hand controller can also be used to play the game and was used for this study.

Both of the games have options that were used to match the games both visually and in game play. MK and DDR have difficulty settings so that the difficulty of the games can be adjusted and matched as best as possible. Visually, MK has a somewhat static background with the two characters moving against that background while fighting. An option on DDR was used so that two characters appeared on screen dancing against a fairly static background. Different songs can be used to dance to in DDR. The rhythm of the song determines the pace of the game;

therefore, the song "Spin the Disc" was chosen because the author felt this would result in a pace closely matching MK. At the default playing difficulty, the author felt both games had somewhat of a medium pace and rhythm to their action. Of course, a pilot study would determine this measure more accurately.

Pilot Study Procedure[1]

Twenty male undergraduates were recruited through the aforementioned psychology recruitment process in late November of 2004. Upon arriving for the study, the subject was led to a small room (approximately 6' X 6') by the experimenter and was given a pencil and two copies of a consent form (Appendix A) to sign, one to give to the experimenter and one to keep. The experimenter had a separate room (set up as an office) where he stayed while the subject read and signed the forms. The subject would call out to the experimenter that the forms were signed, whereupon the experimenter would pick up one copy of the consent form and hand a booklet to the subject requesting that they read all instructions and fill out the booklet until they reach the page which indicates they should stop. This booklet contained three different questionnaires.

A Video Game Questionnaire (Appendix B) was used which asks the subject what games they play most frequently and how they would rate each game in terms of frequency of play, violent content, and their belief of what genre the game belongs to (such as sports, fighting, or educational). This questionnaire was based on Anderson's Video Game Questionnaire, found online at http://www.psychology.iastate.edu/faculty/caa/Scales/VGquest.pdf, which has been used in several studies (Anderson & Dill, 2000; Anderson, Carnagey, Flanagan, Benjamin, Eubanks, & Valentine, 2004).

[1] See Figure 4.3 for a graphical map of the pilot study procedure

Next in the booklet was the Psychological Entitlement Scale (PES; Campbell, Bonacci, Shelton, Exline, & Bushman, 2004; Appendix C) which served as a distracter questionnaire to help in disguising the true aim of the study. The next page in the booklet after the PES told the subject to stop completing the booklet (Appendix D). Subjects were informed beforehand to call out to the experimenter when they reached this step. At this point the experimenter retrieved the booklet putting it back in his office. Upon returning the experimenter asked the subject to follow him into another small room (approximately 6' X 6') where the subject would play a video game. The room contained an office desk (approximately 6' X 3') with a 20" television (Konka Model K2001UM) and Sony Playstation 2 with one standard dual shock controller sitting on the desktop. Also on the desktop was a standard digital kitchen timer that would be used to time the playing experience. By the side of the desk was a computer CPU sitting on the floor. This CPU had no monitor or peripherals attached to it but was placed in the corner of the room in an effort to make the subject believe that the game performance was being recorded onto the computer. There were two chairs side by side facing the television and Playstation 2.

Subjects had been previously randomly assigned to play one of the following conditions: 1) Dance Dance Revolution Max 2 in low/nonfrustrating mode (DDR), 2) Dance Dance Revolution Max 2 in frustrating mode (DDRF), 3) Mortal Kombat: Deception in low/nonfrustrating mode (MK), or 4) Mortal Kombat: Deception in frustrating mode (MKF). Random assignment occurred via pulling slips of paper containing the name of the condition out of a hat and assigning that condition to the name of the next subject on the recruitment list. Five subjects were assigned to each group. The games were previously loaded into the Playstation 2 before the subjects entered the play room. Initially the games were set up in an easy difficulty setting for the subject to practice the game. For Mortal Kombat, this was done by entering the

options menu and making sure the difficulty setting was set to novice. While in this options menu, the experimenter also toggled the competition to be a "best of five matches" competition. This assured that within the time frame there would be no possibility for the subject to progress completely through the game therefore eliminating the possibility of completing the game earlier than the predetermined time. For Dance Dance Revolution Max 2, an easy difficulty was achieved by using the options menu to select the "beginner" status. For the dancing game, an option called "event mode" was also toggled to the on position. This option makes sure that the player can continue playing even if technically he lost the game. In other words, this option allows for continuous play regardless of performance. Mortal Kombat: Deception has a similar method built in that asks if you want to continue if you lose the game. After the settings had been manipulated for both games, the experimenter left the Playstation 2 on while turning off the television. This was to assure that no content was present when the subject first entered the room.

Subjects were asked to take a seat in the chair on the right while the experimenter sat in the chair on the left. The subjects in the low/nonfrustrating conditions were read a script (Appendix E) brought in by the experimenter explaining that the aim of the study was to simply understand how people learn to play certain video games. Subjects in the frustrating conditions were told that their performance would be judged against the other performances that day and if theirs was the one of the better performances, they would win a $100 gift card to Best Buy (Appendix F). Several gift cards from Best Buy were shown to the subject in attempt to convince them that the competition was real. This was in fact a deception. Not apparent to the subject was the fact that these cards had no monetary value credited to them. There was no true intention to monetarily reward subjects for their play. All subjects were told that the computer

lying on the ground by their side would record their performances. In actuality, these computers were merely for show and did not record anything. The subjects were also told during the script that they would practice the game for 5 minutes with the experimenter and then be left alone to play the game for 10 minutes, during which time their performance would be recorded. Sherry's (2001) meta-analysis of video game studies found the following regarding treatment length:

> Length of treatment varied from as little as 5 minutes to as much as 75 minutes of game playing. This may result in a confounding of frustration in the brief conditions because the players don't have enough time to become proficient with the game and a confounding of boredom in the longer conditions because the players may be forced to play longer than they want to. (p. 414)

The point of the 5-minute practice session was to ensure that the subject was proficient at playing the game. Other studies have similarly used 10-minute treatment periods (Scott, 1995; Bartholow & Anderson, 2002; Cooper & Mackie, 1986; Uhlmann & Swanson, 2004).

After gaining assurance the subject understood the aim of the study, the experimenter turned on the television and told the subject which game they would be playing. The experimenter explained some basic rules of the game. It was important to the experimenter that all subjects play the games under the same conditions. Beforehand, the experimenter had chosen a certain song in DDR that he believed would result in the same pace of action as in MK. DDR is composed of five different stages which each last the duration of the song. In between each stage, the player is allowed to choose a different song. One of the rules therefore was that the player had to choose the same song for every stage. The subject was shown how to pick songs and which song to pick in order to go to the next stage.

For MK, the player competes in "best of" matches (for example, best of five) against a competitor. If they win, they advance to fight a different, more difficult character. The player initially chooses a character to play in the game, and if they subsequently lose, they can continue

the game and choose a different character if they wish. Some of these characters include men, women, zombies, and ninjas. It was decided beforehand by the experimenter that the most normal looking character would be played. The experimenter decided to use the character named "Kobra" who was a blond-haired male in a standard martial arts white robe. The rule in this case was that the subject always had to choose Kobra as their character. If the player lost and was asked to continue, they had to continue and still had to choose Kobra.

Rules that were applicable to both games included the directive that the subject play continuously and not stop the action by pausing the game or putting down the controller until told to stop by the experimenter. After the rules were explained, the experimenter started the game and explained the gameplay to the subject. For the MK subjects a list of which button triggered which action was laid out in front of the subject to remind them during play (Appendix G). It was explained to the DDR subjects that they would play at a beginner's training level, the easiest level of play. Visually the subject sees the back of a person standing up and dancing, moving their feet in accordance with the direction of the scrolling arrows. It was explained to the MK subjects that they would be practicing in the training mode. This mode allows the player to attack an opponent and figure out different combinations of moves without having the opponent fight back in retaliation.

After the experimenter explained the game and how to play and was assured that the subject understood the goal of the game and how to play, the experimenter set the countdown timer to 5 minutes and told the subject to begin practicing. The experimenter sat quietly watching the gameplay, answering only questions regarding gameplay, and then informed the subject when the 5-minute period was complete (the timer would also beep at this time).

When the 5-minute period was complete, the experimenter told the subject, "Now I need to check the computer equipment to see if everything is working and recording properly. This is a cramped room so if you wouldn't mind, could you please leave the room to give me enough space to move about freely?" At this point the subject left and the experimenter shut the door behind them. When the experimenter was alone, he went back into the options of the games and either changed or rechecked some settings. For the DDR condition, the experimenter changed the difficulty setting to "light." This setting was chosen because it was believed to more closely match the pace of the MK condition, but still retained an easy level of difficulty. An option was also toggled at this point to change the visual aspect of the game so that instead of seeing one person's back in the game, the player saw two males dancing on screen. The male characters chosen to dance were named "Rage" and "Dread." This is not an available option in beginner's training mode, thus the reason for not originally using this setup. However, the experimenter believed this visual would come closer to matching the visual in the MK conditions. The experimenter also rechecked to make sure that the event mode was toggled on. Otherwise the game would shut off if the player did not perform well.

For the DDRF condition, event mode was rechecked and the visual of two people dancing was toggled to the on position using the same characters. However, the difficulty level was set to standard. Contrary to its name, this level of play is very difficult. It was determined that the highest level of play, heavy, may in fact be too difficult for most players and could possibly result in a learned helplessness-type situation in which the player may decide to give up on the game. This, of course, would not have served the experiment well, so it was decided to use the standard level.

In the MK condition, the experimenter checked to make sure that the difficulty level was set at novice. The option to set the number of best-of matches was also checked to make sure that "rounds to win" was set at three. For MKF, the difficulty level was set at maximum and the best-of option was set at "3 rounds to win." In this experiment, frustration with both the nonviolent game (DDR) and violent game (MK) was therefore manipulated by first offering the subject a valuable goal (performing well enough to win the $100) and then changing the game settings. If frustration is defined by the blockage of goal attainment, then blocking the subject's perceived chances of winning $100 by having the difficulty be extremely high should result in frustration. After changing or checking the settings for the various conditions (which usually took around a minute) the experimenter asked the subject to come back into the play room and have a seat. The experimenter repeated that now the subject would have 10 minutes to play the game alone and their performance would be recorded. The experimenter began the 10-minute timer, left the room, closed the door, and let the subject play for 10 minutes.

At the end of the 10-minute period, the experimenter returned with a pencil and original questionnaire booklet that the subject initially filled out. The experimenter asked the subject to stop playing the game and then turned off the television. The experimenter asked the subject to complete the last set of questions and then return the booklet to the experimenter. This last questionnaire, the Video Game Rating Sheet (1985; Appendix H), was in fact the most important. As previously noted, this questionnaire asks the subject to rate the video game they just played in terms of difficulty, enjoyment, frustration, excitement, pace of the action, violent content, and violent graphics on a 7-point scale. After the completion of this scale, the subject brought the booklet to the experimenter in his office where the experimenter collected the

booklet, gave the subject a debriefing sheet (Appendix I), and then verbally debriefed the subject regarding the true aim of the study.

Results of the Pilot Study

Separate one-way ANOVAs were run on each of the 7 characteristics of the Video Game Rating Sheet from the pilot study using condition (DDR, DDRF, MK, and MKF) as the independent factor. A homogeneity of variance test was run to ensure variances could be assumed equal between conditions (see Appendix J). The violation of homogeneity can be explained in the measure of violent content and violent graphics because for the nonviolent conditions (DDR, DDRF), all subjects ranked these characteristics as 1 on the 7-point scale. There simply was no variation in answers on these two characteristics within those two conditions. However there was variance on those two characteristics for the violent conditions (MK, MKF).

Results of the separate one-way ANOVAs found the following variables to be significantly different: difficulty, frustration, fast (pace of action), violent content, and violent graphics (see Appendix K). In post hoc testing, it was revealed that individually MK and MKF were significantly more violent in content and in graphics than DDR and DDRF (see Appendix L). This is important because a main criticism of much video game violence experiments has been that the competing video games did not show enough difference in violent content between the nonviolent and violent games (Funk, Buchman, Jenks, & Bechtoldt, 2003; Carnagey & Anderson, 2004). In fact, experiments which had a bigger difference in violent content between the nonviolent and violent games tended to show a larger effect of violent content on aggressive behavior (Anderson, 2003). It should be noted that violence in content and violence in graphics

were significantly positively correlated (r=.994, p<.001; see Appendix M). This correlation has also been found in another study (Anderson & Ford, 1986).

Another significant positive correlation of importance was that of difficulty and frustration (r=.901, p<.001; see Appendix M). Again, Anderson and Ford found a similar effect. This makes heuristic sense if one considers that as a task gets more difficult it can become more frustrating. Post hoc testing of the characteristic of frustration revealed: 1) DDRF was significantly more frustrating than DDR, 2) MKF was significantly more frustrating than MK, 3) there were no significant differences between DDR and MK, and 4) there were no significant differences between DDRF and MKF (see Appendix N). Post hoc testing of the characteristic of difficulty mimicked that of frustration (see Appendix N), making sense being that the two characteristics were so highly correlated. This manipulation check suggests that the manipulation of both violence and frustration is effective and that other variables such as enjoyment and excitement do not significantly differ.

There is however one problem with the manipulation check. It was found that fast, or pace of the action, significantly varied among the conditions (see Appendix K). Post hoc analysis revealed that DDR was slower than MK, MKF, or DDRF (see Appendix O). However, there were no significant differences between MK and MKF or DDRF and no significant difference between DDRF and MKF (see Appendix O). Therefore, it is suggested that DDR being slower than the other games was the problem. However, the author felt that quickening the pace of the game could inadvertently affect the difficulty of the game. If in the dancing game the speed of the game increased, the difficulty and frustration with game play may have increased. Correlations between these factors lend support to this belief (see Appendix M). Fast was positively correlated to both difficulty (r=.685, p=.001) and frustration (r=.596, p=.006). The

author believes the problem with the fast characteristic should be noted but not used to discredit these two games and their manipulations as being a good fit for this experiment.

Procedure of the Main Experiment

Phase 1[2]

As mentioned in detail earlier, 150 male undergraduates were recruited for the experiment. Psychology students signed up online for a date to come in and complete the first phase of the experiment. When the experimenter recruited subjects from mass communication courses, he brought with him a sign up sheet so the students could pick a date to participate in the first phase. The first phase of the experiment was always held on a Monday night except in one case where Monday was a school holiday and that week's first session was on the following Tuesday night. For the first session, the recruits would come to a large lecture room. As they entered, the experimenter asked them to check in with him so he could mark them present and asked them to sign up for a second session to complete the experiment. These second sessions consisted of 45-minute slots held during the same week typically from 1 to 6pm. It was left up to the subject to pick which day he would return for the second session. Some subjects may have chosen to return the next day or four days later on a Friday. No sessions were held on Saturday or Sunday. Since the aim of the first session was to merely gain background and personality information, there was no theoretical basis to suggest waiting four days as opposed to one day would affect the results.

When the designated time for the session arrived, the experimenter handed out two copies of a consent form (Appendix P) to each subject and also handed out pencils if needed. Both copies were to be signed with one copy returned to the experimenter and one copy kept by the

[2] See Figure 4.4 for a graphical map of the first phase of the main experiment procedure

subject. When all subjects had signed the consent forms, the experimenter gathered one copy of the form and handed out a questionnaire booklet.

The first item in the questionnaire booklet was an information sheet that asked for the subject's name, a phone number where the subject could be reached, and the subject's email address (Appendix Q). These were needed so the experimenter could remind the subject about arriving for the second session or to call the subject in case the second session needed to be cancelled or rescheduled. The second item in the booklet was the Video Game Questionnaire (Appendix B), the same as used in the pilot study. The next questionnaire (Appendix R) consisted of 25 questions taken from the State-Trait Anger Expression Inventory-2 (STAXI; Spielberger, 1999). The STAXI is composed of 57 items measuring 6 scales, 5 subscales and an anger expression index, which "provides an overall measure of the expression and control of anger" (p. 1). For the current experiment, the first 25 questions of the STAXI were used. These items measure both state anger (including the subscales "feeling angry," "feel like expressing anger verbally," and "feel like expressing anger physical") and trait anger (including the subscales "angry temperament" and "angry reaction"). The STAXI was also previously used in a video game experiment by Fleming and Rickwood (2001) to measure aggressive mood.

The fifth item in the questionnaire booklet was the Psychological Entitlement Scale (PES; Appendix C) previously mentioned and used in the pilot study. Again, this questionnaire was a distracter questionnaire added so there would be some set of questions that did not deal with aggression.

The final item in the questionnaire booklet was Buss and Warren's Aggression Questionnaire (AQ; Appendix S), the latest version of an aggression questionnaire previously released by Buss and Perry (1992). The AQ consists of 34 items divided into 5 scales (physical

aggression, verbal aggression, anger, hostility, and indirect aggression). An AQ total is also provided which sums all 34 items into one overall score. The Buss-Perry version of the AQ has been used in several video game studies (Anderson & Dill, 2000; Scott, 1995; Calvert & Tan, 1994; Uhlmann & Swanson, 2004). Both the STAXI and the AQ were used at this stage of the experiment to gather baseline information about hostile and aggressive personality characteristics. Interestingly, Sherry (2001) found that the average effect size for attitude and affect paper and pencil measures was somewhat larger than behavioral measures in many experiments. After the subjects completed all the questionnaires, they handed in their booklet. After all subjects handed in their questionnaire booklet, the first phase of the experiment was complete.

Phase 2[3]

Subjects were emailed and reminded of their appointment time a day before their appointment. For phase 2 of the experiment, subjects were run individually and a decision was made to hire two assistants to help administer this second phase. The assistants were trained and run through the procedures on three different occasions before the second phase began. One assistant was male while the other was female. The 150 subjects would be playing the same games under the same conditions as the pilot study; therefore the subjects were split into the following groups: 37 subjects were in the DDR group, 38 subjects were in the DDRF group, 38 were in the MK group, and 37 in the MKF group. This meant that an equal number of subjects were exposed to violent and nonviolent content (75 in the DDR groups and 75 in the MK groups), and exposed to frustration or low/nonfrustration (75 in each group). Subjects were randomly assigned beforehand into these conditions following the same method as the pilot study.

[3] See Figure 4.5 for a graphical map of the second phase of the main experiment procedure

Two chairs were set outside the offices where the study would be conducted (the same space as the pilot study). When subjects arrived for the experiment, the experimenter told them to have a seat and someone would be with them in a moment. Typically the subject was made to wait for five minutes, in attempt to make sure the subject's arousal was not artificially inflated from rushing or exerting himself physically in order to make the appointment. After the resting period, the subject followed the experimenter into one of two play rooms (the same as used in the pilot study). For the pilot study, only one room was used, but for the main experiment another room was set up identical to the first. Thus, both were identical to the room used in the pilot study. The same brand television and Playstation 2 were used.

Once the subject had a seat in the play room, the experimenter stated that it was first necessary to get a baseline heart rate and blood pressure measure. The experimenter then used an Omron automatic blood pressure monitor (model HEM-712C), following the device's manual, to obtain heart rate, systolic blood pressure, and diastolic blood pressure from the subject. This information was recorded on the first page of a questionnaire booklet (Appendix T) which would later be given to the subject. After taking these arousal measurements, the experiment proceeded exactly as it occurred in the pilot study. The goal or objective of the experiment was read to the subject. The rules were stated, and the practice session began followed by the frustration manipulation and the 10-minute play period. However, when the 10-minute play period ended, the experimenter entered the play room with the questionnaire booklet, turned off the television, and told the subject that heart rate and blood pressure needed to be measured again. This again was done with the automatic blood pressure monitor. These measurements served as a post-test measure of arousal to compliment the pre-test measure that was taken before playing the game. After these measures were recorded, the experimenter told

the subject that all that remained was filling out the rest of the questions in the questionnaire booklet. At that point, the experimenter handed the booklet and a pencil to the subject and informed them to please deliver the booklet to the experimenter's office when finished.

The booklet contained a cover sheet (Appendix T) which asked for the subject's name and also contained the arousal scores at the bottom. The first questionnaire in the booklet contained the same 25 items from the STAXI that were asked in phase 1 (Appendix R). This questionnaire served as a post-test measure of affect to compliment the pre-test measure that was taken during phase 1. The next questionnaire was the Video Game Rating Sheet (Appendix H) used in the pilot study. This questionnaire served three purposes: 1) it served as a distracter task that specifically did not ask questions about personal hostility, 2) it could be compared with the same measures taken during the pilot to see if the games were still evenly matched, and 3) if the games did not match exactly as before on the characteristics, scores on those characteristics could be used as covariates in the analysis. The final questionnaire in the booklet was the AQ that was used in phase 1 (Appendix S). Again, this questionnaire served as a post-test measure of affect to compliment the pre-test measure that was taken during phase 1.

The experimenter left the subject to fill out the booklet alone and returned to the main office. When the subject finished the booklet, he returned it to the experimenter in the main office and the experimenter handed the subject a debriefing sheet (Appendix U) and verbally debriefed them towards the true aim of the experiment. The subject left, and this concluded both phase 2 and the main experiment. The total time for running phase 2 was approximately 45 minutes.

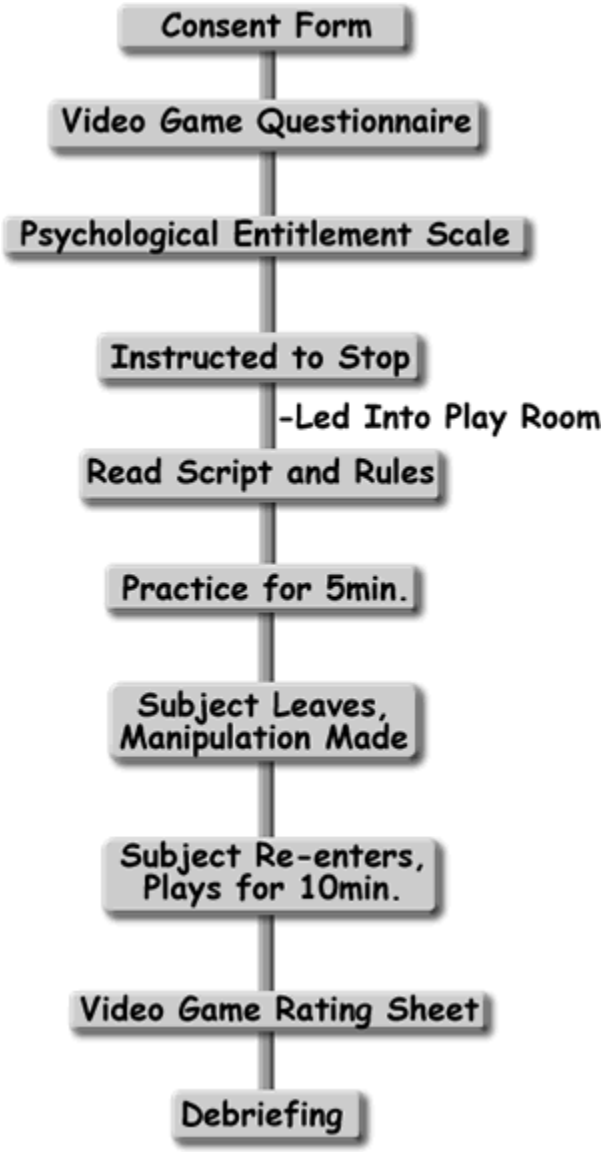


Figure 4.3. Pilot Study Procedure Map

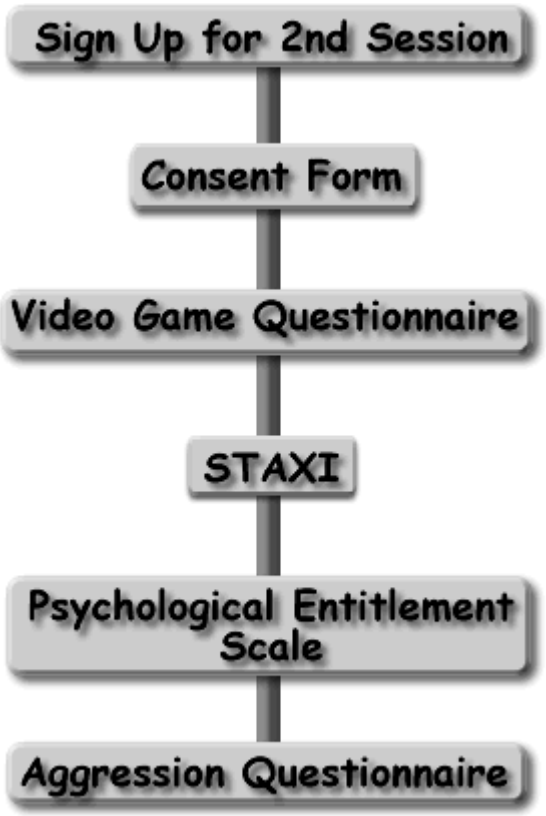


Figure 4.4. Main Experiment Phase 1 Procedure Map

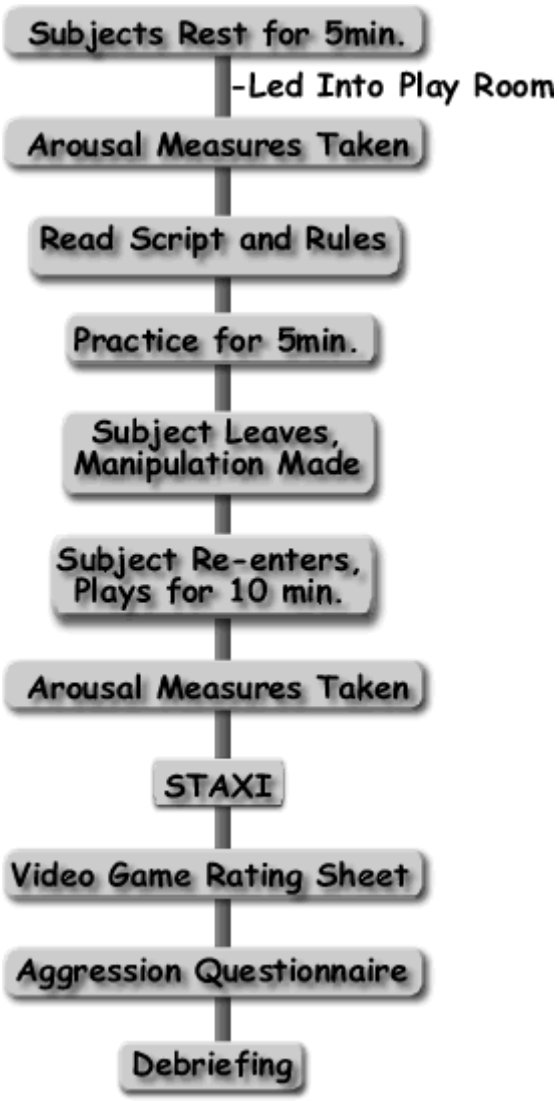


Figure 4.5. Main Experiment Phase 2 Procedure Map

CHAPTER 5

RESULTS

Descriptive Information

Although not the key focus of this study, it is interesting to note some key descriptive trends about video game use that have also been mentioned in past studies. An estimate of time spent playing video games revealed that subjects typically play video games on average of 9.5 hours per week. This number is higher than the 5.72 hours per week reported by the Kaiser Family Foundation (2005); however, their report only looked at 8 to 18 year olds. Perhaps game play increases once one enters college.

All subjects reported having played a video game in their lifetime. When asked to classify the genre of their most played games; "fighting with weapons" was cited most often. When asked to name their most played games, Halo 2, a first person shooter, was most frequently cited. When asked to rate the violent content of these video games on a scale of 1 (little or no violent content) to 7 (extremely violent content), subjects reported their most played games averaged around 3.7. Another point of interest reveals that the least cited genre was educational/family game.

Combining Variables for Analysis

Of particular interest to this study was the effect of violence and frustration on measures of arousal and measures of state hostility (or anger). The key measures composing the dependent variable of arousal were heart rate, SBP, and DBP. Key measures of affect were scores on the STAXI subscale of state anger, the anger subscale of the AQ, and the hostility subscale of the

AQ. The AQ manual (Buss & Warren, 2000) explains the difference between the anger and hostility subscales. The manual states, "The Anger subscale of the AQ includes seven items that describe aspects of anger related to arousal and sense of control…High scores on this scale are often associated with the presence of irritability, frustration, emotional lability, and temperamental gesturing" (p. 14). The Hostility subscale "is the one most closely associated with pervasive social maladjustment, as well as severe psychopathology and even physical illness" (p. 14). Subjects with elevated scores on this subscale experience "a high proportion of angry thoughts and generate internalized reactions to perceived assaults on their well-being by others" (p. 15). On the STAXI, the State Anger subscale is defined as measuring "the intensity of angry feelings and the extent to which a person feels like expressing anger at a particular time" (Spielberger, 1999, p. 2).

A correlation matrix was conducted on the data gathered during phase 2 of the main experiment to see if these measures could be combined for multivariate analysis (Table 5.1). After playing the video game, SBP and DBP were positively correlated ($p<.001$). However heart rate was positively correlated to DBP but not SBP. Therefore the measures of blood pressure (SBP and DBP) will be combined for multivariate analysis and the measure of heart rate will be kept separate for univariate analysis.

Affect measures taken after playing the video game were also analyzed for correlations (Table 5.1). The STAXI State Anger subscale and the AQ Anger subscale were positively correlated ($p<.001$). These two anger subscales were combined for a final multivariate analysis. Even though the AQ Hostility scale was positively correlated to both the AQ Anger ($p<.001$) and the STAXI State Anger ($p<.001$) subscales, the aforementioned definitions made the author

hesitant to combine the hostility construct with the anger subscales. Thus, the AQ Hostility subscale will be kept separate for univariate analysis.

Discrepancies Found in Game Ratings

As was previously mentioned the same Video Game Ratings Sheet (Appendix H) that was used in the pilot study to determine matching games was also used in phase 2 of the main experiment. This was done to compare the results of the ratings in the pilot study to those in the main experiment, and, if differences existed, use the main experiment findings as covariates in our main analysis. Indeed, differences were found.

As was the case in the pilot study, significant differences existed in the ratings of difficulty, frustration, fast (pace of action), violent content, and violent graphics. All of these differences were expected except that of pace. However, in the main study enjoyment (p=.005) and excitement (p<.001) were now significantly different as well (see Table 5.2). Therefore, data for this study will be analyzed in two separate fashions: 1) post-test (after gameplay) dependent measures will be analyzed using the pretest measures as covariates and 2) post-test (after gameplay) dependent measures will be analyzed using the pretest measures and the phase 2 ratings of enjoyment, excitement, and fast as covariates.[4] Comparing the two analyses may uncover a pattern influenced by enjoyment, excitement, and pace.

Coding the Independent Variables

For this study, the two independent variables of violent content and frustration with gameplay were used to analyze the data. This is different than in the pilot study where the four separate video games served as the independent variable. For the main experiment the games

[4] To avoid later confusion, only pretest heart rate, blood pressure, and affect measures are included as covariates in the "Initial Analysis." When discussing the results of the "Analysis with Extra Covariates," the ratings measures of excitement, enjoyment and fast are added as covariates along with the pretest measures used in the "Initial Analysis."

were coded as either a 0 (nonviolent) or 1 (violent) for the violent content variable. The same coding (0 for low/nonfrustrating and 1 for frustrating) was used for frustration. Therefore for the violent content independent variable, the nonviolent games DDR (Dance Dance Revolution low/nonfrustrating) and DDRF (Dance Dance Revolution frustrating) were coded as 0 and the violent games MK (Mortal Kombat low/nonfrustrating) and MKF (Mortal Kombat frustrating) were coded as 1. For the frustration independent variable, DDR and MK were coded as 0 and DDRF and MKF were coded as 1.

Arousal

Initial Analysis

Heart rate after gameplay was analyzed using a 2 x 2 ANCOVA with heart rate before gameplay as the covariate (Table 5.3). Results indicate no significant main effect for either violent content (p=.539) or frustration (p=.947). Interaction between the two independent variables was also nonsignificant (p=.718). This means that the presence of either violence or frustration in the video games did not significantly affect heart rate compared to the absence of either violence or frustration. Heart rate means appear in Table 5.4.

Blood pressure was analyzed using a 2 x 2 MANCOVA entering SBP and DBP as the dependent variable, with the pretest measures of SBP and DBP as the covariates (Table 5.5). Initial data screening indicated 2 outliers in the SBP measurement and 1 in the DBP measurement. These cases were removed for the analysis. The covariates of SBP before gameplay (p<.001) and DBP before gameplay (p<.001) were both significant.

The main effect of violent content (p=.225) was nonsignificant, but the main effect of frustration was significant (p=.004). Univariate ANOVA results indicate that frustration significantly affected both SBP (p=.033) and DBP (p=.002, Table 5.6). This means that the

frustrating games led to a significant increase in blood pressure when compared to the low/nonfrustrating games. The interaction of violent content and frustration was found to be nonsignificant (p=.210). These results suggest that heart rate is unaffected by content, frustration, or the combination of the two. Blood pressure is significantly affected by frustration but not necessarily violent content. Although both SBP and DBP are affected by frustration, it seems DBP is affected more than SBP. Blood Pressure means appear in Table 5.4.

In seeking to answer how groups ranked on measures on physiological arousal, it was hypothesized that MKF (violent and frustrating) would have the highest ratings and DDR (nonviolent and low/nonfrustrating) would have the lowest but what was not known was how MK (violent and low/nonfrustrating) and DDRF (nonviolent but frustrating) would compare. In terms of heart rate, MKF ranked the highest and DDR (nonviolent and low/nonfrustrating) ranked the lowest. This was as hypothesized. DDRF (nonviolent but frustrating) was the second highest rate followed closely by MK (violent but low/nonfrustrating). Means can be found in Table 5.4.

In terms of systolic blood pressure, DDRF had the highest SBP, followed by MKF, then MK, and finally DDR. This was not as hypothesized, with the exception of DDR having the lowest SBP. For diastolic blood pressure, DDRF had the highest DBP, followed by MKF, then DDR, and finally MK. None of the DBP ranks match the hypothesis. Means can be found in Table 5.4.

Analysis Including Ratings Covariates

This analysis included the phase 2 ratings of enjoyment, excitement, and pace, as well as the original pretest measures used in the above analysis. Again, heart rate was analyzed using ANCOVA (Table 5.3). Significance of the covariates were as follows: 1) heart rate before

gameplay was significant (p<.001), 2) enjoyment was nonsignificant (p=.066), 3) excitement was nonsignificant (p=.110), and 4) fast (pace of action) was nonsignificant (p=.133). Thus all of the ratings characteristics were nonsignificant when added to the analysis. Results indicate no significant main effect for either violent content (p=.176) or frustration (p=.195). Interaction between the two independent variables was also nonsignificant (p=.335). This means that the presence of either violence or frustration in the video games did not significantly affect heart rate compared to the absence of either violence or frustration. Heart rate means appear in Table 5.4.

Blood pressure was again analyzed using a MANCOVA, but this time enjoyment, excitement, and pace were added to the covariates of SBP and DBP before gameplay (Table 5.5). Significance of the covariates were as follows: 1) SBP before gameplay was significant (p<.001), 2) DBP before gameplay was significant (p<.001), 3) enjoyment was nonsignificant (p=.819), 4) excitement was nonsignificant (p=.770), and 5) fast (pace of action) was nonsignificant (p=.584).

The main effect of violent content on blood pressure was nonsignificant (p=.547), but the main effect of frustration was significant (p=.025). Univariate ANOVA results indicate that frustration significantly affected both SBP (p=.034) and DBP (p=.022; Table 5.6). This means that the frustrating games led to a significant increase in blood pressure when compared to the low/nonfrustrating games. The interaction of violent content and frustration was found to be nonsignificant (p=.240). This would suggest that heart rate is still unaffected by content, frustration, or the combination of the two. Blood Pressure is still significantly affected by frustration but not necessarily content. While both SBP and DBP are affected by frustration, it seems DBP is affected more than SBP. These results mimic those of the original analysis without the added covariates. Blood pressure means appear in Table 5.4.

Looking at the rankings of measures of physiological arousal in this new analysis, the following was found. In terms of heart rate, the MKF (violent and frustrating) grouped ranked the highest and DDR (nonviolent and low/nonfrustrating) ranked the lowest. This was as hypothesized. DDRF (nonviolent but frustrating) was the second highest rate followed closely by MK (violent but low/nonfrustrating). Means can be found in Table 5.4.

In terms of systolic blood pressure, DDRF had the highest SBP, followed by MKF, then MK, and finally DDR. This was not as hypothesized, with the exception of DDR having the lowest SBP. For diastolic blood pressure, DDRF had the highest DBP, followed by MKF, then DDR, and finally MK. None of the DBP ranks match the hypothesis. Means can be found in Table 5.4. The physiological ranking results mimic those of the original analysis without the added covariates.

Some interesting events occur when comparing the initial analysis to the analysis with the extra covariates added. For the measure of heart rate, while adding the covariates did not result in significance, it did improve the p value for both violence and frustration as well as the interaction of the two (Table 5.3). Most notably, enjoyment almost achieved significance as a covariate of heart rate. It could be that as one enjoys playing the game more, heart rate increases. However, adding the covariates to the blood pressure analysis had the opposite effect, increasing the p values. When compared to the initial analysis, adding the extra covariates did not change the individual rankings of the games on measure of physiological arousal.

Affect

Initial Analysis

The score on the Aggression Questionnaire Hostility subscale (AQ Hostility) after gameplay was analyzed using a 2 x 2 ANCOVA with the score before gameplay (collected

during phase 1) used as the covariate (Table 5.7). Results indicate no significant main effect for violent content (p=.063). However, there was a significant main effect for frustration (p=.034). This means that the frustrating games led to a significant increase in AQ Hostility scores when compared to low/nonfrustrating games. Interaction between the two independent variables was also significant (p=.028). Both violent and nonviolent games score at the same level when they are nonfrustrating; but when the games are frustrating, the violent game produces a greater score than the nonviolent game**.** This interaction is represented graphically in Figure 5.6. AQ Hostility means appear in Table 5.8.

Anger was measured by entering the STAXI State Anger and AQ Anger scores gained after gameplay as a dependent variable in a 2 x 2 MANCOVA analysis (Table 5.9). The STAXI State Anger and AQ Anger scores gathered before gameplay (during phase 1) were used as covariates in the analysis. The covariates of STAXI State Anger before gameplay (p<.001) and AQ Anger before gameplay (p<.001) were both significant.

The main effect of violent content was significant (p=.003). Univariate ANOVA results revealed that violent content significantly affected the STAXI State Anger score (p=.001), but was nonsignificant for the AQ Anger score (p=.132; Table 5.10). The main effect of frustration was also significant (p<.001). Univariate ANOVA results revealed that frustration significantly affected the STAXI State Anger score (p<.001) but was nonsignificant for the AQ Anger score (p=.302; Table 5.10). This means that both violent content and frustration individually led to significant increases in scores on the STAXI State Anger measure when compared to nonviolent and low/nonfrustrating games, but neither significantly affected AQ Anger scores.

The interaction of violent content and frustration was found to be significant (p=<.001). Univariate ANOVA results revealed that the interaction significantly affected both the STAXI

State Anger score (p=.003) and the AQ Anger score (p=.003; Table 5.10). For the STAXI score, both the violent and nonviolent games score nearly the same when the condition in nonfrustrating; but when the games are frustrating, the violent game produces a greater score than the nonviolent game (Figure 5.8). For the AQ score, there is an interesting difference. For the nonfrustrating games, the nonviolent game actually scores higher than the violent game; however, this reverses itself when the games are frustrating. When frustrating, the violent game scores higher than the nonviolent game (Figure 5.10). STAXI State Anger and AQ Anger means appear in Table 5.8.

In seeking to answer how groups ranked on measures of affect, it was hypothesized that MKF (violent and frustrating) would have the highest ratings and DDR (nonviolent and low/nonfrustrating) would have the lowest but what was not known was how MK (violent and low/nonfrustrating) and DDRF (nonviolent but frustrating) would compare. In terms of AQ Hostility scores, MKF ranked the highest followed by DDR, then DDRF, and finally MK. This means that only MKF ranked in the manner hypothesized. Means can be found in Table 5.8.

In terms of the STAXI State Anger measure, MKF had the highest score, followed by DDRF, then MK, and finally DDR. The rankings of MKF and DDR were as hypothesized. For AQ Anger, MKF had the highest score, followed by DDR, then MK, and finally DDRF. Again, this was not as hypothesized, with the exception of MKF having the highest score. Means can be found in Table 5.8.

Analysis Including Ratings Covariates

This analysis included the phase 2 ratings of enjoyment, excitement, and pace, as well as the original pretest measures used in the above analysis. Again, AQ Hostility was analyzed using ANCOVA (Table 5.7). Significance of the covariates were as follows: 1) AQ Hostility

before gameplay was significant (p<.001), 2) enjoyment was nonsignificant (p=.851), 3) excitement was nonsignificant (p=.379), and 4) pace was nonsignificant (p=.977). Thus all of the ratings characteristics were nonsignificant when added to the analysis. Results indicate no significant main effect for either violent content (p=.360) or frustration (p=.107). This means that the presence of either violence or frustration in the video games did not significantly affect AQ Hostility scores compared to the absence of either violence or frustration. However, the interaction between the two independent variables was significant (p=.038). This interaction is similar to its counterpart in the initial analysis, the major difference being the nonfrustrating condition. In that condition the violent and nonviolent games do not score as close together as in the initial analysis. In fact, the nonviolent game actually scores higher than the violent game. This interaction is represented graphically in Figure 5.7. AQ Hostility means appear in Table 5.8.

Anger was again analyzed using a MANCOVA, but this time enjoyment, excitement, and pace were added to the covariates of STAXI State Anger and AQ Anger before gameplay (Table 5.9). Significance of the covariates were as follows: 1) STAXI State Anger before gameplay was significant (p<.001), 2) AQ Anger before gameplay was significant (p<.001), 3) enjoyment was nonsignificant (p=.217), 4) excitement was nonsignificant (p=.223), and 5) fast (pace of action) was nonsignificant (p=.211).

Both the main effects of violent content (p=.008) and frustration (p=.001) on the anger measures were significant. Univariate ANOVA results indicate that violent content significantly affected STAXI State Anger scores (p=.002), but did not significantly affect AQ Anger scores (p=.306; Table 5.10). Frustration significantly affected STAXI State Anger scores (p=<.001), but did not significantly affect AQ Anger scores (p=.648; Table 5.10). This means that although

violent content and frustration significantly affected anger scores, they significantly affected them only on the STAXI measure and not the AQ measure.

The interaction of violent content and frustration was found to be significant (p=<.001). Univariate ANOVA results revealed that the interaction significantly affected both the STAXI State Anger score (p=<.001) and the AQ Anger score (p=.010; Table 5.10). On the STAXI score, the interaction is similar to that of the initial analysis except that there is more of a separation in scores in the nonfrustrating condition with the nonviolent game scoring higher than the violent game (Figure 5.9). For the frustrating condition, the violent game scores higher than the nonviolent game. The AQ Anger interaction is very similar to the initial analysis with the nonviolent game scoring higher during the nonfrustrating condition but the violent game scoring higher in the frustrating condition (Figure 5.11). STAXI State Anger and AQ Anger means appear in Table 5.8.

Looking at the rankings of measures of physiological arousal in this new analysis, the following was found. In terms of AQ Hostility, the MKF group ranked the highest, followed by DDR, then DDRF, and finally MK. This was not as hypothesized, with the exception of MKF having the highest score. Means can be found in Table 5.8.

For the STAXI State Anger score, MKF had the highest score, followed by DDRF, then DDR, and finally MK. This was not as hypothesized, with the exception of MKF having the highest score. For the AQ Anger Score, MKF had the highest score, followed by DDR, then MK, and finally DDRF. MKF did rank as hypothesized, but DDR did not. Means can be found in Table 5.8. The affect ranking results mimic those of the original analysis without the added covariates, except in the case of the STAXI measure where DDR and MK switch rankings.

The results from the revised analysis which includes the ratings of enjoyment, excitement, and pace actually differ from those of the initial analysis. In the initial analysis, AQ Hostility was not significantly affected by violent content but was significantly affected by frustration. However frustration became nonsignificant when adding in extra covariates. In both analyses, the interaction of violence and frustration was significant. When looking at the MANCOVA, no major differences occurred.

In Summary

Summarizing the findings, significant differences in heart rate do not result when manipulating either violent content or frustration with videogame play. Manipulating violent content does not appear to significantly affect blood pressure, but frustration does significantly affect both systolic and diastolic blood pressure with a frustrating game increasing blood pressure when compared to a low or nonfrustrating game. The interaction between violent content and frustration is nonsignificant.

When using the Aggression Questionnaire's subscale measure of hostility, it was found that a violent game does not significantly result in more hostility when compared to a nonviolent game. A frustrating game does significantly result in a higher AQ Hostility score than a low/nonfrustrating game; however, this effect weakens when considering extra gameplay covariates such as excitement, enjoyment, and pace. There is a significant interaction between the two independent variables. When the game is nonfrustrating, both violent and nonviolent games score nearly the same amount of hostility. When the game is frustrating, a person playing the violent game scores higher on hostility than a person playing a nonviolent game.

Other measures, such as the STAXI Anger subscale and the AQ Anger subscale, were used to assess affect. Violent content, compared to nonviolent content, significantly affects

scores on the STAXI subscale but not on the AQ Anger subscale. This results in a finding of significance for the violent content independent variable as a whole. Frustration also is a significant factor, resulting in higher scores on the STAXI, when compared to a low/nonfrustrating game. However, frustration does not appear to significantly affect the AQ Anger subscale. There is a significant interaction between the two independent variables. When playing a nonfrustrating game, scores on the STAXI are nearly the same whether one plays a violent or nonviolent game. When playing a frustrating game, a person playing a violent game scores higher on the STAXI than a person playing a nonviolent game. The interaction as measured by the AQ Anger subscale is somewhat different. There is a disordinal effect. When playing a nonfrustrating game, a person playing a nonviolent game scores higher on the AQ Anger measure than a person playing a violent game. However this effect reverses when playing a frustrating game. Then the person playing a violent game scores higher on the AQ Anger measure when compared to a person playing the nonviolent game. Interpretation of all results will be discussed further in the next chapter.

Table 5.1. Correlation Matrix for Measures Gathered After Gameplay

		Systolic Blood Pressure After Gameplay	Diastolic Blood Pressure After Gameplay	Heart Rate After Gameplay	Phase 2 STAXI State Anger Subscale	Phase 2 AQ Anger Subscale	Phase 2 AQ Hostility Subscale
Systolic Blood Pressure After Gameplay	Pearson Correlation	1	0.417**	-0.011	0.057	-0.016	-0.081
	Sig.		<.001	0.889	0.49	0.844	0.326
Diastolic Blood Pressure After Gameplay	Pearson Correlation	0.417**	1	0.322**	0.086	-0.07	-0.168
	Sig.	<.001		<.001	0.293	0.393	0.039
Heart Rate After Gameplay Gamplay	Pearson Correlation	-0.011	0.322**	1	0.113	-0.053	0.027
	Sig.	0.889	<.001		0.167	0.517	0.744
Phase 2 STAXI State Subscale	Pearson Correlation	0.087	0.03	0.06	1	0.644**	0.335**
	Sig.	0.292	0.718	0.466		<.001	<.001
Phase 2 AQ Anger Subscale	Pearson Correlation	-0.016	-0.07	-0.053	0.423**	1	0.393**
	Sig.	0.844	0.393	0.517	<.001		<.001
Phase 2 AQ Hostility Subscale	Pearson Correlation	-0.081	-0.168	0.027	0.225**	0.393**	1
	Sig.	0.326	0.039	0.744	0.006	<.001	

Table 5.2. Descriptive Statistics and ANOVAs for Game Ratings During Phase 2

Rating Characterisitc	Condition	Mean	Std. Deviation	DF	F	Sig.
Rating of how difficult game was (1 to 7)				3, 146	157.936	<.001
	DDR	1.405	0.551			
	DDRF	5.237	1.149			
	MK	2.789	1.189			
	MKF	5.784	0.976			
Rating of how enjoyable game was (1 to 7)				3, 146	4.501	0.005
	DDR	3.514	1.660			
	DDRF	3.737	1.811			
	MK	4.789	1.298			
	MKF	4.000	1.633			
Rating of how frustrating game was (1 to 7)				3, 146	81.067	<.001
	DDR	1.703	1.199			
	DDRF	5.079	1.323			
	MK	2.605	1.326			
	MKF	5.568	1.237			
Rating of how exciting game was (1 to 7)				3, 146	11.186	<.001
	DDR	2.622	1.277			
	DDRF	3.368	1.895			
	MK	4.368	1.364			
	MKF	4.405	1.658			
Rating of how fast the action of the game was (1 to 7)				3, 146	30.727	<.001
	DDR	2.757	1.234			
	DDRF	5.632	1.496			
	MK	4.711	1.088			
	MKF	4.838	1.519			
Rating of how violent the content of the game was (1 to 7)				3, 146	700.437	<.001
	DDR	1.000	0.000			
	DDRF	1.000	0.000			
	MK	6.289	0.694			
	MKF	5.973	1.190			
Rating of how violent the graphics of the game were (1 to 7)				3, 146	846.665	<.001
	DDR	1.000	0.000			
	DDRF	1.000	0.000			
	MK	6.237	0.714			
	MKF	5.865	1.004			

Table 5.3. Heart Rate ANCOVA Results

	Source	df	F	Sig.	Partial Eta Squared
Initial Analysis					
	HEART RATE BEFORE GAMEPLAY	1, 145	283.721	<.001	0.662
	VIOLENCE	1, 145	0.379	0.539	0.003
	FRUSTRATION	1, 145	0.004	0.947	<.001
	VIOLENCE * FRUSTRATION	1, 145	0.131	0.718	0.001
With Extra Covariates					
	HEART RATE BEFORE GAMEPLAY	1, 142	265.901	<.001	0.652
	ENJOYMENT	1, 142	3.426	0.066	0.024
	EXCITEMENT	1, 142	2.584	0.110	0.018
	FAST	1, 142	2.282	0.133	0.016
	VIOLENCE	1, 142	1.852	0.176	0.013
	FRUSTRATION	1, 142	1.693	0.195	0.012
	VIOLENCE * FRUSTRATION	1, 142	0.936	0.335	0.007

Table 5.4. After Gameplay Arousal Means of Game Conditions

Initial Analysis	Condition	Unadjusted Mean	Std. Deviation	N	Adjusted Mean	Std. Error
Heart Rate	DDR	72.135	13.462	37	73.713	1.177
	DDRF	75.921	13.216	38	74.057	1.163
	MK	74.132	10.858	38	74.853	1.159
	MKF	74.757	11.171	37	74.352	1.174
SBP						
	DDR	123.000	11.693	37	123.427	1.465
	DDRF	130.611	11.544	36	129.120	1.489
	MK	128.316	11.637	38	128.129	1.455
	MKF	127.528	10.112	36	128.778	1.490
DBP						
	DDR	66.838	8.139	37	67.923	1.046
	DDRF	72.167	10.937	36	71.187	1.063
	MK	69.079	9.746	38	67.441	1.039
	MKF	69.167	9.629	36	70.760	1.064
With Extra Covariates						
Heart Rate	DDR	72.135	13.462	37	71.833	1.405
	DDRF	75.921	13.216	38	74.911	1.314
	MK	74.132	10.858	38	74.850	1.175
	MKF	74.757	11.171	37	75.359	1.232
SBP						
	DDR	123.000	11.693	37	123.602	1.796
	DDRF	130.611	11.544	36	129.901	1.702
	MK	128.316	11.637	38	127.463	1.508
	MKF	127.528	10.112	36	128.518	1.595
DBP						
	DDR	66.838	8.139	37	68.423	1.298
	DDRF	72.167	10.937	36	70.890	1.229
	MK	69.079	9.746	38	67.350	1.090
	MKF	69.167	9.629	36	70.639	1.152

Table 5.5. Blood Pressure MANCOVA Results

	Source	df	Wilks' Λ	F	Sig.	Partial Eta Squared
Initial Analysis						
	SBP BEFORE GAMEPLAY	2, 140	0.700	30.057	<.001	0.300
	DBP BEFORE GAMEPLAY	2, 140	0.485	74.395	<.001	0.515
	VIOLENCE	2, 140	0.979	1.506	0.225	0.021
	FRUSTRATION	2, 140	0.925	5.693	0.004	0.075
	VIOLENCE * FRUSTRATION	2, 140	0.978	1.578	0.210	0.022
With Extra Covariates						
	SBP BEFORE GAMEPLAY	2, 137	0.695	30.028	<.001	0.305
	DBP BEFORE GAMEPLAY	2, 137	0.501	68.223	<.001	0.499
	ENJOYMENT	2, 137	0.997	0.200	0.819	0.003
	EXCITEMENT	2, 137	0.996	0.262	0.770	0.004
	FAST	2, 137	0.992	0.541	0.584	0.008
	VIOLENCE	2, 137	0.991	0.607	0.547	0.009
	FRUSTRATION	2, 137	0.948	3.782	0.025	0.052
	VIOLENCE * FRUSTRATION	2, 137	0.979	1.444	0.240	0.021

Table 5.6. Univariate ANOVAs for Measure of Blood Pressure

Initial Analysis						
	Source	Dependent Variable	df	F	Sig.	Partial Eta Squared
	VIOLENCE	Systolic blood pressure after gameplay	1, 141	2.190	0.141	0.015
		Diastolic blood pressure after gameplay	1, 141	0.187	0.666	0.001
	FRUSTRATION	Systolic blood pressure after gameplay	1, 141	4.659	0.033	0.032
		Diastolic blood pressure after gameplay	1, 141	9.843	0.002	0.065
	VIOLENCE * FRUSTRATION	Systolic blood pressure after gameplay	1, 141	2.866	0.093	0.020
		Diastolic blood pressure after gameplay	1, 141	0.001	0.980	<.001
With Extra Variables						
	VIOLENCE	Systolic blood pressure after gameplay	1, 138	0.555	0.458	0.004
		Diastolic blood pressure after gameplay	1, 138	0.303	0.583	0.002
	FRUSTRATION	Systolic blood pressure after gameplay	1, 138	4.568	0.034	0.032
		Diastolic blood pressure after gameplay	1, 138	5.363	0.022	0.037
	VIOLENCE * FRUSTRATION	Systolic blood pressure after gameplay	1, 138	2.236	0.137	0.016
		Diastolic blood pressure after gameplay	1, 138	0.106	0.746	0.001

Table 5.7. AQ Hostility ANCOVA Results

	Source	df	F	Sig.	Partial Eta Squared
Initial Analysis					
	AQ HOSTILITY BEFORE GAMEPLAY	1, 145	498.687	<.001	0.775
	VIOLENCE	1, 145	3.506	0.063	0.024
	FRUSTRATION	1, 145	4.586	0.034	0.031
	VIOLENCE * FRUSTRATION	1, 145	4.898	0.028	0.033
With Extra Covariates					
	AQ HOSTILITY BEFORE GAMEPLAY	1, 140	460.521	<.001	0.767
	ENJOYMENT	1, 140	0.036	0.851	<.001
	EXCITEMENT	1, 140	0.778	0.379	0.006
	FAST	1, 140	0.001	0.977	<.001
	VIOLENCE	1, 140	0.843	0.360	0.006
	FRUSTRATION	1, 140	2.637	0.107	0.018
	VIOLENCE * FRUSTRATION	1, 140	4.366	0.038	0.030

Table 5.8. After Gameplay Affect Means of Game Conditions

Initial Analysis	Condition	Unadjusted Mean	Std. Deviation	N	Adjusted Mean	Std. Error
AQ Hostility	DDR	14.189	5.507	37	14.036	0.403
	DDRF	14.632	5.048	38	14.011	0.398
	MK	12.895	4.184	38	13.902	0.400
	MKF	15.892	5.724	37	15.648	0.403
STAXI State Anger						
	DDR	15.970	1.481	37	16.455	0.635
	DDRF	18.130	3.878	38	17.855	0.625
	MK	16.180	1.858	38	16.634	0.626
	MKF	22.540	7.716	37	21.881	0.638
AQ Anger						
	DDR	11.108	3.612	37	11.410	0.409
	DDRF	11.053	3.646	38	10.618	0.402
	MK	10.263	2.901	38	10.807	0.403
	MKF	12.860	4.198	37	12.451	0.411
With Extra Covariates						
AQ Hostility	DDR	14.189	5.507	37	14.221	0.485
	DDRF	14.632	5.048	38	14.025	0.459
	MK	12.895	4.184	38	13.666	0.413
	MKF	15.892	5.724	37	15.416	0.446
STAXI State Anger						
	DDR	15.970	1.481	37	16.983	0.756
	DDRF	18.130	3.878	38	17.277	0.707
	MK	16.180	1.858	38	16.578	0.644
	MKF	22.540	7.716	37	22.003	0.674
AQ Anger						
	DDR	11.108	3.612	37	11.584	0.490
	DDRF	11.053	3.646	38	10.596	0.458
	MK	10.263	2.901	38	10.839	0.417
	MKF	12.860	4.198	37	12.267	0.436

Table 5.9. Anger Scales MANCOVA Results

	Source	df	Wilks' Λ	F	Sig.	Partial Eta Squared
Initial Analysis						
	STAXI STATE ANGER BEFORE GAMEPLAY	2, 143	0.806	17.174	<.001	0.194
	AQ ANGER BEFORE GAMEPLAY	2, 143	0.515	67.336	<.001	0.485
	VIOLENCE	2, 143	0.922	6.089	0.003	0.078
	FRUSTRATION	2, 143	0.842	13.443	<.001	0.158
	VIOLENCE * FRUSTRATION	2, 143	0.899	8.050	0.001	0.101
With Extra Covariates						
	STAXI STATE ANGER BEFORE GAMEPLAY	2, 140	0.805	16.927	<.001	0.195
	AQ ANGER BEFORE GAMEPLAY	2, 140	0.510	67.262	<.001	0.490
	ENJOYMENT	2, 140	0.978	1.543	0.217	0.022
	EXCITEMENT	2, 140	0.979	1.515	0.223	0.021
	FAST	2, 140	0.978	1.572	0.211	0.022
	VIOLENCE	2, 140	0.934	4.957	0.008	0.066
	FRUSTRATION	2, 140	0.905	7.342	0.001	0.095
	VIOLENCE * FRUSTRATION	2, 140	0.891	8.532	<.001	0.109

Table 5.10. Univariate ANOVAs for Measures of STAXI State Anger and AQ Anger

Initial Analysis						
	Source	Dependent Variable	df	F	Sig.	Partial Eta Squared
	VIOLENCE	STAXI State Anger	1, 144	11.145	0.001	0.072
		AQ Anger	1, 144	2.301	0.132	0.016
	FRUSTRATION	STAXI State Anger	1, 144	26.980	<.001	0.158
		AQ Anger	1, 144	1.073	0.302	0.007
	VIOLENCE * FRUSTRATION	STAXI State Anger	1, 144	9.397	0.003	0.061
		AQ Anger	1, 144	9.096	0.003	0.059
With Extra Variables						
	VIOLENCE	STAXI State Anger	1, 141	9.655	0.002	0.064
		AQ Anger	1, 141	1.057	0.306	0.007
	FRUSTRATION	STAXI State Anger	1, 141	14.776	<.001	0.095
		AQ Anger	1, 141	0.210	0.648	0.001
	VIOLENCE * FRUSTRATION	STAXI State Anger	1, 141	12.803	<.001	0.083
		AQ Anger	1, 141	6.766	0.010	0.046

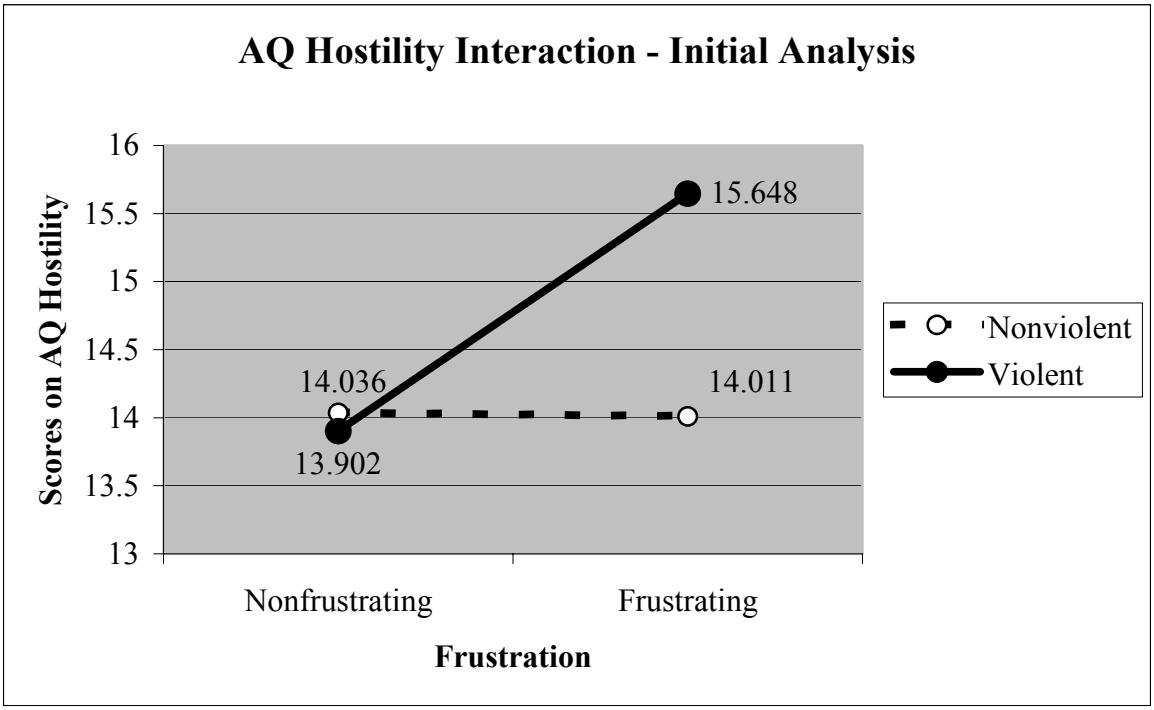


Figure 5.6. AQ Hostility Interaction – Initial Analysis

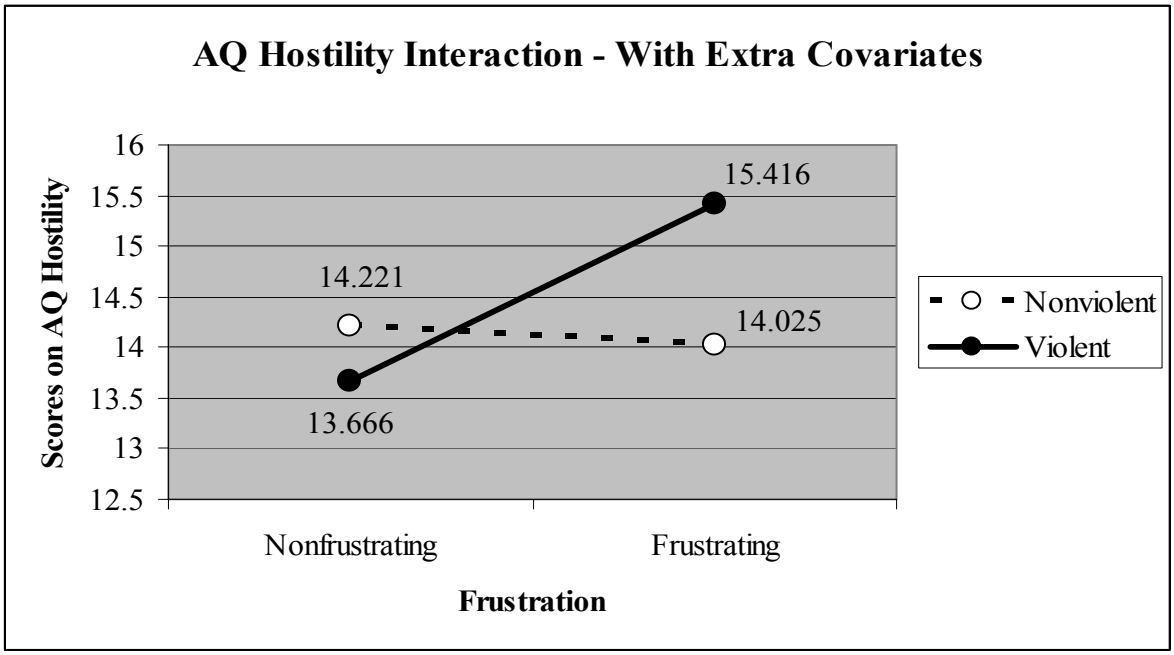


Figure 5.7. AQ Hostility Interaction – With Extra Covariates

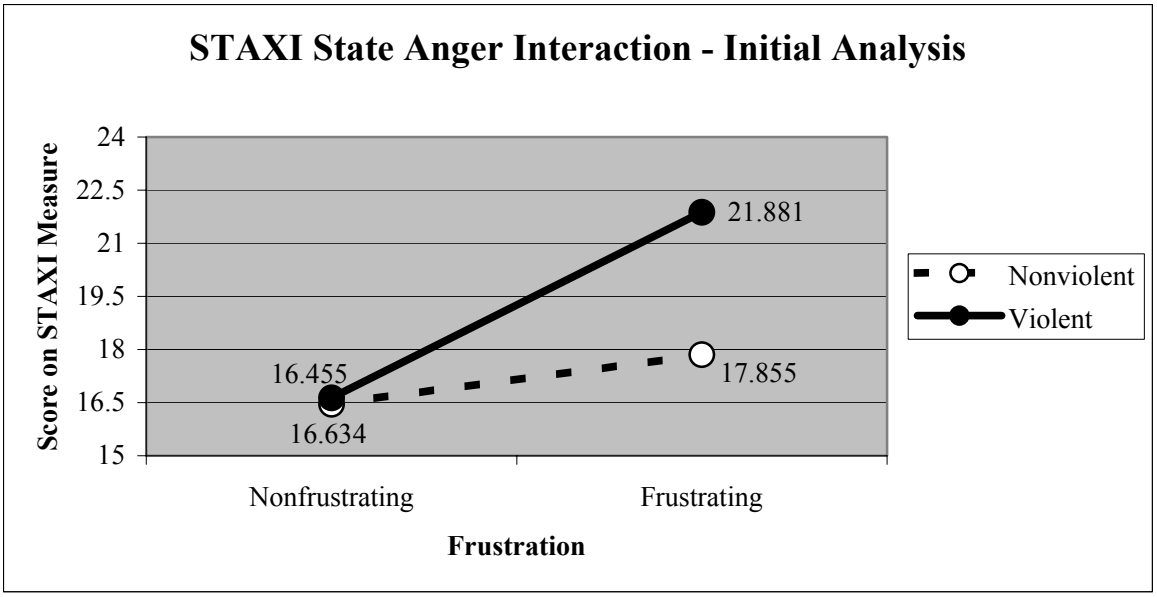


Figure 5.8. STAXI State Anger Interaction – Initial Analysis

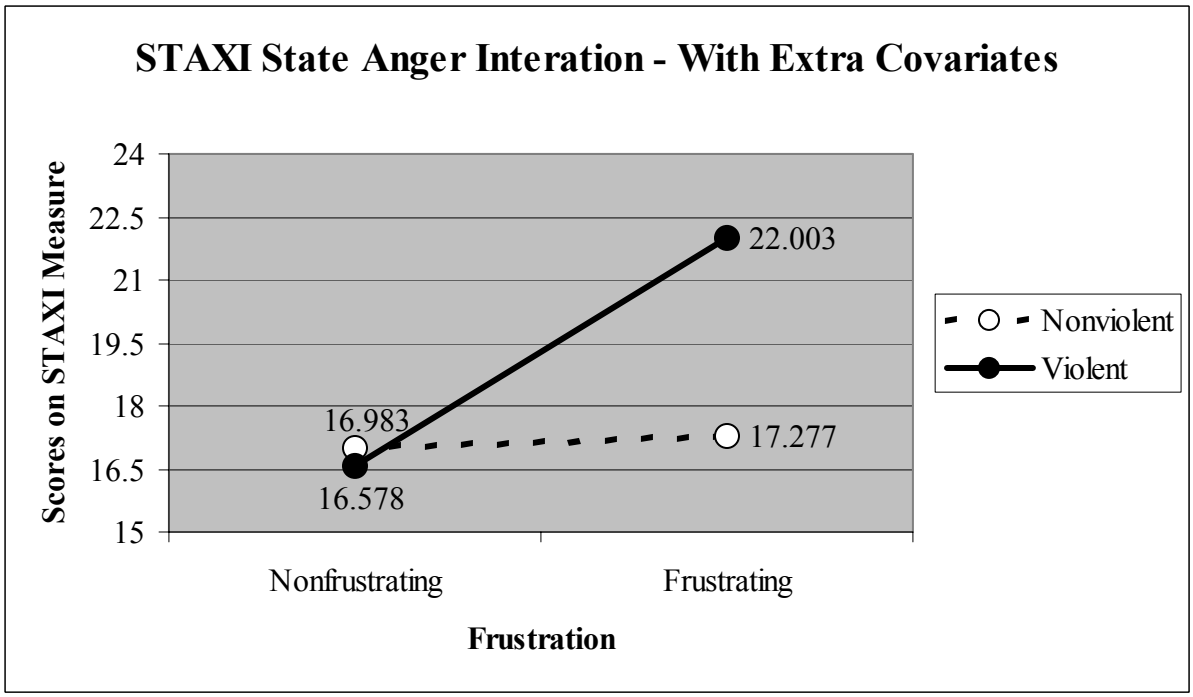


Figure 5.9. STAXI State Anger Interaction – With Extra Covariates

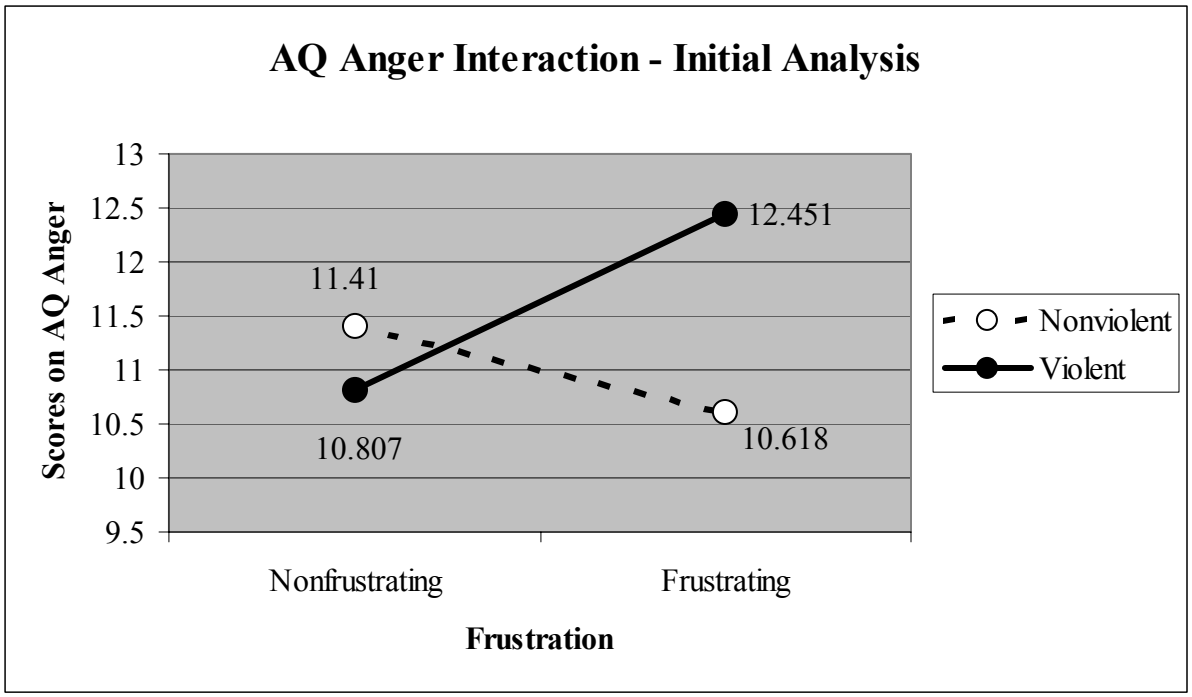


Figure 5.10. AQ Anger Interaction – Initial Analysis

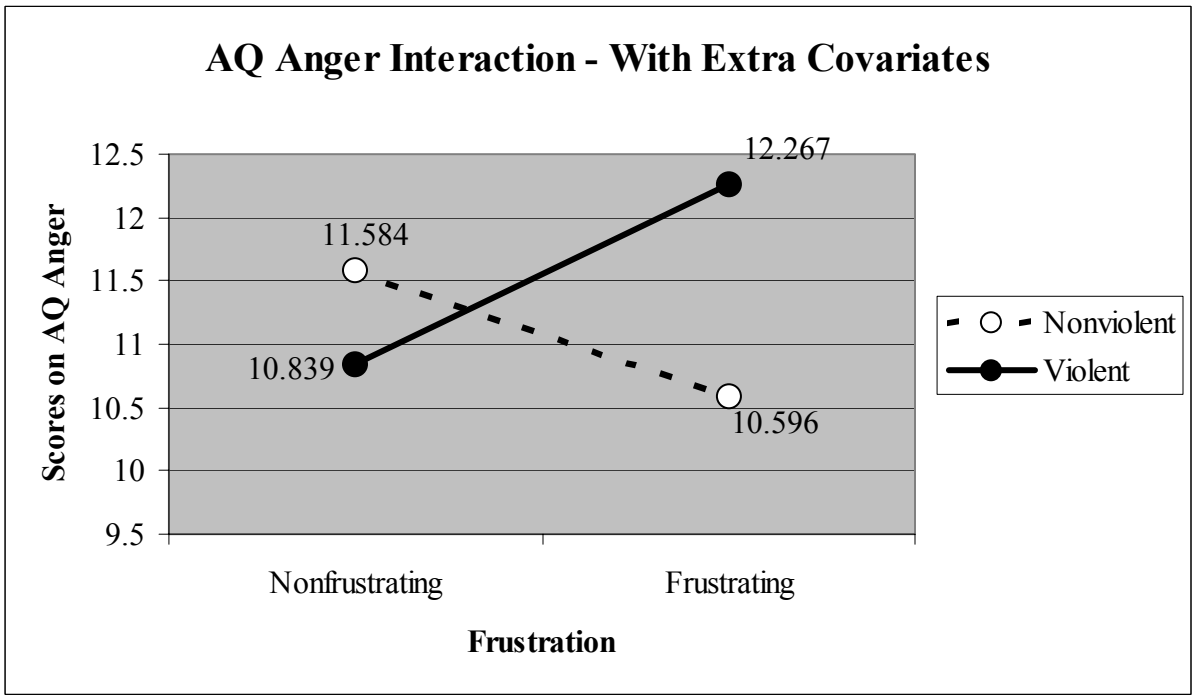


Figure 5.11. AQ Anger Interaction – With Extra Covariates

CHAPTER 6

DISCUSSION

Much of the past research on video games has focused on the effect that the violent content in those games has had on players' aggressive feelings and physiological arousal. The current study investigates not only violent content but also how frustration with game play can affect players' aggressive feelings and physiological arousal. Therefore, the level of violence and the level of frustration were manipulated in this experiment in order to assess their impact on these measures. Is it possible that playing a nonviolent but frustrating game could result in aggressive characteristics, such as arousal and hostile affect, just as effectively as playing a violent video game? Eight hypotheses and two research questions were generated to examine the relationship between video games, violent content, frustration with gameplay, arousal, and affect.

Interpreting Arousal Findings

In summarizing the arousal findings, discussion of only those hypotheses related to arousal (Hypotheses 1, 2, 5, 7) will be addressed. Hypothesis 1 stated, "Compared to a nonviolent game, a violent game should lead to increases in physiological measures including heart rate, systolic blood pressure, and diastolic blood pressure." Previous research had shown that playing a violent video game, compared to a nonviolent video game, resulted in higher measures of physiological arousal, such as heart rate and blood pressure (Murphy, Alpert, and Walker, 1992; Fleming and Rickwood, 2001). The current study did not confirm those results nor lend any support for Hypothesis 1. In this study, exposure to playing a violent video game did not result in significantly different measures of heart rate, systolic blood pressure (SBP), or

diastolic blood pressure (DBP) when compared to playing a nonviolent video game. Some studies have found no significant differences on measures between violent and nonviolent games on measures of arousal (Winkel, Novak, & Hopson, 1987; Irwin and Gross, 1995; Panee and Ballard, 2002). Some of these studies provide a possible explanation as to why exposure to violent content in this study did not result in significantly increased physiological measures when compared to nonviolent content. Winkel, Novak, and Hopson found that although exposure to violent content when compared to nonviolent content did not significantly affect heart rate, female subjects had higher heart rates after exposed to violent content than male subjects. Perhaps there is a gender effect on heart rate which results in female heart rate increasing more so than male heart rate after to exposure to violent content. Since the current study used only males, perhaps this accounts for the discrepancy between the current study's findings of those of other studies. Future research may want to include gender as a variable when studying the variables of violence and frustration.

Other reasons for the discrepancy could be derived from the length of exposure to the violent content in the video game or from the method of measuring the physiological variables. Research, such as Calvert and Tan (1994), which found that violent content increased physiological arousal measures, utilized short exposure times (such as 4 minutes) when playing the video games. The current study used an exposure time of 10 minutes. Other studies which found nonsignificant results in terms of physiological measures had exposure times around 20 minutes or greater (Irwin and Gross, 1995; Panee and Ballard, 2002). One could speculate that perhaps there is an initial period in which physiological measures increase when exposed to violence, but over a longer time those increases gradually decline back to normal levels. This is why another method of measuring may prove helpful. The current study, and many others, only

test physiological arousal measures directly after gameplay. A better method may be to constantly monitor these measures while playing the game (taking care that the monitoring process does not interfere with the subject's ability to play the game).

The current study lent partial support for Hypothesis 2: compared to a low/non-frustrating game, a frustrating game should lead to increases in physiological measures including heart rate, systolic blood pressure, and diastolic blood pressure. Manipulating frustration did result in some significant findings in terms of arousal. Although playing a frustrating game did not result in significantly different heart rates than playing low/nonfrustrating games, frustration did affect blood pressure for both SBP and DBP. Therefore, according to this study, frustration with gameplay is more of a factor in increasing arousal than the actual content of the game. This is not to discredit other experiments in which violent content did affect physiological arousal. The current study serves to shed light on the finding that difficulty and frustration with gameplay can result in increased blood pressure which the General Aggression Model relates with aggression. As a practical implication, this means that parents who are worried about their children getting "overly excited" by playing video games should not only consider the violent content of the game but more importantly may want to consider if the difficulty of the game is age appropriate for their child. A game which requires a complex set of actions in order to succeed may not be appropriate for a small child and may only serve to fuel their aggressive tendencies by increasing their blood pressure.

Hypotheses 5 and 7 respectively stated the combined effect of violence and frustration, which would be Mortal Kombat with high frustration (MKF) should lead to the highest levels of physiological arousal while the absence of both, which would be Dance Dance Revolution with low/nonfrustration (DDR), should lead to the lowest levels of arousal. These two hypotheses

both received only partial support. They were supported for the measure of heart rate, with MKF players having the highest heart rate and DDR players having the lowest heart rate. When measuring blood pressure, DDR players did have the lowest systolic blood pressure (SBP), but MKF players did not have the highest SBP rates. For diastolic blood pressure (DBP), MKF players did not have the highest DBP rates and DDR players did not have the lowest rates.

In light of the findings that violent content did not affect heart rate or blood pressure when compared to nonviolent content but frustration, compared to low/nonfrustration, did affect blood pressure, the interpretation of these rankings is logical. If frustration is equal between DDRF and MKF and equal between MK and DDR, then the frustrating games should rank higher than the low/nonfrustrating games. Within each grouping (DDRF and MKF; DDR and MK) it may be random chance that ranks those games since violence is not a factor. Indeed, on all physiological measures the MKF players and Dance Dance Revolution with frustration (DDRF) players ranked either 1 or 2. Mortal Kombat with low/nonfrustration (MK) and DDR players ranked either 3 or 4. This pattern confirms the analysis of variance findings: frustration may be a more important variable than violent content when measuring increases in arousal.

A final caveat needs to be stated concerning physiological measurement in experimental settings such as this one. There is utility in using physiological measures to corroborate and validate other measures used in experiments; however, using physiological measures as the only means of investigating the construct of aggression is risky. As Blascovich (2000) states, "a one-to-one correspondence between specific behaviors and unitary physiological responses rarely exists. This lack of singular correspondence derives from the multifunctionality of physiological processes and the complexity of behavior" (p. 119). For example, in the current experiment measures of heart rate and blood pressure were taken with the belief that higher measures were

linked to exposure to violent material or frustration. However, increases in those same physiological measures could have occurred in response to other stimuli. Perhaps the female assistant was physically attractive to one of the subjects and her presence alone increased heart rate and blood pressure. A construct, such as aggression, needs to be fully understood in terms of existing theory, definition, and past research so that the use of both self-reported psychological assessments and physiological measures can be used in triangulating that construct. As Blascovich notes, "Physiological indexes will not replace more traditional self-report and behavioral indexes in social psychology. However, we dare say that physiological indexes when properly employed and understood will increase the impact of social psychological research substantially" (p. 134).

Interpreting Affect Findings

In summarizing the affect findings, discussion of only those hypotheses related to affect (Hypotheses 3, 4, 6, 8) will be addressed. In determining the effect that violent content and frustration have on a person's state hostility, two different analyses were conducted. While one analysis focused on the Aggression Questionnaire's (AQ) Hostility subscale, a separate multivariate analysis was conducted on the STAXI subscale measure of state anger and the AQ Anger measure. There are several different instruments that can be used to measure hostility/anger. By using separate scales, it was hoped that some sort of cross-validation could be achieved that would result in a firm foundation to base interpretations.

On the AQ Hostility subscale, manipulating violent content did not result in significantly different scores in either the initial analysis or the analysis including the covariates of enjoyment, excitement, or pace. In other words, according to this scale, playing a violent video game does not make one feel more hostile than playing a nonviolent game. The same cannot be said about

frustration. In the initial analysis, playing a frustrating game did result in significantly higher AQ Hostility when compared to a low/nonfrustrating game; however, when taking into consideration the variables of enjoyment, excitement, and pace of the game, the effect of frustration is nonsignificant. In other words, when taking those factors into account, a player does not report feeling significantly more hostile when playing a frustrating game compared to playing a low/nonfrustrating game. On this measure of affect (AQ Hostility) it appears that frustration does not have an impact.

There is an impact, however, created by the interaction that takes place between violent content and frustration. After subjects played a nonfrustrating game, AQ Hostility scores were nearly the same regardless of whether they played a violent or nonviolent game. This changes when the game played was frustrating. In that case, those subjects who played the violent game scored higher on AQ Hostility than those who played the nonviolent game. In short, subjects reported feeling more hostile after playing a game that was both violent and frustrating than subjects who played a game that was frustrating but nonviolent. When frustration was not part of the game, subjects felt nearly the same amount of hostility regardless of whether they played DDR or MK.

At least on the AQ Hostility measure, it seems that the findings reinforce what was found when investigating arousal: frustration, compared to exposure to violent content, seems to be more effective in eliciting responses typically related to aggression. Again, this is not to discredit past findings that suggest exposure to violent video games is related to aggression. The current study serves to add to that literature in stating that other factors, one of which appears to be frustration, also contributes to eliciting aggressive responses. An exploration of the anger findings will help corroborate the interpretation of the AQ Hostility evidence.

The anger measure was a multivariate combination of two subscales from two different instruments: the STAXI State Anger subscale and the AQ Anger subscale. These subscales indicate self-reported feelings of anger. For the first time in the experiment, the analysis showed exposure to violent content to be a significant factor. In other words, those subjects who played a violent game reported more anger afterwards than those who played a nonviolent game. Even though in the initial analysis, the variable of violent content appeared to be significant, a deeper exploration revealed that differences on the STAXI measure were significant but differences on the AQ Anger measure were not significant. In other words, according to the initial data analysis subjects who played a violent game reported more anger on the STAXI measure than those who played a nonviolent game. On the measure of AQ Anger, the anger reported by subjects who played the violent game was not significantly different than that reported by subjects who played the nonviolent game. This inconsistency may be due to differences in how these two instruments measure anger.

The difference in measures also occurs when considering the impact of frustration. When the game was frustrating, subjects reported feeling more anger afterward than those who had played a nonfrustrating game. Upon further analysis, frustration resulted in more anger specifically on the STAXI measure and not on the AQ Anger measure. This is similar to the AQ Hostility findings. Again, it appears that the STAXI measure and the AQ Anger measure may be measuring the concept of anger differently. A closer examination of the individual questions revealed that the AQ Anger questions could be interpreted more as general trait aggression questions than "at this moment" state aggression measures (see Appendices R and S). This could mean that exposure to either violent video games or frustrating video games affects state feelings of aggression but does not affect trait feelings of aggression. However, it is important to

remember that in the initial analysis frustration significantly influenced AQ Hostility. Therefore, further investigation of how video games affect trait aggression is warranted.

The interaction of violent content and frustration with gameplay was significant. Specifically, the STAXI measure responded in the same manner as the AQ Hostility measure. When the video game was low/nonfrustrating, subjects reporting of anger on the STAXI did not significantly differ regardless of playing either a nonviolent or violent game. After playing a frustrating game however, those who played a violent game reported more anger on the STAXI measure than those who played the nonviolent game.

On the measure of AQ Anger, the interaction of violent content and frustration was significant as well, but this interaction is disordinal (resulting graphically in an "X" shape; see Figure 5.11) in contrast to the ordinal interactions on AQ Hostility and STAXI State Anger (resulting graphically in a "∠" shape; see Figure 5.8). On the AQ Anger measure, playing a nonfrustrating game resulted in the nonviolent game players reporting more anger than the violent game players. In contrast, playing a frustrating game resulted in the nonviolent game players reporting less anger than the violent game players. It is difficult to explain why this interaction differed from the STAXI or AQ Hostility interaction, but a key pattern must be remembered. When playing a frustrating game, subjects who played a violent game scored higher on all three measures of affect than those who played the nonviolent game. This effect will also be investigated later when considering the rankings of the games on measures of state hostility/anger.

Hypothesis 3 stated that compared to a nonviolent game, a violent game should lead to increases in state hostility. This hypothesis received partial support. Violent content was not a significant factor on the AQ Hostility measure, but was a significant factor on the measures of

anger. The STAXI measure was significant but the measure of AQ Anger was nonsignificant. Because nonsignificance was found for two out of three of the measures used to assess affect, the findings are inconclusive and do not fully confirm past evidence that exposure to violent video games, when compared to nonviolent video games, results in increased aggressive affect (Panee & Ballard, 2002; Ballard & Lineberger, 1999; Ballard & Weist, 1996; Anderson and Ford, 1986).

Hypothesis 4 stated that compared to a low/non-frustrating game, a frustrating game should lead to increases in state hostility. This hypothesis received partial support. Although it appeared that playing a frustrating game, as opposed to a low/nonfrustrating game, led to increases in AQ Hostility, that effect weakened and was nonsignificant when the extra covariates were added. On the anger measures, playing a frustrating game, as opposed to a low/nonfrustrating game, led to increases on the STAXI measure but not on the AQ Anger measure.

Hypotheses 6 and 8 respectively stated the combined effect of violence and frustration, which would be Mortal Kombat with high frustration (MKF), should lead to the highest levels of state hostility while the absence of both, which would be Dance Dance Revolution with low/nonfrustration (DDR), should lead to the lowest levels of state hostility. Hypothesis 6 received full support. MKF players had the highest scores on all three measures of state hostility/anger. Hypothesis 8 did not receive any support. There was no consistent pattern to indicate any particular game led to the lowest levels of state hostility.

Research Questions

Research Question 1 asked, "How would those playing a nonviolent video game that is high in frustration compare against those playing a violent video game which is low in

frustration on physiological measures including heart rate, systolic blood pressure, and diastolic pressure?" In terms of this experiment, the question is, "How did DDRF compare to MK on ratings of physiological arousal?" DDRF players ranked higher than MK players on scores of heart rate, systolic, and diastolic blood pressure. This again hints that frustration with gameplay may be more important in inspiring some aggressive reactions than exposure to violent content. Mere physiological increases do not always lead to aggressive actions. Rather the General Aggression Model suggests many variables need to be present. One of those would be hostile or angry feelings.

Research Question 2 asked, "How would those playing a nonviolent video game that is high in frustration compare against those playing a violent video game which is low in frustration on measures of state hostility?" In terms of this experiment, the question is, "How did DDRF compare to MK on measures of state hostility?" The evidence for this question is mixed. DDRF players scored higher than MK players on the AQ Hostility and STAXI measure; however, MK players scored higher than DDRF players on the measure of AQ Anger.

Major Implications

Several implications can be derived from this study. First, this study indicates that frustration with playing a video game was a more effective variable in eliciting arousal and affect characteristics often related to aggression than exposure to violent content. Video games have often been treated like television when studying their affect on aggression. In this sense, content has been the most often studied variable. This way of thinking limits a deeper analysis of the impact of video games on society. Video games are an interactive experience controlled by the player, and there are several distinguishing characteristics not present in television that lend themselves to further study. By pointing out that frustration is one aspect of a video game that

can influence aggressive responses, perhaps other characteristics will come to light and offer themselves as variables worthy of study. Of course, this also means that the critics against violent video games can not simply point to the content when explaining how this popular technology is inspiring children to violence and aggression. Could a nonviolent but frustrating game inspire just as much aggression as a violent but nonfrustrating game? The rankings of video games on several different arousal and affect measures in this study suggest that it is a possibility. Yet only the violent games are mentioned in the press after a school shooting. The next step in research is to look at how these manipulations of content and frustration affect actual behavior.

Second, when talking about impacting how angry or hostile a player feels after playing a game, one thing became very clear. The combination of violent content and high frustration in a video game resulted in the highest self-reported feelings of anger and hostility. Is it possible that a nonviolent game could inspire some form of aggression? The answer is yes, but purchasers should take special care when buying a game that is both violent and frustrating. If parents are concerned regarding how aggressive the video game will make their child feel, a violent and difficult game may not be the best choice.

This study provides a warning to and clear implications for the video game industry. Video game producers should ensure that violent games come with an adjustable difficulty setting. The Entertainment Software Ratings Board grades video games by violent content and puts their rating label on the video game box. Perhaps it should also be suggested that experts, such as developmental or cognitive psychologists, be used to identify age appropriateness for the difficulty level of the game.

In most video games, after the player has successfully defeated the video game, there is an "end movie" which ties up the storyline of the video game. Unfortunately in some past video games, the length of the "end movie" depended on the difficulty level at which the player defeated the game. This encouraged players to opt for the higher difficulty setting. In the future, video game producers may want to make sure the "end movie" content is the same regardless of what difficulty level the video game was defeated.

In many of these games there is simply no way to totally eliminate the violence. A fighting game or a war game must, by definition, have physical aggression. In many of these games, the level of violence can be adjusted. Mortal Kombat uses this technique where the level of blood and gore can be adjusted from a low amount to a high amount. This technique should be investigated for other violent games. Many parents are unaware of the different options within the game to adjust both the violence and difficulty level. Parents should educate themselves with not only the content and description of the game but also with what options are available on the video game. In this way, parents who purchase games for their children could make sure that the video game had an option to adjust the difficulty.

Theoretically, this study confirms many past aggression theories and adds credence to the more recent General Aggression Model (GAM). Specifically, the findings have relevance to social cognitive theory, cognitive neoassociation theory, excitation transfer theory, and the GAM. Social cognitive theory, also known as social learning theory, would dictate that those being rewarded for their aggressive behavior would be more apt to behave aggressively or feel aggressive in later situations. In this study, state anger (as measured by the STAXI anger subscale) was greater for those subjects who played a violent game than for those who played a nonviolent game. One could speculate that the players in the violent manipulation felt as though

their aggressive behavior in the Mortal Kombat game was rewarded with points, victories, and, in one condition, the increased probability of winning a $100 gift card. It could be stipulated that in this study subjects learned that being more aggressive than the computer opponent resulted in rewards. Applying this practically, video game players may be learning through their own playing and through viewing their friends' playing of violent video games that aggression often leads to rewards and obtaining goals. On the other hand, the fact that those who played DDRF also scored highly on the STAXI Anger indicates that exposure to violent stimuli is not necessary in order to elicit anger. Perhaps the subjects had previously learned that reacting aggressively helps when encountering a frustrating situation as well.

Cognitive neoassociation would explain why anger was elicited in either the presence or absence of violent content. According to this theory, a number of associative links would be triggered in students' minds when they encountered Mortal Kombat's kicking, punching, and gushing blood. For example, "punch" links to "blood" and "hurt," which leads to "fight back" and "revenge," which is linked to anger. By the same token, frustration, even in the absence of violent content, could also lead to anger. For example, "frustration" links to "losing," which triggers thoughts of "failure" and "inadequacy," which could be linked to "anger."

So far, theories have been addressed which explain how anger can be caused. Yet talking about arousal is a trickier subject because the physiological measures investigated here (heart rate, SBP, and DBP) are part of the automatic nervous system, often thought of as being involuntarily controlled. Understanding how violence in video games or how the stress involved in playing a difficult video game leads to increased arousal is yet to be understood fully. However, when relating these measures to aggression, the excitation transfer theory is often cited. This theory would state that any additional arousal created by exposure to violence or to

frustration would fuel the dominant emotion at the time. For the main effect of violence, no significant differences in arousal measures were found between violent and nonviolent content. In this case there appears to be no additional arousal to fuel or carry over to feelings of aggression. It could be argued that the increase in blood pressure caused by the main effect of frustration served to fuel feelings of aggression and resulted in the significant difference on the STAXI Anger measure between frustrating games and low/nonfrustrating games. Future work would need to be performed to investigate how physiological arousal and feelings of anger are related. It may be that systematic increases in arousal lead to positive systematic increases in feelings of anger.

The findings of the current study can also be explained by the more recent General Aggression Model (GAM). Recalling Figure 2.2, arousal and affect are two of the three components of internal states, which mediate input factors and lead to an action or outcome. Playing a video game would serve as a situation factor, an environmental event which would impact internal states. As was learned in the current study, frustration influenced both arousal and affect. In one of our measures, violent content impacted affect, but the fact that violent content did not affect arousal does not dismantle the GAM. This is because the GAM considers a host of factors which can act individually to influence aggression while also considering the various factors which can cumulatively influence aggression. In considering this cumulative nature of the GAM, it is understood why the interaction of both violent content and frustration (MKF) would lead to the highest scores of aggressive affect.

Limitations of This Study

As with many social science experiments that study aggression, there are several limitations to this study. This study lacks a behavioral component to the study of aggression.

Since this is a laboratory setting and not a real world setting, there are ethical limits to what can be measured. Most likely, aggressive behavior would have to be studied using a device such as a noise burst machine or some other device construed to make the subject believe they are punishing another person. Although the physiological measures in this experiment are believed to be free from bias, using self-report affective measures may not result in the most accurate measurement of hostility or anger. Especially in a laboratory setting, it is possible that a typical survey response bias may result in underreported aggressive feelings. Even though subjects were reminded their answers would be kept confidential, the subjects may have been hesitant to answer questions that tended to paint them in a highly aggressive light.

Because this experiment utilized only two video game titles, an argument exists that perhaps this study does not really investigate violent games compared to nonviolent games and frustrating games compared to low/nonfrustrating games; but, in effect, is really just studying Dance Dance Revolution compared to Mortal Kombat. The author believed that it was best to focus on finding two games thought to be matched closely instead of finding a wider range of games which could have resulted in having several factors that did not match closely among the games. As the main experiment indicated, even when believing and confirming with a pilot study that the games are closely matched, differences may surface later causing speculation as to how well matched the games actually were. The author argues that it would be very difficult to find games in the current marketplace that were equally matched. The best solution would be to construct a video game where only the variables to be studied could be manipulated. The author has witnessed some of these constructions and has not been impressed with how well they represent the current marketplace. Most of the games are overly simplistic and are graphically not as pleasing as in the current marketplace.

Another limitation could be that the video games rating sheet excludes factors that could be used to match games. Although this instrument is currently used in experiments, it was first published in 1986. The video game industry has drastically evolved since 1986 and some factors of video games may now exist that were not considered in 1986. Such as factors as graphical clarity, realism of characters, rhythm of background music, and difficulty of joystick operation may be important factors to consider.

A final limitation could be in the manipulation of frustration. Although subjects reported that the manipulation did result in frustration, a few subjects indicated during debriefing that they did not really believe that someone would give away $100 gift cards. For the experiment, it was believed that a highly appealing goal needed to be presented in order to manipulate frustration when that goal was blocked. Perhaps other goals, such as letting a subject pick out a gift beforehand, or less grand goals, such as less money, would have been more believable to the subject.

Future Avenues of Research

As was indicated, there are possibly many more factors of a video game that could possibly affect aggression. For instance, Dance Dance Revolution includes dance music playing in the background. Future research may find that pulsing, high energy dance music influences measures of arousal more so than other types of background music. The realism of the graphics could also influence measures of aggression. Studies have shown that realism is an influential factor when learning aggression from the media (Huesmann, Lagerspetz, & Eron, 1984; Atkin, 1983). For example, a study could be conducted to see if the older versions of Mortal Kombat influence aggressive reactions as effectively as the graphically advanced latest versions of Mortal Kombat.

While on the topic of realism, some current video games allow players to construct the game character all the way from skin color to type of sunglasses. This technique of creating a customizable character is known as a "skin." Not only does this add to the realism of the game, but it also can help the player identify with the character. Studies have shown identification with a fictional character who commits violence increases the likelihood of learning aggression from that character (Leyens & Picus, 1973; Eyal & Rubin, 2003). It could be possible to study this effect by having some subjects construct a character which mimics their physical characteristics and having other players play a predetermined character. Using this procedure to play a violent game and then testing the subjects on measures of aggression may yield interesting insights into how players identify and react to video game characters.

The current study was interested in how exposure to violent content in and frustration with video games affects aggressive characteristics in terms of short-term effects. The experiment tested subjects on a range of dependent variables immediately after gameplay. Future research should look at the duration of these effects after a delayed amount of time. Would the effects last for a few hours or a few months? There is no published research on the lasting effects of video game frustration on future aggression. Research by Deselms and Altman (2003) suggests that the prolonged effect of exposure to video game violence diminishes slowly but is still significant when compared to nonviolent games one hour after gameplay. One might speculate that the effect of frustration with gameplay would diminish slowly as well. With this argument, one might expect short-term effects (minutes or hours) after gameplay but perhaps no effects after longer time periods (weeks or months). Again, as the General Aggression Model predicts, there is a risk that consistently frequent exposures to violence and frustration

experiences with gameplay would accumulate over time resulting in lasting effects that would increase the likelihood of the player engaging in aggressive behavior later in the future.

Finally, research has been conducted which shows those high in trait aggression (a general aggressive personality) respond differently to aggressive stimuli than those with normal levels of trait aggression (Gentile, Lynch, Linder, and Walsh, 2004; Lynch, 1994). The current study could be replicated with the addition of another variable, trait aggression. Instruments are available to measure such trait aggression. This type of study would indicate whether those with high trait aggression respond to a greater extent to exposure to violent content and frustration with game play when compared against with normal or low levels of trait aggression.

In conclusion, this study has found that factors other than exposure to violent content can influence aggressive responses when playing video games. Violent video games have been the scapegoat for many of the current school shootings and violent acts created by teenagers. Indeed, the simulation of a first-person shooter is eerily similar to what happened at Columbine. Hopefully, the current study will serve to warn video game players, parents, the video game industry, and video game critics alike that there may be more factors within the game other than violent content which can impact how aggression and violence is learned via this highly popular medium.

REFERENCES

Anderson, C. A. (1997). Effects of violent movies and trait hostility on hostile feelings and aggressive thoughts. *Aggressive Behavior, 23* (3), 161-178.

Anderson, C. A. (2003). Video games and aggressive behavior. In Ravitch, D., & Viteritti, J. P. (Eds.), *Kid stuff: Marketing sex and violence to America's children*. Baltimore: The John Hopkins University Press.

Anderson, C. A., Anderson, K. B., Dorr, N., DeNeve, K. M., & Flanagan, M. (2000). Temperature and aggression. In Zanna, M. (Ed.), *Advances in experimental social psychology, 32*, 63-133. San Diego, CA: Academic Press.

Anderson, C. A., Benjamin, A. J., & Bartholow, B. D. (1998, July). Does the gun pull the trigger? Automatic priming effects of weapon pictures and weapon names. *Psychological Science, 9* (4), 308-314.

Anderson, C. A., Berkowitz, L., Donnerstein, E., Huesmann, L. R., Johnson, J. D., Linz, D., et al. (2003, December). The influence of media violence on youth. *Psychological Science in the Public Interest, 4* (3), 81-110.

Anderson, C. A., & Bushman, B. J. (2001, September). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12* (5), 353-359.

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*, 27-51.

Anderson, C. A., Carnagey, N. L., Flanagan, M., Benjamin, A. J., Eubanks, J., & Valentine, J. C. (2004). Violent video games: Specific effects of violent content on aggressive thoughts and behavior. *Advances in Experimental Social Psychology, 36,* 199-249.

Anderson, C. A., & Deuser, W. E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: Tests of a general model of affective aggression. *Personality & Social Psychology Bulletin, 21* (5), 434-448.

Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology, 78*, 772-790.

Anderson, C. A., & Ford, C. M. (1986, December). Affect of the game player: Short-term effects of highly and mildly aggressive video games. *Personality and Social Psychology Bulletin, 12* (4), 390-402.

Anderson, C. A., & Huesmann, L. R. (2003). Human aggression: A social-cognitive view. In Hogg, M. A., & Cooper, J. (Eds.), *Handbook of social psychology* (pp. 296-323). London: Sage Publications.

Anderson, C. A., & Morrow, M. (1995, October). Competitive aggression without interaction: Effects of competitive versus cooperative instructions on aggressive behavior in video games. *Personality and Social Psychology Bulletin, 21* (10), 1020-1030.

Anderson, C. A., & Murphy, C. R. (2003). Violent video games and aggressive behavior in young women. *Aggressive Behavior, 29*, 423-429.

Anderson, K. B., Anderson, C. A., Dill, K. E., & Deuser, W. E. (1998). The interactive relations between trait hostility, pain, and aggressive thoughts. *Aggressive Behavior, 24*, 161-171.

Atlas, R., Cornett, L., Lane, D. M., & Napier, H. A. (1997). The use of animation in software training: Pitfalls and benefits. In Quinones, M. A., & Ehrenstien, A. (Eds.), *Training for a rapidly changing workplace: Application of psychological research*. Washington, DC: American Psychological Association.

Averill, J. (1982). *Anger and aggression: An essay on emotion*. New York: Springer-Verlag.

Averill, J. (1983). Studies on anger and aggression: Implications for theories of emotion. *American Psychologist, 38*, 1145-1160.

Ballard, M. E., & Lineberger, R. (1999). Video game violence and confederate gender: Effects on reward and punishment among college males. *Sex Roles, 41*, 541-558.

Ballard, M. E., & Weist, J. R. (1996). Mortal Kombat: The effects of violent video game play on males' hostility and cardiovascular responding. *Journal of Applied Social Psychology, 26*, 717-730.

Bandura, A. (1973). *Aggression: A social learning theory analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1983). Psychological mechanism of aggression. In Geen, R. G., & Donnerstein, E. I. (Eds.), *Aggression: Theoretical and empirical reviews: Volume 1* (pp. 1-40). New York: Academic Press.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology, 3*, 265-299.

Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology, 63*, 575-582.

Barnett, M. A., Vitaglione, G. D., Harper, K. G., Quackenbush, S. W., Steadman, L. A., & Valdez, B. S. (1997). Late adolescents' experiences with and attitudes toward videogames. Journal of Applied Social Psychology, 27, 1316-1334.

Baron, R. A. (1984). Reducing organizational conflict: An incompatible response approach. *Journal of Applied Psychology, 69*, 272-279.

Baron, R. A. (1999). Social and personal determinants of workplace aggression: evidence for the impact of perceived injustice and the Type A behavior pattern. *Aggressive behavior, 25*, 281-296.

Bartholow, B. D., & Anderson, C. A. (2002). Effects of violent video games on aggressive behavior: Potential sex differences. *Journal of Experimental Social Psychology, 38*, 283-290.

Baumeister, R. F., Bushman, B. J., & Campbell, W. K. (2000, February). Self-esteem, narcissism, and aggression: Does violence result from low self-esteem or from threatened egotism? *Current Directions in Psychological Science, 9* (1), 26-29.

Baumeister, R. F., Smart, L., & Boden, J. M. (1996, January) Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review, 103* (1), 5-33.

Berkowitz, L. (1965). The concept of aggressive drive: Some additional considerations. In Berkowitz, L. (Ed.), *Advances in experimental psychology: Volume 2* (pp. 301-329). New York: Academic Press.

Berkowitz, L. (1969). The frustration-aggression hypothesis revisited. In Berkowitz, L. (Ed.), *Roots of aggression* (pp. 1-28). New York: Atherton.

Berkowitz, L. (1978). Whatever happened to the frustration-aggression hypothesis? *American Behavioral Scientist, 21*, 691-708.

Berkowitz, L. (1974). Some determinants of impulsive aggression: Role of mediated associations with reinforcements for aggression. *Psychological Review, 81*, 165-176.

Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin, 106 (1)*, 59-73.

Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive neoassociationistic analysis [Electronic Version Retrieved from PsycInfo]. *American Psychologist, 45* (4), 494-503.

Berkowitz, L. (1993). Pain and aggression: Some findings and implications. *Motivation and Emotion, 17*, 277-293.

Berkowitz, L., Cochran, S., & Embree, M. (1981). Physical pain and the goal of aversively stimulated aggression. *Journal of Personality and Social Psychology, 40,* 687-700.

Berkowitz, L., & Harmon-Jones, E. (2004). Toward an understanding of the determinants of anger [Electronic Version Retrieved from PsycInfo]. *Emotion, 4* (2), 1528-3542.

Berkowitz, L., & LePage, A. (1967). Weapons as aggression-eliciting stimuli. *Journal of Personality and Social Psychology, 7* (2), 202-207.

Blackstock, C. (2004, July 29). Killing "incited by video game": Parents of murdered teenager call for ban. *The Guardian*. Retrieved December 1, 2004, from LexisNexis Academic database.

Blascovich, J. (2000). Using physiological indexes of psychological processes in social psychological research. In Reis, H. T., & Judd, C. M. (Eds.), *Handbook of research methods in social and personality psychology*. (pp. 117-137). Cambridge, UK: Cambridge University Press.

Block, J. H. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. *Child Development*, 54, 1335-1354.

Buchman, D. D., & Funk, J. B. (1996). Video and computer games in the '90s: Childrens' time commitment and game preference. *Children Today, 24*, 12-16.

Bushman, B. J. (1995, November). Moderating role of trait aggressiveness in the effects of violent media on aggression. *Journal of Personality and Social Psychology, 69* (5), 950-960.

Bushman, B. J. (1998, May). Priming effects of violent media on the accessibility of aggressive constructs in memory. *Personality and Social Psychology Bulletin, 24* (5), 537-545.

Bushman, B. J., & Anderson, C. A. (2001). Is it time to pull the plug on the hostile versus instrumental aggression dichotomy? *Psychological Review, 108*, 273-279.

Bushman, B. J., & Anderson, C. A. (2002, December). Violent video games and hostile expectations: A test of the general aggression model. *Personality and Social Psychology Bulletin, 28* (12), 1679-1686.

Bushman, B. J., & Baumeister, R. F. (1998, July). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology, 75* (1), 219-229.

Bushman, B. J., & Geen, R. G. (1990, January). Role of cognitive-emotional mediators and individual differences in the effects of media violence on aggression. *Journal of Personality and Social Psychology, 58* (1), 156-163.

Bushman, B. J., & Stack, A. D. (1996). Forbidden fruit versus tainted fruit: Effects of warning labels on attraction to television violence. *Journal of Experimental Psychology: Applied, 2*, 207-226.

Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology, 63*, 452-459.

Buss, A. H., & Warren, W. L. (2000). *Aggression Questionnaire: Manual.* Los Angeles: Western Psychological Services.

Cairns, R. B., Cairns, B. D., Neckerman, H. J., Ferguson, L. L. & Gariepy, J. L. (1989). Growth and aggression: 1. Childhood to early adolescence. *Developmental Psychology*, 25, 320-330.

Calvert, S. L., & Tan, S. (1994). Impact of virtual reality on young adults' physiological arousal and aggressive thoughts: Interaction versus observation. *Journal of Applied Developmental Psychology, 15*, 125-139.

Campbell, W. K., Bonacci, A. M., Shelton, J., Exline, J. J., & Bushman, B. J. (2004). Psychological entitlement: Interpersonal consequences and validation of a self-report measure. *Journal of Personality Assessment, 83* (1), 29-45.

Cantor, J. R., Zillmann, D., & Einsiedel, E. F. (1978, October). Female responses to provocation after exposure to aggressive and erotic films. *Communication Research, 5* (4), 395-412.

Carnagey, N.L., & Anderson, C.A. (2003). The role of theory in the study of media violence: The general aggression model. In Gentile, D. (Ed.), *Media violence and children*. (pp. 87-106). Westport, CT: Praeger.

Carnagey, N.L., & Anderson, C.A. (2004, March). Violent video game exposure and aggression: A literature review. *Minerva Psichiatrica, 45* (1), 1-18.

Chance, P. (1993). *Learning and behavior (3rd ed.)*. Pacific Grove, CA: Brooks/Cole Publishing Company.

Children Now. (2001). *Fair play? Violence, gender and race in video games*. Los Angeles, CA: Children Now.

CIRP, *Cooperative Institutional Research Program Survey Results* (Ames, Ia: Office of Institutional Research, 1998, 1999).

Collins, A. M., & Loftus, E. F. (1975). A spreading activation theory of semantic processing. *Psychological Review, 82*, 407-428.

Cooper, J., & Mackie, D. (1986). Video games and aggression in children. *Journal of Applied Social Psychology, 16* (8), 726-744.

Deselms, J. L., & Altman, J. D. (2003). Immediate and prolonged effects of videogame violence. *Journal of Applied Social Psychology, 33* (8), 1553-1563.

Dietz, T. L. (1998). An examination of violence and gender role portrayals in video games: Implications for gender socialization and aggressive behavior. *Sex Roles, 38* (5/6), 425-442.

Dill, J. C., & Anderson, C. A. (1995). Effects of frustration justification on hostile aggression. *Aggressive Behavior, 21*, 359-369.

Dill, K. E., Anderson, C. A., Anderson, K. B., & Deuser, W. E. (1997). Effects of aggressive personality on social expectations and social perceptions. *Journal of Research in Personality, 31*, 272-292.

Dill, K. E., & Dill, J. C. (1998). Video game violence: A review of the empirical literature. *Aggression and Violent Behavior, 3* (4), 407-428.

Dollard, J., Doob, L., Miller, N., Mowrer, O., & Sears, R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press.

Dominick, J. R. (1984, Spring). Videogames, television violence, and aggression in teenagers. *Journal of Communication, 34* (2), 136-147.

Dominick, J. R., & Greenberg, B. S. (1972). Attitudes toward violence: The interaction of television exposure, family attitudes, and social class. In Comstock, G. A., & Rubinstein, E. A. (Eds.), *Television and social behavior: Vol. 3. Television and adolescent aggressiveness* (pp. 314-335). Washington, DC: U.S. Government Printing Office.

Elmer-Dewitt, P. (1993, September 27). The amazing video game boom. *Time, 142* (13), 66-73.

Fleming, M. J., & Rickwood, D. J. (2001). Effects of violent versus nonviolent video games on children's arousal, aggressive mood, and positive mood. *Journal of Applied Social Psychology, 31* (10), 2047-2071.

Fling, S., Smith, L., Rodriguez, T., Thornton, D., Atkins, E., & Nixon, K. (1992). Video games, aggression, and self-esteem: A survey. *Social Behavior and Personality, 20*, 39-46.

Frijda, N. H. (1986). *The emotions*. New York: Cambridge University Press.

Frijda, N. H., Kuipers, P., & ter Schure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology, 57*, 212-228.

Frith, M. (2003, September 18). "Grand Theft Auto" creators sued for $100m over killing. *The Independent*. Retrieved December 1, 2004, from LexisNexis Academic database.

Funk, J. B. (1993). Reevaluating the impact of video games. *Clinical Pediatrics, 32*, 86-90.

Funk, J. B., Baldacci, H. B., Pasold, T., & Baumgardner, J. (2004). Violence exposure in real-life, video games, television, movies, and the internet: Is there desensitization? *Journal of Adolescence, 27*, 23-39.

Funk, J. B., Buchman, D. D., Jenks, J., & Bechtoldt, H. (2003). Playing violent video games, desensitization, and moral evaluation in children. *Applied Developmental Psychology, 24*, 413-436.

Funk, J. B., Flores, G., Buchman, D. D., & Germann, J. N. (1999). Rating electronic games: Violence is in the eye of the beholder. *Youth and Society, 30*, 283-312.

Geen, R. G. (2001). *Human aggression (2nd ed.)*. Buckingham, England: Open University Press.

Geen, R. G., & O'Neal, E. C. (1969). Activation of cue-elicited aggression by general arousal. *Journal of Personality and Social Psychology, 11*, 289-292.

Gelmis, J. (1999, June 3). Are video games teaching kids to kill?. *Times-Picayune*. Retrieved December 1, 2004, from LexisNexis Academic database.

Gentile, D. A., Lynch, P. J., Linder, J. R., & Walsh, D. A. (2004). The effects of violent video game habits on adolescent hostility, aggressive behaviors, and school performance. *Journal of Adolescence, 27*, 5-22.

Gentile, D. A., & Walsh, D. A. (2002). A normative study of family media habits. *Journal of Applied Developmental Psychology, 23*, 157-78.

Glendinning, L. (2004, August 14). Doom 3's distributors dismiss copycat violence claims. *The Guardian*. Retrieved December 1, 2004, from LexisNexis Academic database.

Griffiths, M. (1997, September). Video games and aggression. *Psychologist, 10* (9), 397-401.

Grossman, D. (1995). *On killing: The psychological cost of learning to kill in war and society*. Little, Brown and Co.

Grossman, D., & DeGaetano, G. (1999). *Stop teaching our kids to kill: A call to action against TV, movie and video game violence*. New York, NY: Crown Books.

Gustafson, R. (1986). Human physical aggression as a function of frustration: Role of aggressive cues. *Psychological Reports, 59*, 103-110.

Hanratty, M. A., O'Neal, E., & Sulzer, J. L. (1972). Effect of frustration upon imitation of aggression. *Journal of Personality and Social Psychology, 21* (1), 30-34.

Hansen, C. H., & Hansen, R. D. (1990, April). The influence of sex and violence on the appeal of rock music videos. *Communication Research, 17* (2), 212-234.

Harris, M. B., & Williams, R. (1985). Video games and school performance. *Education, 105*, 306-309.

Hatch, J. P., Moore, P. J., Borcherding, S., & Cyr-Provost, M. (1992). Electromyographic and affective responses of episodic tension-type headache patients and headache-free controls during stressful task performance. *Journal of Behavioral Medicine, 15* (1), 889-112.

Herrald, M. M., & Tomaka, J. (2002). Patterns of emotion-specific appraisal, coping, and cardiovascular reactions during an ongoing emotional episode. *Journal of Personality and Social Psychology, 83*, 434-450.

Hettrick, S. (1995, May 11). Video games on target for $22 billion. Hollywood Reporter.

Hu, J. (2002, February 7). Video game sales set record in 2001. Retrieved October 2, 2004 from http://news.com.com/Video+game+sales+set+record+in+2001/2100-1040_3-831599.html.

Hubbard, B., & Bartels, L. (1999, May 3). Researchers say Harris reconfigured video game boy turned "Doom" into school massacre, investigators claim. *Rocky Mountain News*. Retrieved December 1, 2004, from LexisNexis Academic database.

Huesmann, L. R. (1986). Psychological processes promoting the relation between exposure to media violence and aggressive behavior by the viewer. *Journal of Social Issues, 42* (3), 125-139.

Huesmann, L. R. (1988). An information processing model for the development of aggression. *Aggressive Behavior, 14*, 13-24.

Huesmann, L. R. (1997). Observational learning of violent behavior: Social and biosocial processes. In Raine, A., Farrington, D. P., Brennen, P. O., & Mednick, S. A. (Eds.), *The biosocial basis of violence* (pp. 69-88). New York: Plenum Press.

Huesmann, L. R. (1998). The role of social information processing and cognitive schema in the acquisition and maintenance of habitual aggressive behavior. In Geen, R. G., & Donnerstein, E. (Eds.), *Human aggression: Theories, research, and implications for social policy* (pp. 73-109). New York: Academic Press.

Huesmann, L. R., & Guerra, N. G. (1997, February). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality and Social Psychology, 72* (2), 408-419.

Huesmann, L. R., & Miller, L. S. (1994). Long-term effects of repeated exposure to media violence in childhood. In Huesmann, L. R. (Ed.), *Aggressive behavior: Current perspectives* (pp. 153-183). New York: Plenum Press.

Huesmann, L. R., Moise-Titus, J., Podolski, C., & Eron, L. D. (2003). Longitudinal relations between children's exposure to TV violence and their aggressive and violent behavior in young adulthood: 1977-1992. *Developmental Psychology, 39*, 201-221.

Irwin, A. R., & Gross, A. M. (1995). Cognitive tempo, violent video games, and aggressive behavior in young boys. *Journal of Family Violence, 10* (3), 337-350.

Izard, C. E. (1991). *The psychology of emotion*. New York: Plenum.

Kaiser Family Foundation. (2005, March). *Generation M: Media in the lives on 8-18 year-olds*. Retrieved March 30, 2005, from http://www.kff.org/entmedia/7250.cfm

Kelly, P. T. (Ed.). (1999). *Television Violence: A guide to the literature, 2nd edition.* Commack, NY: Nova Science Publishers, Inc.

Kirsh, S. J. (2003). The effects of violent video games on adolescents: The overlooked influence of development. *Aggression and Violent Behavior, 8*, 377-389.

Kubey, R., & Larson, R. (1990). The use and experience of the new video media among children and young adolescents. *Communication Research, 17*, 107-130.

Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.

Leyens, J. P., & Picus, S. (1973). Identification with the winner of a fight and name mediation: Their differential effects upon subsequent aggressive behavior. *British Journal of Social and Clinical Psychology, 12*, 374-377.

Lin, S., & Lepper, M. R. (1987). Correlates of children's usage of videogames and computers. *Journal of Applied Social Psychology, 17*, 72-93.

Lindsay, J. J., & Anderson, C. A. (2000, May). From antecedent conditions to violent actions: A general affective aggression model. *Personality and Social Psychology Bulletin, 26* (5), 533-547.

Luzadder, D., Vaughan, K., & Abbott, K., & Bartels, L. (1999, December 13). Killers taped chilling goodbye: Harris, Klebold apologize, brag in videos made days, minutes before attack on Columbine. *Denver Rocky Mountain News*. Retrieved December 1, 2004, from LexisNexis Academic database.

Lynch, P. (1994). Type A behaviour, hostility, and cardiovascular function at rest after playing video games in teenagers. *Psychosomatic Medicine, 56*, 152.

Malamuth, N. M., Linz, D., Heavey, C. L., Barnes, G., & Acker, M. (1995, August). Using the confluence model of sexual aggression to predict men's conflict with women: a 10-year follow-up study. *Journal of Personality and Social Psychology, 69* (2), 353-369.

Matthews, K. (1997, November). Hostility. Retrieved December 27, 2004 from http://www.macses.ucsf.edu/Research/Psychosocial/notebook/hostility.html.

McNamara, M. (2004, June 6). Style and culture; Culture. *Los Angeles Times*. Retrieved December 1, 2004, from LexisNexis Academic database.

Mehrabian, A., & Wixen, W. J. (1986). Preferences for individual video games as a function of their emotional effects on players. *Journal of Applied Social Psychology, 16* (1), 3-15.

Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal and Social Psychology, 67*, 371-378.

Onion, C. W. R., & Bartzokas, C. A. (1998). Changing attitudes to infection management in primary care: A controlled trial of active versus passive guideline implementation strategies. *Family Practice, 15*, 99-104.

Osterman, K., Bjorkqvist, K., Lagerspetz, K. M. J., Kaukiainen, A., Landau, S. F., Fraczek, A., et al. (1998). Cross-cultural evidence of female indirect aggression. *Aggressive Behavior, 24* (1), 1-8.

Paik, H., & Comstock, G. (1994). The effects of television violence on antisocial behavior: a meta-analysis. *Communication Research, 21,* 516-546.

Panee, C. D., & Ballard, M. E. (2002). High versus low aggressive priming during video-game training: effects on violent action during game play, hostility, heart rate, and blood pressure. *Journal of Applied Social Psychology, 32*, (12), 2458-2474.

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989, February). A developmental perspective on antisocial behavior. *American Psychologist, 44* (2), 329-335.

Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisoical boys*. Eugene, OR: Castalia.

Perry, D. G., & Perry, L. C. (1976). Identification with film characters, covert aggression verbalization, and reactions to film violence. *Journal of Research in Personality, 10*, 399-409.

Potter, W. J. (2003). *The 11 myths of media violence*. Thousand Oaks, CA: Sage Publications, Inc.

Provenzo, E. F. (1991). Video kids: Making sense of Nintendo. Cambridge, MA: Harvard University Press.

Rule, B. G., Taylor, B., & Dobbs, A. R. (1987). Priming effects of heat on aggressive thoughts. *Social Cognition, 5*, 131-144.

Savitsky, J. C., Rogers, R. W., Izard, C. E., & Liebert, R. M. (1971). Role of frustration and anger in the imitation of filmed aggression against a human victim. *Psychological Reports, 29*, 807-810.

Savoye, C. (2000, July 21). Mortal Kombat – if mom's there. *Christian Science Monitor*. Retrieved December 1, 2004, from LexisNexis Academic database.

Scott, D. (1995, March). The effect of video games on feelings of aggression. *Journal of Psychology: Interdisciplinary and applied, 129* (2), 121-132.

Segal, K. R., & Dietz, W. H. (1991). Physiologic responses to playing a video game. *American Journal of Diseases of Children, 145*, 1034-1036.

Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology, 5*2, 1061-1086.

Sherry, J. L. (2001, July). The effects of violent video games on aggression: A meta-analysis. *Human Communication Research, 27* (3), 409-431.

Smith, S. L., Lachlan, K., & Tamborini, R. (2003, March). Popular video games: Quantifying the presentation of violence and its context. *Journal of Broadcasting and Electronic Media*, 47 (1), 58-76.

Sparks, G. G. (2002). A brief history of media effects research. In *Media effects research: A basic overview* (pp. 39-56). Belmont, CA: Wadsworth/Thomson Learning

Spielberger, C. D. (1999). *State-trait anger expression inventory-2: Professional manual*. Lutz, FL: Psychological Assessment Resources, Inc.

Tate, D. C., Reppucci, N. D., & Mulvey, E. P. (1995, September). Violent juvenile delinquent: Treatment effectiveness and implications for future action. *American Psychologist, 50* (9), 777-781.

Tedeschi, J. T., & Felson, R. B. (1994). *Violence, aggression, & coercive actions*. Washington, DC: American Psychological Association.

Turner, C. W., & Berkowitz, L. (1972). Identification with film aggressor (covert role taking) and reactions to film violence. *Journal of Personality and Social Psychology, 21*, 256-264.

Uhlmann, E., & Swanson, J. (2004, February). Exposure to violent video games increases automatic aggressiveness. *Journal of Adolescence, 27* (1), 41-52.

Unsworth, G., & Ward, T. (2001, November). Video games and aggressive behavior. *Australian Psychologist, 36* (3), 184-192.

Vaughan, K., & Kass, J. (2001, December 5). Columbine papers revealed; Previously unreleased documents include plot to attack school, kill family of friend. *Rocky Mountain News*. Retrieved December 1, 2004, from LexisNexis Academic database.

Venable, V. L., Carlson, C. R., & Wilson, J. (2001). The role of anger and depression in recurrent headache. *Headache, 41*, 21-30.

Walsh, D. A., & Gentile, D. A. (2001). A validity test of movie, television, and video-game ratings. *Pediatrics, 107*, 1302-1308.

Walsh, D. A., Gentile, D. A., Gieske, J., Walsh, M., & Chasco, E. (2004, November 23). *Ninth annual Mediawise video game report card*. Retrieved March 30, 2005, from the Mediawise Web site: http://www.mediafamily.org/research/report_vgrc_2004.shtml

Walters, R., & Brown, M. (1963). Studies of reinforcement of aggression: Transfer of responses to an interpersonal situation. *Child Development, 34*, 563-571.

Weiss, H. M., Suckow, K., & Cropanzano, R. (1999). Effects of justice conditions on discrete emotions. *Journal of Applied Psychology, 84*, 786-794.

Wertham, F. (1954). *Seduction of the innocent*. New York: Rinehart & Company.

Winkel, M., Novak, D. M., & Hopson, H. (1987). Personality factors, subject gender, and the effects of aggressive video games on aggression in adolescents. *Journal of Research in Personality, 21*, 211-223.

Woolley, W. (2003, September 7). From "Army of one" to Army of fun; Online video game helps build ranks. *Times-Picayune*. Retrieved December 1, 2004, from LexisNexis Academic database.

Zillmann, D. (1971). Excitation transfer in communication-mediated aggressive behavior. *Journal of Experimental Social Psychology, 7* (4), 419-434.

Zillmann, D. (1979). *Hostility and aggression*. Hillsdale, NJ: Erlbaum.

Zillmann, D. (1982). Television viewing and arousal. In Pearl, D., Bouthilet, L., & Lazar, J. (Eds.), *Television and behavior: Ten years of scientific progress and implications for the eighties: Vol. 2. Technical reviews* (DHHS Publication No. ADM 82-1196, 53-67). Washington, DC: U. S. Government Printing Office.

Zillmann, D. (1983). Arousal and aggression. In Geen, R., & Donnerstein, E. (Eds.), *Aggression: Theoretical and empirical reviews: Vol. 1* (75-102). New York: Academic Press.

LIST OF APPENDICES

Appendix A

Pilot Study Consent Form

I agree to take part in a research study titled *Video Game Learning Styles*, which is being conducted by Kevin Williams of the Grady College of Journalism and Mass Communication. Kevin can be reached by calling 542-4978. This study is under the direction of Dr. Joseph Dominick of the Telecommunications Department of Grady College. He can be reached by calling 542-4974. I understand that I do not have to take part in this study, and I can stop taking part at any time without giving any reason, and without penalty. I can ask to have information related to me returned to me, removed from the research records, or destroyed.

The purpose of this experiment is to study how players react to video game play. If taking part in this experiment through the psychology research pool, I will be awarded 1 research credit for the experiment. If I was recruited through a class outside of the psychology research pool, I will receive extra class credit for completing the experiment. During the experiment, I will be asked to answer a few questions describing myself and my game playing habits. I will then play some video games and complete a questionnaire. This experiment should take no longer than 1hour.

I understand that I may be exposed to violence in the video games. No other discomforts or stress should be gained from this experiment. There are no other risks foreseen than those created by playing video games. In order to make this study a valid one, some information about my participation will be withheld until after the study. Again if I am uncomfortable with what I see during the course of this experiment, I understand that I can stop taking part at any time without giving any reason, and without penalty. I understand that any information which could personally be connected to me will be kept confidential and not shared with anyone outside the research group. This personal information can only be released with my permission. If information about me is published, it will be written in a way that I cannot be recognized. However, research records may be obtained by court order. The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 706-542-4978.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Signature of Researcher Date

_____

Signature of Participant Date

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Appendix B

Video Game Questionnaire

VIDEO GAME EXPERIMENT

Please print the last four digits of your Student ID Number. _____

Instructions: Pease think of the three video games that you have played for the greatest amount of time. Include computer, console/TV, and arcade games. Please write down the titles of these games on the blank lines below. Please try to think of three; however, if you cannot think of three please fill out as many as come to mind and leave the rest blank.

If you have never played a video game in your life, please check here _____ and go on to the next questionnaire on page 4.

1) Title of your "most played" game: _____.
PLEASE PRINT CLEARLY

2) Title of your "2nd most played" game: _____.
PLEASE PRINT CLEARLY

3) Title of your "3rd most played" game: _____.
PLEASE PRINT CLEARLY

4) What is the average number of hours per day during a typical weekday (Monday through Friday) that you play video games?

_____
Please List in hours and minutes

5) What is the average number of hours per day during a typical weekend day (Saturday and Sunday) that you play video games?

_____
Please List in hours and minutes

Now, please rate each game you listed before by answering the questions that follow.

1). For the following items, rate the game you listed as your "most played" game:

a) In recent months, how often have you played this game? (Circle one)

1	2	3	4	5	6	7
Rarely			Occasionally			Often

b) How violent is the content of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Violent Content						Extremely Violent Content

c) How bloody/gory are the graphics of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Blood & Gore						Extremely Bloody & Gory

d) Which of the following categories best describes this game? Check all that apply.

_____Education/Family
_____Sports
_____Fantasy
_____Simulation
_____Fighting with hands/feet
_____Fighting with Weapons
_____Skill
_____Puzzle

2). For the following items, rate the game you listed as your "2nd most played" game:

a) In recent months, how often have you played this game? (Circle one)

1	2	3	4	5	6	7
Rarely			Occasionally			Often

b) How violent is the content of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Violent Content						Extremely Violent Content

c) How bloody/gory are the graphics of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Blood & Gore						Extremely Bloody & Gory

d) Which of the following categories best describes this game? Check all that apply.

_____Education/Family
_____Sports
_____Fantasy
_____Simulation
_____Fighting with hands/feet
_____Fighting with Weapons
_____Skill
_____Puzzle

3). For the following items, rate the game you listed as your " 3rd most played" game:

a) In recent months, how often have you played this game? (Circle one)

1	2	3	4	5	6	7
Rarely			Occasionally			Often

b) How violent is the content of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Violent Content						Extremely Violent Content

c) How bloody/gory are the graphics of this game? (Circle one)

1	2	3	4	5	6	7
Little or No Blood & Gore						Extremely Bloody & Gory

d) Which of the following categories best describes this game? Check all that apply.

_____Education/Family
_____Sports
_____Fantasy
_____Simulation
_____Fighting with hands/feet
_____Fighting with Weapons
_____Skill
_____Puzzle

Appendix C

Psychological Entitlement Scale

Please respond to the following items by writing the number that best reflects your own beliefs. Please respond using the following 7-point scale:

1 = strong disagreement
2 = moderate disagreement
3 = slight disagreement
4 = neither agreement nor disagreement
5 = slight agreement
6 = moderate agreement
7 = strong agreement

_____ I honestly feel I'm just more deserving than others.

_____ Great things should come to me.

_____ If I were on the Titanic, I would deserve to be on the first lifeboat!

_____ I demand the best because I'm worth it.

_____ I do not necessarily deserve special treatment.

_____ I deserve more things in my life.

_____ People like me deserve an extra break now and then.

_____ Things should go my way.

_____ I feel entitled to more of everything.

Appendix D

Stop Here Page

PLEASE STOP HERE.

YOU WILL FINISH THE REST OF THE QUESTIONNAIRE LATER.

Appendix E

Low/Nonfrustration Condition Script

Non frustration

I am conducting this study to see how well students learn to play certain video games. The machine in front of you is set up to record your performance. Don't worry about your experience or inexperience with playing this or any other video game. I am interested in your performance but the credit you receive for this experiment does not depend on how well you play this game.

You will practice with the video game for 5 minutes. After that practice session, I will ask you to play the video game for an additional 10 minutes.

Appendix F

Frustration Condition Script

Frustration Group

I am conducting this study to see how well students learn to play certain video games. It is important that I make sure you are motivated to play this game to the best of your abilities. Therefore, I will be giving a reward of a $100 gift card to Best Buy to those people who perform best at this game. The machine in front of you is set up to record your performance. Don't worry about your experience or inexperience with playing this or any other video game. I previously asked you how often you play video games and what video games you like to play. In competing for the $100 gift card, you will only be competing against people who are similar to you in those preferences. I will compare your play against theirs. At the end of the day, I will compare your performance with theirs and if yours is one of the best performances, you will get the $100 gift card.

You will practice with the video game for 5 minutes but this practice does not count towards the competition. After your 5-minute practice session, you will play the video game for 10 minutes. This 10-minute period is when you are competing for the $100 gift card.

Appendix G

Mortal Kombat Controls List

CONTROLS

□ = LIGHT PUNCH

Δ = HARD PUNCH

O = HARD KICK

X = LIGHT KICK

L1 = CHANGE FIGHTING STYLE (USE WEAPON)

L2 = DOES NOTHING

R1 = THROW OPPONENT

R2 = BLOCK

- **DO NOT PAUSE THE GAME**
- **WHEN IT ASKS YOU IF YOU WANT TO CONTINUE MAKE SURE "YES" IS IN GOLD AND HIT THE "X" BUTTON.**
- **THEN SCROLL TO KOBRA AND PRESS "X"**

Appendix H

Video Game Rating Sheet

Video Game Rating Sheet

1. How difficult was the video game?

1	2	3	4	5	6	7
Easy						Difficult

2. How enjoyable was the video game?

1	2	3	4	5	6	7
Not Enjoyable						Enjoyable

3. How frustrating was the video game?

1	2	3	4	5	6	7
Not Frustrating						Frustrating

4. How exciting was the video game?

1	2	3	4	5	6	7
Not Exciting						Exciting

5. How fast was the action of the video game?

1	2	3	4	5	6	7
Slow Action						Hectic Action

6. How violent was the content of the video game?

1	2	3	4	5	6	7
No Violent Conent						Very Violent Content

7. How violent were the graphics of the video game?

1	2	3	4	5	6	7
No Violent Graphics						Very Violent Graphics

Appendix I

Pilot Study Debriefing Sheet

DEBRIEFING STATEMENT - PILOT

Thank you for participating in this experiment, entitled "Video Games Learning Styles." While it was true that I was interested in your playing a video game, I was not trying to judge how well you played the game. Your participation is actually part of a pilot study. My main research is to investigate how playing a video game affects your feelings of anger or aggression. Subjects either played a violent game or a nonviolent game. Half of you were told you would be competing for an extra reward depending on how well you played the game. This was a deception. There was never a true intent to give you an extra reward. For those people told of the extra reward, I made the video game especially difficult for you to play. I was hoping to make you frustrated with the game. Frustration in my experiment is defined as giving someone a valuable goal and then making it almost impossible to obtain it. This is why I offered a reward (the valuable goal) and then changed the difficulty level (restricting you from obtaining it).

It is important that you understand that there is no extra reward for competing in the experiment. Those of you who were not offered the extra reward hopefully felt no frustration with the game. In your case, the difficulty level of the game was kept at a beginner level.

After you played the video game, you filled out a questionnaire concerning how you rated the video game. The main point of this pilot study is to make sure that the video games differed in violence and that those told of the extra reward were frustrated when they actually thought they were competing for the prize. In order to run a bigger experiment, I needed to make sure that I was able to control frustration with the game and that I could classify one game to be violent and the other to be nonviolent. Your answers to that rating sheet will tell me whether I should use those games for my next experiment.

My belief is that frustration with video games can lead to feelings of aggression. My main question is to figure out if a nonviolent frustrating game can influence aggression just as much as a violent non-frustrating game.

Again, thank you for your participation. If you have any further questions, comments, or would like to know the results of this experiments please contact Kevin Williams at 706-542-4978.

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Appendix J

Homogeneity of Variance Test on Pilot Study's Characteristics of Video Games

Rating Characteristic	Levene Statistic	Significance
Difficulty	0.419	0.742
Enjoyment	0.874	0.475
Frustration	0.837	0.493
Excitement	1.830	0.182
Fast	0.040	0.989
Violent Content	64.000	<.001
Violent Graphics	64.000	<.001

Appendix K

ANOVAs of Pilot Study's 7 Characteristics of Video Games

	df	F	Significance
Difficulty	3, 16	61.909	<.001
Enjoyment	3, 16	0.253	0.858
Frustration	3,16	13.556	<.001
Excitement	3, 16	3.059	0.058
Fast	3, 16	13.412	<.001
Violent Content	3, 16	348.444	<.001
Violent Graphics	3, 16	348.444	<.001

Appendix L

Post Hoc Comparisons of Pilot Study's Ratings of Violent Content and Graphics

Violent Content			Mean Difference (I-J)	Sig.
	(I) CONDITION	(J) CONDITION		
	ddr	mk	*-5.600	<.001
		ddrf	0.000	1.000
		mkf	*-5.600	<.001
	mk	ddr	*5.600	<.001
		ddrf	*5.600	<.001
		mkf	0.000	1.000
	ddrf	ddr	0.000	1.000
		mk	*-5.600	<.001
		mkf	*-5.600	<.001
	mkf	ddr	*5.600	<.001
		mk	0.000	1.000
		ddrf	*5.600	<.001
Violent Graphics	ddr	mk	*-5.600	<.001
		ddrf	0.000	1.000
		mkf	*-5.600	<.001
	mk	ddr	*5.600	<.001
		ddrf	*5.600	<.001
		mkf	0.000	1.000
	ddrf	ddr	0.000	1.000
		mk	*-5.600	<.001
		mkf	*-5.600	<.001
	mkf	ddr	*5.600	<.001
		mk	0.000	1.000
		ddrf	*5.600	<.001

*. The mean difference is significant at the .001 level; Tamhane's Method.

Appendix M

Correlations of Pilot Study's Video Game Rating Characteristics

		Difficulty	Enjoyment	Frustration	Excitement	Fast	Violent Content	Violent Graphics
Difficulty	Pearson Correlation	1.000	0.122	**0.901	0.313	**0.685	0.066	0.066
	Sig. (2-tailed)		0.609	<.001	0.178	0.001	0.782	0.782
Enjoyment	Pearson Correlation	0.122	1.000	-0.052	**0.625	0.234	0.131	0.131
	Sig. (2-tailed)	0.609		0.829	0.003	0.321	0.583	0.583
Frustration	Pearson Correlation	**0.901	-0.052	1.000	0.199	**0.596	0.206	0.198
	Sig. (2-tailed)	<.001	0.829		0.400	0.006	0.383	0.403
Excitement	Pearson Correlation	0.313	**0.625	0.199	1.000	0.336	*0.477	*0.477
	Sig. (2-tailed)	0.178	0.003	0.400		0.147	0.033	0.033
Fast	Pearson Correlation	**0.685	0.234	**0.596	0.336	1.000	0.213	0.202
	Sig. (2-tailed)	0.001	0.321	0.006	0.147		0.367	0.394
Violent Content	Pearson Correlation	0.066	0.131	0.206	*0.477	0.213	1.000	**0.994
	Sig. (2-tailed)	0.782	0.583	0.383	0.033	0.367		<.001
Violent Graphics	Pearson Correlation	0.066	0.131	0.198	*0.477	0.202	**0.994	1.000
	Sig. (2-tailed)	0.782	0.583	0.403	0.033	0.394	<.001	

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

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix N

Post Hoc Comparisons of Pilot Study's Ratings of Frustration and Difficulty

Frustration			Mean Difference (I-J)	Sig.
	(I) CONDITION	(J) CONDITION		
	ddr	mk	-0.800	0.317
		ddrf	*-3.400	<.001
		mkf	-4.200	<.001
	mk	ddr	0.800	0.317
		ddrf	*-2.600	0.004
		mkf	*-3.400	<.001
	ddrf	ddr	*3.400	<.001
		mk	*2.600	0.004
		mkf	-0.800	0.317
	mkf	ddr	*4.200	<.001
		mk	*3.400	<.001
		ddrf	0.800	0.317
Difficulty	ddr	mk	-0.600	0.219
		ddrf	*-4.800	<.001
		mkf	*-4.800	<.001
	mk	ddr	0.600	0.219
		ddrf	*-4.200	<.001
		mkf	*-4.200	<.001
	ddrf	ddr	*4.800	<.001
		mk	*4.200	<.001
		mkf	0.000	1.000
	mkf	ddr	*4.800	<.001
		mk	*4.200	<.001
		ddrf	0.000	1.000

*. The mean difference is significant at the .001 level.

Appendix O

Post Hoc Comparisons of Pilot Study's Rating of Fast (Pace of Action)

Fast			Mean Difference (I-J)	Sig.
	(I) CONDITION	(J) CONDITION		
	ddr	mk	*-2.400	0.001
		ddrf	*-3.600	<.001
		mkf	*-2.400	0.001
	mk	ddr	*2.400	0.001
		ddrf	-1.200	0.056
		mkf	0.000	1.000
	ddrf	ddr	*3.600	<.001
		mk	1.200	0.056
		mkf	1.200	0.056
	mkf	ddr	*2.400	0.001
		mk	0.000	1.000
		ddrf	-1.200	0.056

*. The mean difference is significant at the .001 level.

Appendix P

Main Experiment Consent Form

I agree to take part in a research study titled *Video Game Learning Styles*, which is being conducted by Kevin Williams of the Grady College of Journalism and Mass Communication. Kevin can be reached by calling 542-4978. This study is under the direction of Dr. Joseph Dominick of the Telecommunications Department of Grady College. He can be reached by calling 542-4974. I understand that I do not have to take part in this study, and I can stop taking part at any time without giving any reason, and without penalty. I can ask to have information related to me returned to me, removed from the research records, or destroyed.

The purpose of this experiment is to study how players react to video game play. If taking part in this experiment through the psychology research pool, I will be awarded 1 research credit for the first phase of the experiment and 1 credit for the second phase. Full participation in both phases will result in 2 research credits. If I was recruited through a class outside of the psychology research pool, I will receive extra class credit for completing both phases of the experiment. During the first phase of the experiment, I will be asked to answer a few questions describing myself and my game playing habits. I will then return at my scheduled time to complete the second part of this study. This will consist of playing video games and being monitored for blood pressure and heart rate, followed by completing a questionnaire. Each session of this experiment should take no longer than 1hour.

I understand that I may be exposed to violence in the video games. No other discomforts or stress should be gained from this experiment. There are no other risks foreseen than those created by playing video games. In order to make this study a valid one, some information about my participation will be withheld until after the study. Again if I am uncomfortable with what I see during the course of this experiment, I understand that I can stop taking part at any time without giving any reason, and without penalty. I understand that any information which could personally be connected to me will be kept confidential and not shared with anyone outside the research group. A list which connects names of people to the answer booklet they filled out will be kept separately from the answer booklets in a locked file cabinet. This personal information can only be released with my permission. If information about me is published, it will be written in a way that I cannot be recognized. However, research records may be obtained by court order. The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 706-542-4978.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Signature of Researcher Date

_____

Signature of Participant Date

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Appendix Q

Main Experiment Contact Information

VIDEO GAME EXPERIMENT

Instructions: Please fill out all information legibly in the spaces provided. Make sure that when circling items there is no confusion between which answer you have chosen.

1. Please print your name: _____

I need the following information from you so I can contact you to remind you about the follow-up appointment. I also need a way to contact you in case I have to reschedule your appointment.

2. What phone number can I most easily reach you at: _____

3. What email address can I most easily contact you at: _____

Appendix R

State-Trait Anger Expression Inventory-2

Directions: A number of statements that people use to describe themselves are given below. Read each statement and then circle the appropriate number to indicate how you feel *right now*. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to *best* describe your *present feelings*.

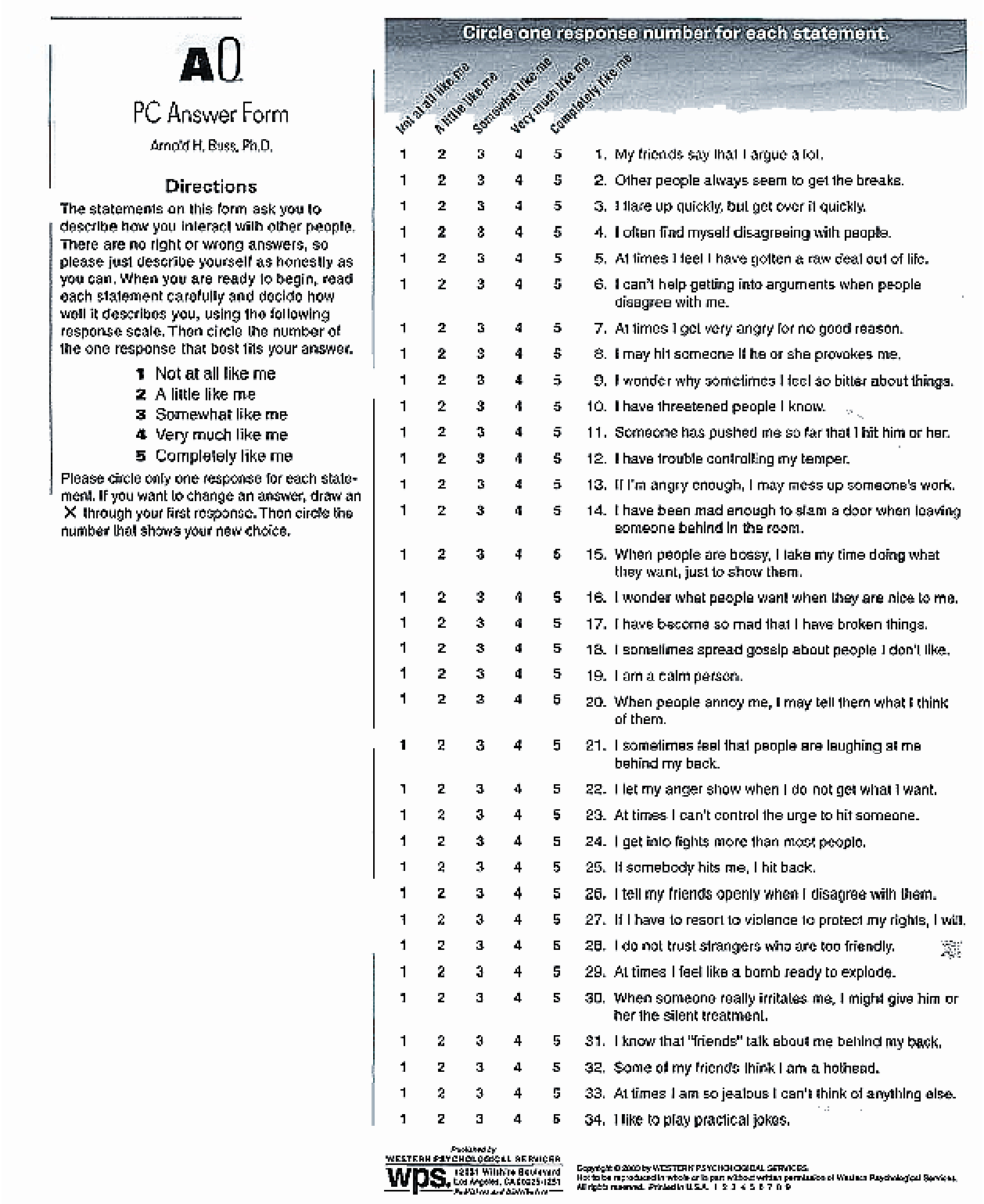
		Not At All	Somewhat	Moderately So	Very Much So
1.	I am furious.	1	2	3	4
2.	I feel irritated.	1	2	3	4
3.	I feel angry.	1	2	3	4
4.	I feel like yelling at somebody.	1	2	3	4
5.	I feel like breaking things.	1	2	3	4
6.	I am mad.	1	2	3	4
7.	I feel like banging on a table.	1	2	3	4
8.	I feel like hitting someone.	1	2	3	4
9.	I feel like swearing.	1	2	3	4
10.	I feel annoyed.	1	2	3	4
11.	I feel like kicking somebody.	1	2	3	4
12.	I feel like cursing out loud.	1	2	3	4
13.	I feel like screaming.	1	2	3	4
14.	I feel like pounding somebody.	1	2	3	4
15.	I feel like shouting out loud.	1	2	3	4

Directions: Read each of the following statements that people have used to describe themselves, and then circle the appropriate number to indicate how you *generally* feel and react. There are no right or wrong answers. Do not spend too much time on any one statement. Circle the answer which *best* describes how you *generally* feel or react.

		Not At All	Somewhat	Moderately So	Very Much So
16.	I am quick tempered.	1	2	3	4
17.	I have a fiery temper.	1	2	3	4
18.	I am a hotheaded person.	1	2	3	4
19.	I get angry when I'm slowed down by others' mistakes.	1	2	3	4
20.	I feel annoyed when not given recognition for doing good work.	1	2	3	4
21.	I fly off the handle.	1	2	3	4
22.	When I get mad, I say nasty things.	1	2	3	4
23.	It makes me furious when I am criticized in front of others.	1	2	3	4
24.	When I get frustrated, I feel like hitting someone.	1	2	3	4
25.	I feel infuriated when I do a good job and get a poor evaluation.	1	2	3	4

Appendix S

The Aggression Questionnaire



AQ

PC Answer Form

Arnold H. Buss, Ph.D.

Directions

The statements on this form ask you to describe how you interact with other people. There are no right or wrong answers, so please just describe yourself as honestly as you can. When you are ready to begin, read each statement carefully and decide how well it describes you, using the following response scale. Then circle the number of the one response that best fits your answer.

1 Not at all like me
2 A little like me
3 Somewhat like me
4 Very much like me
5 Completely like me

Please circle only one response for each statement. If you want to change an answer, draw an X through your first response. Then circle the number that shows your new choice.

Circle one response number for each statement.

Not at all like me	A little like me	Somewhat like me	Very much like me	Completely like me	
1	2	3	4	5	1. My friends say that I argue a lot.
1	2	3	4	5	2. Other people always seem to get the breaks.
1	2	3	4	5	3. I flare up quickly, but get over it quickly.
1	2	3	4	5	4. I often find myself disagreeing with people.
1	2	3	4	5	5. At times I feel I have gotten a raw deal out of life.
1	2	3	4	5	6. I can't help getting into arguments when people disagree with me.
1	2	3	4	5	7. At times I get very angry for no good reason.
1	2	3	4	5	8. I may hit someone if he or she provokes me.
1	2	3	4	5	9. I wonder why sometimes I feel so bitter about things.
1	2	3	4	5	10. I have threatened people I know.
1	2	3	4	5	11. Someone has pushed me so far that I hit him or her.
1	2	3	4	5	12. I have trouble controlling my temper.
1	2	3	4	5	13. If I'm angry enough, I may mess up someone's work.
1	2	3	4	5	14. I have been mad enough to slam a door when leaving someone behind in the room.
1	2	3	4	5	15. When people are bossy, I take my time doing what they want, just to show them.
1	2	3	4	5	16. I wonder what people want when they are nice to me.
1	2	3	4	5	17. I have become so mad that I have broken things.
1	2	3	4	5	18. I sometimes spread gossip about people I don't like.
1	2	3	4	5	19. I am a calm person.
1	2	3	4	5	20. When people annoy me, I may tell them what I think of them.
1	2	3	4	5	21. I sometimes feel that people are laughing at me behind my back.
1	2	3	4	5	22. I let my anger show when I do not get what I want.
1	2	3	4	5	23. At times I can't control the urge to hit someone.
1	2	3	4	5	24. I get into fights more than most people.
1	2	3	4	5	25. If somebody hits me, I hit back.
1	2	3	4	5	26. I tell my friends openly when I disagree with them.
1	2	3	4	5	27. If I have to resort to violence to protect my rights, I will.
1	2	3	4	5	28. I do not trust strangers who are too friendly.
1	2	3	4	5	29. At times I feel like a bomb ready to explode.
1	2	3	4	5	30. When someone really irritates me, I might give him or her the silent treatment.
1	2	3	4	5	31. I know that "friends" talk about me behind my back.
1	2	3	4	5	32. Some of my friends think I am a hothead.
1	2	3	4	5	33. At times I am so jealous I can't think of anything else.
1	2	3	4	5	34. I like to play practical jokes.

Published by
WESTERN PSYCHOLOGICAL SERVICES
wps. 12031 Wilshire Boulevard
Los Angeles, CA 90025-1251

Appendix T

Phase 2 Booklet First Page

VIDEO GAME EXPERIMENT

Instructions: Please fill out all information legibly in the spaces provided. Make sure that when circling items there is no confusion between which answer you have chosen.

1. Please print your name: _____

EXPERIMENTER USE ONLY			
Date:	Cond:	Initials:	
	sys	dia	hr
1			
2			

Appendix U

Main Experiment Debriefing Sheet

DEBRIEFING STATEMENT

Thank you for participating in this experiment, entitled "Video Games Learning Styles." While it was true that I was interested in your playing a video game, I was not trying to judge how well you played the game. I was trying to see how playing the game affected your feelings of anger or aggression. Subjects either played a violent game or a nonviolent game. I was interested in how violent content affected your feelings of aggression after playing the game. Half of you were told you would be competing for an extra reward depending on how well you played the game. This was a deception. There was never a true intent to give you an extra reward. For those people told of the extra reward, I made the video game especially difficult for you to play. I was hoping to make you frustrated with the game. Frustration in my experiment is defined as giving someone a valuable goal and then making it almost impossible to obtain it. This is why I offered a reward (the valuable goal) and then changed the difficulty level (restricting you from obtaining it). I was interested in looking at how violent content in the game and frustration with the game worked together to influence feelings of aggression. It is important that you understand that there is no extra reward for competing in the experiment. Those of you who were not offered the extra reward hopefully felt no frustration with the game. In your case, the difficulty level of the game was kept at a beginner level.

The questionnaires I gave you are instruments designed to determine how often you play video games and what types of games you like to play, how angry or aggressive you feel in general, and how angry or aggressive you felt after playing the video game. Heart rate and blood pressure were measured because these two things tend to increase when one is feeling aggressive. My belief is that frustration can lead to feelings of aggression. My main question is to figure out if a nonviolent frustrating game can influence aggression just as much as a violent non-frustrating game.

Again, thank you for your participation. If you have any further questions, comments, or would like to know the results of this experiments please contact Kevin Williams at 706-542-4978.

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu