MOTIVATIONS FOR VIDEO GAME PLAY: A STUDY OF SOCIAL, CULTURAL AND PHYSIOLOGICAL FACTORS.

by

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B.A., Simon Fraser University, 1990

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in the School of COMMUNICATION

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Abstract

The video game industry has spawned an entire culture of play. This industry has existed for slightly more than twenty years, yet it commands attention across international boundaries as a potent economic and cultural force. Kids play video games for hours, discuss strategy on the playground, and incorporate video game characters into other forms of play. Unfortunately, research into what motivates players to play these games has not kept pace with the rapid development of the video game form. Just as the crude graphics and sound of video games have been replaced by photorealistic graphics and stereo sound, research techniques for media such as the video game must also develop the sophistication necessary to critically examine this dynamic media.

This thesis approaches the motivational aspects of video game play by undertaking the creation of a comprehensive model of video game play. The player's motivation to play is tied into a complex economic and cultural system which must be understood in order to understand the experience of video game play. As such, this thesis explores the history of the video game form by examining the history of the industry, video game design and the social concerns of parents and educators. This history provides the building blocks for the model of video game play and sets the context for interpreting the responses of players to video games.

Once the context of the video game play environment is established, this thesis examines the physiological reaction to play as it relates to the playing and watching of violent and non-violent video games. A
A comprehensive observational methodology is employed which incorporates physiological monitoring, interview, and questionnaire data to record several dimensions of video game player response.

This thesis will demonstrate the relationships and influences of various cultural and industrial forces in determining the kinds of video games available for children. The study will also present results which suggest that player involvement and excitement vary greatly depending on whether or not the subject is playing or watching a video game and whether or not the game contains violent or non-violent themes.
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Motivations for Video Game Play: A Study of Social, Cultural and Physiological Factors.

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Dedication

For Jamie,
with Love
Acknowledgments

Whenever I think I have accomplished something, its always a good idea to take a look around and see whose shoulders I stood on to get there. I would like to thank God, my beautiful wife Jamie, my parents John and Carol, and Ted and Claudette. Their inspiration and kind words made a big difference on a long trip.

I would especially like to thank Steve Kline for alternately inspiring excitement and frustration in my work and for always challenging me to push a little further. Steve's insight and knowledge played a substantial role in the development of my work and without him my study would not have been possible. I also extend my thanks to Jackie Botterill for her invaluable help in undertaking the ICARUS portion of the study. I would like to thank her for her unselfish donation of time, her insightful assistance as a researcher and her unbridled enthusiasm.

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To all the other friends and colleagues who helped me along the way, with friendly discussions over coffee or in some other way I have neglected to note, I thank you as well.
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Chapter I:
Motivation for Video Game Play

Wed., July 16, 1980 (two days before returning to Canada from Brazil) Today Lester and I went to the arcade and played a pile of games. I cleared the board on Space Invaders twice! I also got 100,000 points on Shock! with one ball! Well we got back and Lester and I and Donnie went to the beach and let off firecrackers. We stuffed 'em in all kinds of places, blowing up pop bottles and old plastic bottles, we had a cool time. Well in the night me and Lester stayed up a long time talking.

Mon., July 21, 1980 (one day after returning to Canada) I met up with Armstrong today. We walked over to Jubilee, and they have a whole pile of cool games. There is a new version of Space Invaders where they fall down like Kamikaze's. I went to the library and got some great books...I went to Radio Shack to get info on their computer.

From the author's personal diary.
1.1 Introduction

Having experienced the origins of the video game first hand, I must admit they certainly made an impression upon me as a young boy. I was living in Rio de Janeiro, Brazil when I played my first video game. These black-and-white arcade machines drew me and my friends out of the sun and into their air-conditioned arcades for entire afternoons. Regardless of our backgrounds, whether Canadian (as I am), American, Brazilian or Chinese, we all enjoyed challenging these square blocky tanks, planes and Space Invaders.

Video games became one of the primary activities in our daily lives. We went to school, we played soccer and we went to the beach, but the video game provided something completely different. We were fascinated by the visual images presented and the pleasure we got from mastering the games. We discussed strategy, pooling our experience to beat the mighty Space Invaders, and cheered loudly when we set new high scores. When I returned to Canada, my fascination with the games continued with my new group of friends.

It was the memory of these intense video game play sessions that inspired me to undertake a careful examination of the motivational aspects of video game play. The direction that study was to take was inspired primarily by a recent maelstrom of concern around popular video games. On December 1, 1993, a U.S. senator named Joseph Lieberman held a press conference to denounce the excessive violence in video games. Sen. Lieberman outlined his primary concern of exposing children to violent media when he said, "common sense suggests that the effect of violence or sexual images in video
games may be even greater [than non-interactive television violence]". ¹ Sen. Lieberman was concerned as the levels of visual realism were extremely high and comparable to television.

The game which inspired Sen. Lieberman’s concern was a video game called Mortal Kombat. Mortal Kombat is a game where two opponents battle each other in hand to hand combat on the video game screen. The winner is the player who knocks out their opponent.

Two factors brought this game to the attention of parents and legislators. Firstly, the characters in the game were created by photographing actors in costume and those pictures were “digitized” into the computer graphics. This resulted in highly realistic representations of the characters in the game. Secondly, Mortal Kombat introduced the “Fatality”. This option allowed a player to engage in an excessively bloody decapitation or dismemberment at certain points in the game. (see Figure 1)

This combination of realism and fantasy violence created a game which began to approach the visual resolution of television. The impetus for Senator Lieberman’s December press conference was the fact that this new, violent video game was leaving the arcade and entering homes as a home video game cartridge. This unification of violence, realism and home play renewed the debate on the effect of video games on children.

¹ “U.S. Senate Calls For Video-Game Legislation.” Video Games. March 1994, pg.10.
Figure 1: A Fatality in *Mortal Kombat*

Johnny Cage decapitates Sub-Zero with a “Fatality”. The video “blood” is both covering the ground and flying through the air.²

Senator Lieberman’s notion that the interactivity and realism of a particular media increases effect of that media on the viewer (or player) provided an interesting starting point for investigation. In the late seventies, all the video games were generally black and white with extremely coarse screen resolutions. The graphics were collections of square blocks and highly symbolic in nature. Concerns about violence and video games were often dismissed as the low-quality of the video image was usually wildly unrealistic,

Video-game violence is far less harmful than television violence, some professionals maintain, because the blood and gore in video games is less realistic. Even though game designers seem to spend inordinate amounts of time and energy dreaming up bizarre ways to kill and maim, for the most part the violence is the stuff of science fiction and fantasy.  

Games like Mortal Kombat are moving the boundaries between fantasy and realistic visuals by implementing video footage of real actors in the creation of graphics. The movements of actors are also being used to create animation for video games. Motion-capture technology uses actors to move the electronic figures in the computer. Those motions are translated into video game animations with extremely realistic results.

I felt it was time to re-examine the field of video games as the medium has expanded in terms of complexity and detail. I wanted to explore the question of whether or not this realistic violent content is attracting kids to video games or are there other factors?

This thesis explores the terrain of video game player motivation in two ways. First, the terrain of the video game is mapped onto a model of video game play as I believe there are social, cultural and industrial contexts which have a direct impact on the creation of the video game player’s desire to play. The marketplace also plays an important role in the cultivation of many players' sense of video game aesthetics which must also be accounted for in the model of video game play.

---

Secondly this thesis explores motivation through an experimental approach using observational and physiological monitoring techniques in an attempt to understand why video games and players interact in the ways they do and if violence and interactivity are important factors in player motivation. The interview and questionnaire data provide attitudinal observations which may be compared with physiological responses to video game play. These responses are interpreted through the lens of the video game model to provide a cohesive picture of player motivation to play (or not play) video games.

1.2 Thesis Overview

1.2.1 Objectives

This thesis presents an overview of the history and context of the emergence of a new form of play, that of the video game. This overview is used to frame an observational study on video game players. By examining the relationships between the various stakeholders of players, game creators, parents and other organizations, this thesis attempts to ground its observational analysis and conclusions within the context of play that exists in North America. By examining the structural constraints within the video game industry and charting the relationships between players, parents, video games and industry, a model of video game play will be constructed. With that model established, the thesis will then present the results of an observational study of video game players which will report their attitudes, experiences and physiological responses to video game play. The central focus of this study is the role of interaction and content in attracting and motivating kids to play video games. The depth of interaction between
watching and playing will be compared and the response to violent and non-violent content will also be reported.

1.2.2 Methodology

This thesis consists of two separate research activities. One is to create a contextual model of video game play which examines the emergence of the video game as a new form of play. Video games embody characteristics from games, toys, sports and other references to create a new form of play based in technology. The other research activity is to conduct a piece of audience research. In order to build the model of video game play and set the context of the study, a literature review was undertaken. In addition to the key research on video game play, video game magazines dating from the early eighties to present day were employed to reconstruct player concerns throughout the short history of video game play. The video games themselves were also used in the analysis of video game design.

The second part of the research involved the study of the experience of play using interviews, questionnaires and a physiological monitoring system called ICARUS. Based on principles of psychophysiology, ICARUS was designed to monitor physiological reactions such as heart rate, galvanic skin response and electromyography. These reactions are measured in response to a video game stimulus. Integrating the early research on physiological response to violent and non-violent video games, a research design was created to monitor video game players as they played and watched violent and non-violent video games in order to measure the physiological differences between playing and watching violent and non-violent games.
Twenty-five subjects (21 male and 4 female) were recruited from a phone list of respondents who called in after a request for subject volunteers was given on three local open-line radio talk shows. The subjects were given a pre-questionnaire, monitored by ICARUS for playing and watching violent and non-violent games, and were interviewed after the session. The data was collected and coded for statistical analysis. Summaries of the statistics and samples of the research tools are provided in the appendices.

1.2.3 Structure of the Thesis

The thesis is made up of nine chapters and several appendices. The introductory chapter reviews the motivations to undertake this study and presents the basic objectives and methodology. Chapter Two presents the Model of Video Game Play. Chapter Three gives an overview of the research and social concerns relating to video games & violence as it affects children, parents and families. Chapters Four, Five & Six deal with the video game industry, video games and video game players respectively. These chapters explain and review the context and relationships of play as articulated in the Model of Video Game Play. Chapter Seven presents the ICARUS system for monitoring physiological response to video game play. Chapter Eight presents an analysis of the results of the study on video game players. Finally, Chapter Nine presents conclusions and recommendations.
Chapter II:
The Model of Video Game Play

I took my kids to the local game center recently, and I was floored to see how complex and intimidating the games have become. Despite impressive technological advances, I think we've lost something really important. With the possible exception of Tetris, games are no longer satisfying, addictive, and fun for everyone. They only appeal to experts. And that's sad.⁴

Nolan Bushnell, creator of PONG

⁴ Bushnell, Nolan K. “King Pong” Electronic Entertainment, January 1994, pg.140
2.1 Growth and Change in the Industrial Context of Video Games.

In the mid-eighties it was entirely possible for an individual to create video games on their home computer that rivaled commercially available products. That process is now extremely rare. However, this small scale approach spawned successful games which launched companies that have become video game companies. Two Canadian examples are Distinctive Software (now Electronic Arts Canada) and Gray Matter, both international video game companies founded with the profits from a single video or computer game created by one or two programmers. Video games today are born in an environment of team development, intensive market strategy, complex licensing agreements, multiple distribution options and constant testing procedures. Current estimates place the cost of bringing a game to market at approximately $1 million, with further promotional costs approaching $2 million.5

The size and shape of the market has also changed. In 1982 the video game industry in North America was worth approximately $3 billion in yearly sales for all companies, with Atari leading the way with $2 billion in sales.6 By the end of 1983 the entire market collapsed to a total of $100 million in sales.7 That dramatic loss of revenue was hailed by many as the end of the video game, a fad whose time had past. Since that crash Nintendo has rebuilt the video game market into a global economic force. Now Nintendo and Sega

---


7 Ibid Sheff, p.150.
command huge revenues in the global marketplace. While the size of the 1993 US video game market was US$5.3 billion, Sega had total 1993 revenues of US$3.6 billion in 1993 and US$4 billion in 1994 and Nintendo had total revenues of US$4.3 billion in 1993 and US$5.2 billion in 1994. Within these gross revenues are also individual blockbusters, for example, in December 1994 Sega claims to have sold 300,000 32X machines (a hardware upgrade for their Sega Genesis unit) within the first month of release. That figure translates into sales of US$45 million in one month.

The setting for video game play has also shifted squarely into the home. In the late seventies the video game phenomenon started in the arcade. The arrival of Space Invaders from Japan was seen by many as the catalyst for the first wave of video game excitement. Video games became a common sight in public places such as bars, movie theaters, arcades, restaurants and convenience stores. The popularity of the public games translated into sales of home games. Now the home video game console is the engine of the video game industry. Sales of Sega’s home related game products account for 66% of their total $4 billion sales, while arcades account for only 25%. While arcade play is still a part of the industry and the site of development for new games, the home game is the primary force.

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10 Ibid Ladensohn, p.102.

2.2 The Early Context of the Video Game.

The size of the marketplace, the increasing complexity of the game hardware and the team development atmosphere have created an context of video game play which is more complex than the context of video game play of the early to mid-eighties. To illustrate how the context of the video game has changed I will examine one of the first video games.

One of the first successful video games to hit the market was PONG. PONG was created by Nolan Bushnell in the fall of 1972.\textsuperscript{12} The game design was done by one person, creating a self-contained game which would stand by itself. A player would approach the game and operate it without any need for outside instruction or assistance.

\textbf{Figure 2: PONG}

\begin{center}
\includegraphics[width=0.4\textwidth]{pong.png}
\end{center}

\textit{PONG, the first commercially successful video game}\textsuperscript{13}

\textsuperscript{12} Morrison, Mike. \textit{The Magic of Interactive Entertainment}. Sams Publishing, Indianapolis, IN. 1994, pg.34

\textsuperscript{13} PONG, ©Atari, 1972
PONG was the graphic equivalent of ping-pong or table-tennis. Two players would each manipulate a paddle up and down one side of the screen, while a small square block bounced back and forth across the playfield. If a player missed the ball, it travelled off-screen and their opponent scored a point. The game progressed to 15 points. The name of the game, PONG, represented the sound-effect the player heard when the square "ball" would hit the edges of the playfield or the paddle.

In designing PONG, several design criteria were introduced. The game was multi-player, the computer provided no "intelligence" (artificial or otherwise) to the game. Players provided all the skill and strategy, while the computer provided an equal playing field where it took care of the rules and scoring. One interesting feature of the PONG design was that it was modeled after a common activity. The metaphor for PONG was table-tennis, an activity players probably had seen before. As such, people had an idea of what to do when they dropped their quarter into the PONG machine.

The instructions reflected a simplicity of design as well. The entire instructions read as follows,

Insert Quarter
Ball Will Serve Automatically
Avoid Missing Ball for High Score\(^\text{14}\)

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\(^{14}\) Bushnell, Nolan K. "King Pong" Electronic Entertainment, January 1994, pg.140
The challenge of *PONG* was in the potential challenges of your friends who engaged you on the *PONG* playfield. Players would begin to discover the various elements of becoming expert *PONG* players as they engaged each other in the game. The subtleties of the game encoded into it by the designer were discovered by the players through play and experimentation. Ultimately, players would master the game and looked forward to newer challenges.

The other element of *PONG* was that it was a game intended for public use. It was housed in a large console and placed in bars, pinball arcades and restaurants. This situation of the game in a public space encouraged social activities of playing, watching and competing. The success of the game prompted the manufacture and sale of home based versions of the same game. This movement of successful arcade games into home video games continues to this day, where the most popular arcade games become the home video game cartridges.

Working from the game *PONG*, the process of video game production could be modeled as follows:

**Figure 3: A Simple Model of Video Game Play**

```
Game Creator
     ↓
     Game
     ↑
  Player
```
The video game designer encodes a video game experience into a game, which is then manufactured into a self-contained product, either a freestanding arcade game or video game cartridge. The player then comes across the game and decodes the game play experience as they play with the game. The hallmark of this kind of design is clear simplicity, the player must instantly know what to do with the game. No previous knowledge or experience is necessary to play the game. As the home game became more popular, the need for knowledge outside of the game itself becomes necessary. As the video game industry developed, contexts outside the game play experience and social relations between the parents and other groups quickly became a part of the video game experience.

2.3 The Model of Video Game Play

Modern video game play has maintained some of the basic features of the early video game industry, but it has grown and matured into a much more complex sphere of activity. As such, I present the following Model of Video Game Play (See Figure 4) as an expansion of the model presented in Figure 3.

The model reflects the massive expansion of the video game industry and the elaborate structure of the video game environment. One important difference between Figure 3 and Figure 4 is the flow of information. In the modern context of video game play, information flows between game designers, players and other groups such as parents, teachers and even government. As the video game has increased in complexity, the environment of play has also become more complex.
The Model of Video Game Play presented in Figure 4 includes the three parts of the early video game model (Figure 3): Game Creator, Game and Player. The Game Creator section has been the site of the most visible growth and development. Modern video game design occurs in large companies with development and design teams. The solitary designer has become the exception. While smaller scale game design often occurs outside of the big companies such as Sega and Nintendo, smaller software publishing companies become part of the larger production team through licensing agreements with large companies such as Nintendo and Sega.

The process video game development flows from top to bottom in the model. The creation of a video game no longer begins only with new game ideas. A video game design may also be undertaken as a platform translation, which is when a successful game on one platform (i.e. Sega) is translated to run on a Nintendo or Atari system. Other options are to create a game in an existing genre, in essence a clone of an existing popular game, or perhaps to create a sequel to a popular game that has already proven itself in the marketplace. Another possible motivation to create a game could be the acquisition of a licensed property such as a hit movie or sports celebrity endorsement.
Figure 4: The Model of Video Game Play

GAME CREATOR

- New Game Idea
- Platform Translation
- Clone of Successful Game Type
- Licensed Property
- Sequel

Game Idea

PRODUCTION TEAM

- Producer
- Artists
- Programmers
- Sound Designers

Finished Game Code

- Internal Testing / Evaluation
- Collected Sales Information and Player Feedback

(Possible)

Sega / Nintendo testing

Manufacturing and Packaging
CD-ROM / Cartridge

Marketing / Distribution

GAME

- Interactivity
- Classification
- Content

PLAYER FEEDBACK

- On-line Response
- Player Polls
- Game Magazine Letter Columns

PLAYER

- Expectations
- Motivations
- Previous Knowledge

Sales Information Purchasing Trends

Organizations

Parents

Peers
Any one of these factors could initiate the game design process. The actual programming, game design, art and sound design tasks are assigned to a production team. This may be one team or several teams working on the same project. Under the guidance of a producer, artists, programmers, sound designers and others create the video game. During this process ideas are sent out of the design team for internal evaluation using target audiences and focus groups to measure progress and fine-tune the game design.

Once the game is completed, it is passed along to the hardware manufacturer such as Sega or Nintendo. Both Sega and Nintendo put all new games through their own evaluation process using both kids and expert players to test and rate the games. If the games pass inspection they are sent on to the manufacturing plants, which are usually located in Japan. From there the games are shipped back to North America where marketers and distributors undertake the promotion and sales processes.

The next process in the model is the game itself. I have identified three primary elements of game design to consider in the video game play context: Interactivity, Content and Classification. It is these three elements which have been the traditional focus of study in the field of video games primarily in the games of the early to mid-eighties. Researchers have examined the content of the games, the notions of how the games frame interaction and means of classifying and sorting video games. Inherent to the notion of classification is the relationship of the video game to other media. Video games are not entertainment systems unto themselves, they share characters and settings.
with sports, movies and comic books as well. These influences play a role in what the video game looks like.

The final portion of the model is the player. When a player engages a video game, they are no longer approaching the game without a notion of what the video game is. Players are already familiar with a number of video game genres such as fighting games, racing games, role-playing games, action games, and puzzle games. Players have previous knowledge of video game play derived from previous play experiences which plays a role in developing expectations about the play experience and the strength of their motivation to play. Add to this the strength of the intense marketing campaigns which disseminate knowledge and serve to stimulate excitement around upcoming games.

In addition to those inner concerns about video game play, players also use the games socially. Attitudes and information are exchanged on different levels with parents, peers and organizations (such as schools). These relationships are charted at the bottom of Figure 4. Players respond differently to each group around the topics of video game play. With their parents, video games may be used in the context of rewards for family chores or punishment for lack of attention to homework. The context of video game purchases and the rules around video game play are negotiated around rational arguments of eye-hand coordination and educational value in the parent-player setting.

When players relate to their peers, they become immersed in a subculture of video gaming. The educational arguments are replaced by delighted explanation of how to accomplish the latest "fatality" in Mortal Kombat. The
peers compare skills and compete in video game play, refer to other peer experts for advice and read the literature of game play presented in video game magazines. In the player-peer context they share a language of video game play quite different than the one in which they engage their parents.

The player-organization context refers to other outside relationships the players may engage in such as the filtering in of video game issues into schools. The use of video game characters in drawing or writing exercises becomes an area of expression about video game play outside of the family or peer environment. The advent of portable video games allows for video game play within the confines of the school. Finally video game activities are entering the school context through the computer, often as educational tools. As such, there are emerging contexts for video games outside of the family and peer contexts. Managing these social relations can play a role in shaping attitudes and motivations to play or not play various video games.

Finally, the player is also involved in information exchanges when they involve themselves in the sub-culture of video game play. There are many avenues for voicing opinions back to the game creators. In addition to testing and evaluation that the companies undertake, children write letters to the various companies extolling the virtues or complaining about flaws in their video games. Sales information and purchasing trends are closely monitored and charted by marketers and video game magazines. The magazines also conduct player polls and other contests to solicit opinions of players. These relationships are represented in the Sales Information/Purchasing Trends and Player Feedback boxes in Figure 4.
Video game creators also run phone in help lines, where in addition to helping players through complex games, they collect information on common problems to avoid in future game designs. Finally, both Sega and Nintendo are using Internet and computers to connect directly to players offering and soliciting information from players directly.

All these interconnected activities affect how games are created and designed to both appeal to and motivate players to play video games. Changing any part of the model changes the relationship between the parts, which can in turn affect player motivations to play. As new technology, production processes, distribution systems, and game designs meet developing player expectations the model will continue to change and grow. In order to better understand how the Model of Video Game Play and its relationship to player motivation and video game play, we will now explore each part of the model with reference to how each element has been seen to manage and motivate video game players.
Video games may be hazardous to the health of young people...More and more, people are beginning to understand adverse mental and physical effects of video games on preteenage and teenage children...There's nothing constructive in the games. Everything is eliminate, kill, destroy.  

Dr. Everett Koop,  
U.S. Surgeon General  
November 9, 1982

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3.1 Introduction

In the fall of 1982, the Surgeon General of the United States, Dr. C. Everett Koop made the proclamation that video games are harmful to the young people who use them. The next day Koop retracted the statement, saying the comments he made were based solely on his opinion and not on any scientific measurement or fact. However, the statement did crystallize parental fears that the games may be having harmful effects upon their children. As the games moved from the arcade into the home, parents began to witness first hand the compelling forces video games exerted upon the players. Dr. Koop's statement galvanized debate and mobilized researchers to examine the potential impacts of video game play on the players.

The problem parents face when confronted with video games is often a problem of definition, for the video game is more than an electronic toy, it is an electronic media. The video game shares significant attributes with other children's media such as music, television, radio and comics. The use of a television as the display device for video games instantly situates the video game in relation to television. Video games also relate to other media by sharing characters and settings. The character on the afternoon television cartoon will often appear in a video game, in a comic book and as an action figure playset. The ability of video games to fuse elements of other media, toys and games into one play system makes the video game difficult to evaluate.

When a parent attempts to evaluate any kind of children's toy or media, the parent probably has experience from their own childhood in its use. Parents are familiar with Saturday morning cartoons, Spider-Man comic books and Barbie dolls. Many of these items were integral parts of a parent's
upbringing, and as such, parents have already developed frames for evaluating their opinion of them. The more traditional forms and toys also allow parents to be more comfortable as they offer potential points of connection and sharing with their children. Video games provide children with a new form of play the parents are unfamiliar with.

More often than not, parents are uncomfortable taking a turn at the video game, it is alien territory for them. They are unaware of the rules and logic that govern the video game world. Their children begin to speak a language of video games that may be alarming, with casual references to “killing” and losing their "life". Other terms like "warp-zones" "1UP's" and "mini-bosses" have no meaning for the novice parental player. Add to this unfamiliarity the observations parents make about the powerful grip the games appear to have over their children. The image of the "zombie" staring at the screen for hours, unmoving except for the constant twitching of the thumbs, has become a familiar one for parents. Like television before it, video games are a source of concern and interest for parents.

3.2 Parental Concern

Television has long been criticized for the hypnotic pull it exerts on children. Video games now threaten to intensify that pull by adding interaction to viewing. In his essay, "x Logic": Repositioning Nintendo in Children's Lives, Henry Jenkins discusses the powerful relationship of Nintendo to children and the parental fear that their children will become hopelessly addicted to the video game experience. Jenkins accomplishes this by using a Lewis Padgett's 1943 short story, Mimsy Were the Borogoves as an illustrative example. The story is interesting because it clearly articulates the elements of
parental fear around their children's development as it relates to technology, while pre-dating the video game by decades.

In the story, a boy goes playing in the countryside instead of attending school and finds a box full of toys by a river. He does not know they are toys from the future, accidentally sent back through time. One of the toys is a small cube, which is populated with tiny humanoid figures. The boy, Scott, soon learns that by thinking, he can control the actions of the figures inside.

The tiny people were deftly building a house. Scott wished it would catch fire, so he could see the people put it out. Flames licked up the half completed structure. The automatons, with a great deal of odd apparatus, extinguished the blaze. This was fun, like putting on a play, only more real. The little people did what Scott told them, inside of his head. If he made a mistake, they waited till he'd found the right way. They even posed new problems for him -- The cube was a most instructive toy. It was teaching Scott, with alarming rapidity -- and teaching him very entertainingly. But it gave him no really new knowledge as yet.16

Scott and his younger sister play with this and other toys, learning what a psychologist in the story calls "x logic". While the children easily master the puzzles presented by the toys, their parents are baffled by them. The toys seem to present a logic completely unrelated to parental notions of common sense. The kids play obsessively, and their parents become worried that their children are becoming less and less able to comprehend the reality they live in. The "education" the toys provide creates a gulf between the parents and children, as the children begin to perceive the world around them quite

differently than their parents do. Ultimately the children discover how to pass beyond the logic of the everyday world and disappear completely, leaving the parents behind to wonder where the children have gone.

The parallels with the video game are impossible to ignore. The video game presents an enclosed world for children to control and react to. Scott's "cube" allows him to work at his own pace, learning the rules and logic of the game. Video games work in precisely the same way, allowing the level of difficulty to increase as the player's skill improves. Video games also have their own internal logic system. When a player plays a video game, he or she expects to find secret items and hidden areas. Accessing those items often entails a knowledge of video game conventions such as keys and keyholes. That logic system allows players an instantly access and control a new video game environment without need for instruction.

In his article, Jenkins ponders the power relationships exerted between children, their Nintendo games and their parents. In response to the question, "What are these games teaching?", Jenkins presents the possibility that video game play teaches about identity through exploration. Children explore imaginary worlds with powers and freedom unavailable to them in their daily lives. They get to try a variety of roles and identifications, developing and articulating their identity.

The child rehearses many roles which he/she will not ultimately adopt, tries them on and rejects them like so many silly hats. However, the overall logic of this process matters, which is why the generic structure of Nintendo -- its emphasis on exploration and spatial conquest -- are more important than the specific narrative content of any given game. Nintendo gives children
virtual bodies which stride over their own physical or social limitations...allows them to enter a new space, a world without grownups, and make it their own.17

There is a popular notion that the household video game plays a potentially powerful role in a player’s experience. It is a powerful attractor, a powerful motivator, and by definition, exclusionary of the great majority of parents. It is little wonder that parents are concerned at the potential of the small gray and/or black boxes their children beg for.

Padgett’s story illustrates five of the major issues around video game play and parental concern: escape and fantasy, isolation and alienation, violence, addiction and displacement, and educational values. The parents in the story are concerned with the roles the toys begin to play in the children’s lives, how intensely the children are attracted to them, their children’s growing distance from the parent’s perspective and reality, the isolation of the children from others and the lessons the toys are teaching. These concepts and concerns will create the frame for an examination of issues around video game play.

3.2.1 The Zombie: Escape and Fantasy

The kids get it right away. Nobody has to explain it to a 10-year-old boy what's so great about video games. Just sit him down in front of a Sega Genesis or Super Nintendo machine, shove a cartridge into the slot and he's gone - body, mind and soul - into a make-believe world that's better than sleep, better than supper and a heck of a lot better than school.18

The role of fantasy in video game play has long been an area of interest. In his Ph.D. dissertation, Thomas Malone examined some of the features of video games which made playing them enjoyable.19 His analysis of video game players led him to conclude that fantasy was a major component of the video game play experience. Unlike other forms of fantasy engagement such as books and television, the fantasy of the video game responds to the player. It is Malone's contention that the fantasy element is one of the primary motivational forces in motivating video game players to play.

Other researchers have engaged the role of fantasy in video game play as well, and found the types of fantasy to have implications on whether or not males or females will be motivated to play. Morlock, Yando and Nigolean examined the role of fantasy in their study *Motivation of Video Game Players*. One of their findings was that the women in their study seemed to prefer more whimsical types of games then men. They suggest that the fantasy of the video games tend to be more violent and aggressive and that those fantasies

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do not provide females with the same motivation to engage in the games as males.

Research into the role of fantasy continued in David Myers 1990 study entitled, *Q-Study of Game Player Aesthetics*. In this study Myers assessed the role of *Challenge, Curiosity, Fantasy* and *Interactivity* as they relate to a player's favorite games. His analysis suggests that of these four criteria, challenge was the most critical element in determining a player's favorite game, while fantasy was the least critical element. Myers suggests that the evaluation of a video game cannot be solely based on its content as it is the relationship the game creates between it and the player that sustains interest and motivation to play.

...successful players appear to value computer game "interactivity" very highly. And their (pseudo-social) interactions with the computer game are instrumental in determining that game's success or failure. Therefore, it is likely (as was suggested by Myers, 1984) that a computer game "aesthetic" cannot be based solely on game content but must consider player-game relationships as well - and further detail the interactive process of play.

It is possible to conclude at this point that the role of fantasy in engaging a player is related in the early selection process of the player to play

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22 Ibid Myers. pg.384
or not play a video game. While the fantasy presented by a video game may draw the player in, the fantasy alone is not powerful enough to keep the player motivated. Other elements such as challenge and interactivity play a role in the powerful attraction provided by video games. The fantasy may be the hook to motivate the player but the interactivity and challenge are the line attached to the hook which keeps players engaged in video game play.

The video game is a highly responsive medium. When a player masters an element of a game, the video game responds by becoming more difficult. Like the toys in Padgett's *Mimsy Were The Borogroves*, video games adjust themselves to their players, providing a responsiveness unequalled by other media. According to researcher Seymour Papert, the video game provides not only responsiveness, but a demand for the player's attention which results in the fierce concentration of the video game player.

Video games teach children what computers are beginning to teach adults -- that some forms of learning are fast-paced, immensely compelling, and rewarding. The fact that they are enormously demanding of one's time and require new ways of thinking remains a small price to pay (and is perhaps even an advantage) to be vaulted into the future.²³

Papert would argue that it is the combination of the responsiveness and the demand for attention which video game play requires that stimulates the escape of players into the fantasy world. A second of inattention could result in the loss of a turn in the fantasy world of the video game. When the game ends the fantasy ends with it. This careful balance of changing levels of

difficulty, combined with the demand for attention creates the context by which players become absorbed by the video game.

This process of achieving an “escape” is articulated by Kubey and Csikszentmihalyi in their examination of the differences between television viewing and video game play. It is the authors’ contention that video game play is activating and requires levels of effort greater than activities such as watching television or movies.

Television and film decode themselves for us in a way reading, listening, and thinking do not. Truly rewarding experiences, in contrast, almost invariably require concentrated involvement and interaction with complex information. The “flow” state, the episodes when life is heightened and when one is deeply involved and mental energy is highly focused, is in many ways the opposite of the viewing experience. In “flow” experiences, people report very high concentration but ease of concentration - they feel active, strong and in control. Concentration is so concentrated during “flow” activities that people typically report a diminished awareness of their surroundings and they lose track of time. This state is also more likely to occur when there is rapid, positive feedback about how one is doing in an activity.24

The very definition of this “flow” state relates very well to the process of video game play. Video games demand that the player remain highly focused to keep the game moving, the player requires concentration and focus to maintain the experience. In response, the video game provides positive feedback as long as the player maintains the correct series of play responses. The player understands the contradiction of the “zombie” image. The player

is highly focused and motivated even though the outside observer sees a glassy-eyed stare and only small hand motions.

When the escape and fantasy of the video game become the primary feature of play, the articulation of concern around video games turns to the video game’s potential to be used to insulate one’s self from other people, severing the social ties of social interaction in favor of computer-mediated play.

3.2.2 Social Isolation and Alienation

...what I see the games encouraging is isolation. The games seem to have a lot of appeal to people who are social isolates, who are loners or somewhat alienated. By playing them, it increases both the amount of time they are not trying to relate to other people and their status from being good at something that does not involve any other human interaction...Currently, video games reinforce learning how to be optimally destructive. From my professional experience, I think that might have long-term negative impact on society. Video games put the player in command of usually enormous resources, typically to destroy some enemy. The question is: How much do you want to promote that kind of fantasy, especially among young males who have very little control of anything in their lives? We don't know if the fantasy stops there, or has long-range effects.25

Dr. Philip Zimbardo (professor of psychology, Stanford University)

The powerful attraction of the video game on the player leaves the video game open to criticism that games will be used by children with other concerns and problems to isolate themselves from the outside world. In the early eighties, authors Geoffrey Loftus and Elizabeth Loftus examined the

psychology of video games in their book, *Mind at Play*. They create a series of fictional composite video game players and discuss their fictional relationship to video game play in light of social concerns. When discussing the excessive use of video games they use three questions to determine if the social isolation brought about by excessive video game play is harmful.

1) Is the behavior good for the person?  
2) Is the person in touch with reality?  
3) Is the person’s behavior markedly different from the norm? 

Applying these conditions they conclude that if video game play is not interfering with school, homework and family rules, and as long as the player understands the difference between the fantasy world of play and the real world, he or she is likely mentally healthy. The third criteria leads Loftus and Loftus to some interesting examinations. They concede that excessive play may present concerns but raise the point that the excessive devotion to an activity can be desired and praised as well, such as is the case with Olympic training.

Loftus and Loftus also point out the highly social nature of video game play, “there is more to playing video games than simply the person machine interaction. Rather, playing video games can involve an entire social experience. Game playing gets connected to friendship and often become a way of life.”

However, the interactions players have with machines may also lack social content.

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27 Ibid Loftus pg.86.
Karl Scheibe and Margaret Erwin undertook a study of the conversations players have with the machines they are playing. Scheibe and Erwin noted that of the 40 subjects they studied while playing arcade video games, 39 spontaneously verbalized while playing. The researchers found the players were talking to the machines as though they were people, and would talk to the machines more when they were isolated in the arcade as opposed to when a crowd was around. It is therefore possible to imagine that some players will use the machines as social surrogates in some contexts.

In order to make sense of how players are satisfying social gratifications it is necessary to examine the Gary Selnow’s paper, *Playing Videogames: The Electronic Friend*. Selnow examines the role video games play in player’s lives. He frames his research in terms of uses and gratifications. Selnow posits that video game use is about satisfying a need, but not necessarily satisfying that need in an optimal way. Put another way, the player adjusts his or her expectations in order to enjoy the experience.

Selnow employed a questionnaire to study the reasons players played video games. In his final analysis he separated motivations into five areas:

1) Preference of video game to friends.
2) Video game use as a way to learn about people.

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29 Ibid Scheibe, pg.105.

30 Selnow, Gary. “Playing Video Games: The Electronic Friend”
3) Video game used for companionship.
4) Video games used for action appeal.
5) Video games offering solitude or escape.

What the study concluded was that while the video game play experience offered potentials for solitude and escape, it also provided situations for social interaction around the games. Selnow also concludes that heavy players may be satisfying their social needs through video games by lowering their expectations for companionship. On the other hand, Selnow's data also suggests that video games provide moderately appealing intimate companionship when no suitable human companion is around. The fear of parents is that the video game will become a reliable replacement to human companionship. That fear is compounded when the video game companion is a violent one.

3.2.3 Violence

The games overwhelmingly involve destruction of some sort, be it a piece of technological equipment, aliens from space or unusual monsters. Destruction of a technological artifact serves as the most common object: spaceships, aircraft, robots, missiles, ground targets, or simply "The Base" all act as suitable targets. Destruction of unidentified enemies, often from another planet, is the second most common theme; monsters, aliens or enemy soldiers attacking in hordes must be repelled.31

The early criticism of video game violence was articulated around the notion of symbolic violence. Due to the primitive display technology, objects on the screen tended to be representations of tanks, guns, alien ships and

other pieces of technology. Parents expressed concern around the faceless violence where the implications of destruction were never seen by the players.

In the nineties, video game violence has been personalized. The "Boss" has replace the "Base" and the video game players know their adversaries on a first-name basis. The Mortal Kombat "fatalities" are designed to showcase and highlight the results of ultra-violence. Unstated in early video game criticism was the expectation that the violence, blood and gore would turn kids off the violence of the video game. That has definitely not come to pass.

The role of violence in video game play and its potential impact on players has been examined in numerous ways. One of the concerns is that the violent content of a video game precludes other forms of problem solving and imaginative play with video games. Anderson and Ford examined the effects of playing different types of video games and measured subjects subsequent aggression with a Multiple Affect Adjective Checklist. They found that playing aggressive video games had short-term negative effects on the player's emotional state. Players of games categorized as Highly Aggressive rated higher on measures of hostility and anxiety.

However, Anderson and Ford also illustrate one of the difficulties in studying the highly-reactive media of video games. There are problems in interpreting the data as the researchers were unable to factor out the specific content of the games. The researcher is unable to tell if it is the violent

content or some other factor such as the speed of the game, the play control mechanism, the level of challenge or the sound and graphic elements that are producing a reaction. Isolating the violent content of a video game is an impossible task unless the researcher is programming the game.

Another way in which the violent content of video games has been examined is to draw on the similarities of the video game with television and apply the methods of research used in studying television audiences to the study of video game players. Silvern and Williamson compare watching violent cartoons to the playing of the video game Space Invaders, in their study, The Effects of Video Game Play on Young Children’s Aggression, Fantasy and Prosocial Behavior. Silvern and Williamson observed children in a free play setting before and after watching television and playing a video game.

The researchers found no difference between the groups that had watched the violent cartoon or played the violent video game, but found that the level of aggressive behavior when compared to baseline behavior observations. Silvern and Williamson conclude that the effect of watching violent cartoons or playing violent video games is similar. The researchers point out that the violent acts in Space Invaders are impossible for the children to replicate.

An explanation embedded in social learning theory seems much less tenable with regard to the video game “Space Invaders”. Quite

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simply, the nature of the game is abstract -- for example, there are no characters with whom to identify. For behavior to be modeled, it must be reproduced, and such abstraction as seems to exist in "Space Invaders" makes it virtually irreproducible.\textsuperscript{34}

Many early studies of video game violence suffered from this lack of realism as a barrier to understanding the role of violence. Silvern and Williamson also document the other potential factors affecting a player's response to a violent video game such as: game difficulty, number of players, kinds of player interaction, when and where games are played and motivations to play. Such difficulties in observational experimentation with video games makes analysis of the content and features of the games as another alternative.

David Myers explored the issues of video game play by studying the games themselves and observing players. One of the interesting concerns in video game criticism is the notion of the results of interacting with violence. Does interacting with fantasy worlds affect the ways we react in our real lived experience? One way of examining this issue is to explore if the learning which occurs as a result of video game play is transferrable to other non-game playing experiences. If learning can be transferred through video game play then perhaps the other values and attitudes imparted by video games may be transferred as well.

In his article entitled \textit{The Patterns of Player-Game Relationships A Study of Computer Game Players}, author David Myers explores the motivational

\textsuperscript{34} Ibid Silvern, pg.460.
aspects of computer game play. The games studied are computer versions of the same types of games played in the arcade or on the home video game console. Myers surveyed and observed computer game players over a six-month period in order to formulate answers to the following two questions,

1) How do popular computer games, which are played for their entertainment value, motivate their players?

2) What are the general outcomes of popular computer game play in terms of substantive learning?

During his examination, Myers delineates the game play process into three points in the relationship between game and player, learning the rules, evaluating & judging rules, and adopting rules. The player first learns the rules, finding the results of various actions. The player then goes through a process of evaluating and judging which game rules or conditions must be satisfied and which are seldom relevant. Finally the player adopts or internalizes the rules, no longer fighting with options that will not work.

Myers concludes that players come to the game already motivated to play. The game then provides, or fails to provide, experiences to maintain player interest and motivation. A primary factor in this motivation to play is previously successful game experiences. Players who carry positive experiences approach a new game expecting to get more of those experiences.


36 Ibid Myers, pg.160.
In terms of learning experiences, Myers finds that game players often do not see clear connections between game learning which may be applied to other experiences.

Common learning experiences best fall into the category of "general affective learning"...in which players gain increased self-awareness and a greater sense of personal efficacy and potency.

The problem with linking game knowledge to real world knowledge is that game enjoyment results from discovering connections and patterns within the game structure and manipulating these patterns to the player’s advantage -- that is, in establishing control. Similar strategies in life must face moral and practical obstacles beyond the power of the individual to control.\(^3\)

It would be Myers’ contention that the conditions of the video game world are so clearly different from that of the real world, that players do not confuse the two. It must be kept in mind that this study used video games of the early eighties which did not have the realistic graphics which are present in games today. However, an argument that there is a clear difference between the fantasy world of the video game and the realistic world of lived experience may still be made in the environment of realistic video game visuals.

One of the male subjects in my study reported that he obviously cannot throw fireballs from his fingertips or perform any of the “impossible” finishing moves that he executes in *Mortal Kombat* in real life. It was his contention that the violence was so exaggerated as to be unrealistic and therefore unrelated to his everyday existence.

\(^3\) Ibid Myers, pg.181.
The ability of a person to engage in a world of fantasy is facilitated by video game technology. The audio and video content of video games demands the player's attention immediately or they will not succeed at the video game. The question of whether or not the increased realism of current video game offerings works to break down the distinctions between fantasy and reality in the real lived experience of the player remains untested. Studies such as Myers *The Patterns of Player-Game Relationships* lead one to believe that the rules of the video game world remain trapped there.

Contrasted to that view is the position that video games teach about roles and relationships in the player's lived experience by giving them stories within the video game experience. In Eugene F. Provenso's book *Video Kids*, the author discusses the role video game depictions of violence. He refers to the video game as a cultural "text", one which can tell us the values and attitudes encoded into it. Provenso's analysis focuses on the "back story" of video games, using the box artwork and the written description of the game to perform a content analysis of the games.38

The "back story" is the narrative used by the video game creators to situate the game in a context of a specific fantasy realm. This allows certain creative freedom for the creators of video games. The rules of the fantasy world need not necessarily be the same as our own. The fantasy world can also have its own internal validity and value structure which is clearly detached from the real world in which we live.

The two key figures Provenso uncovers in his analysis are the large number of male figures represented in comparison to female figures and the large number of stories which involve the rescuing of a female by a male. Of the 47 Nintendo (NES) game boxes Provenso examined there were 115 males depicted compared to nine females. In addition, 30% of the 47 games contained the kidnap or rescue of a female as part of the game "back story". In addition only 7 of the games did not have violence as their major theme, while 40 games were based on violent themes.³⁹

From this analysis, Provenso concludes video game themes encourage violent situations and careful analysis of the game “storylines” bears this out. The problem with giving too much weight to the role of the "back story" is the relationship of that story to the game play experience for most players. Many players ignore the back stories completely and are interested only in information that is relevant to game play success. Consider the following "back story" from the SNES version of Mortal Kombat,

The Shaolin Tournament for Martial Arts...

For ages it was a competition of honor and glory, noble warriors from around the globe were invited to take part, each seeking to win the title of Grand Champion.

But that was a long time ago...before the tournament was corrupted by the evil demon Shang Tsung, a warrior who took not only the lives of his opponents, but their very souls...

With the aid of his pupil Goro, a hideous half-human dragon, Tsung began a domination of the contest which has lasted for centuries. Today, 500 years later, the contest begins anew as warriors once again gather to partake in Mortal Kombat.40

So begins the actual game. The problem with overemphasis on these texts is that in actual game play, players seldom read the manuals and skip through opening screens as fast as possible. An effort to examine the internal representations should focus primarily on the game play itself, as that is where children are spending all their time looking and interacting. The final scene may involve a narrative theme or story, but often that story is a 15-second segment which was preceded by several hundred hours of play without the narrative references. While the stated goal may be to rescue a princess or girlfriend, the primary motivations for play in the game design are the conquering of levels or defeating of a series of opponents.

However, the use of the back story is not without effect. The highly scripted nature of these back stories provides a clear set of rules and perceptions that will not be broken in the game play experience. The back story defines the space of the video game and constrains the narrative and action to the internal rules and values of that story. The player is unable to change or modify those back story scripts. Russian psychologist Lev Vygotsky argued that, “The imaginary situation already contains rules laid down in advance.”41

While the players may take a long time to assimilate the back story, the game designers use those stories as a template to manage the rules and internal logic of the video game. The process of assimilating or discarding the values of the video game continues to be a grey area.

The role of violence within video games has been the site of gender debates on the lack of participation by females in the video game culture. One of the most popular video games among women is a completely non-violent game called Tetris and video game companies are struggling to find the keys to understanding why this puzzle game is so popular among women. Tetris is one of the few identifiable blockbuster hits with women players, many of whom would not categorize themselves as video game players. Psychologists and researchers are looking at the game to try and understand why it is so appealing to women so they may incorporate those designs into new games.

Nintendo figures that women account for 40 per cent of the 27 million worldwide buyers of Game Boy, a handheld video-game player that comes bundled with Tetris; that’s double the percentage of women buying its other machines...Software sleuths figure if they can decipher Tetris’s sex appeal, they can design new games that will entice a largely untapped market of women. To that end, surveys have been commissioned, marketers have been dispatched and psychologists have been hired.42

The gender difference is often articulated in terms of the violent content of video games. Game design research with a sensitivity to gender is being...
conducted in order to find out what females enjoy about video game play. In "We Have Never-Forgetful Flowers In Our Garden:” Girls’ Responses to Electronic Games, researchers Inkpen, Upitis, Klawe, Lawry, Anderson, Ndunda, Sedighian, Leroux and Hsu explore that landscape of female response. They conclude through an observational study that female players are more interested in storyline, character and relationships than boys who favor action, speed and color.43

It is interesting that Inkpen et al. emphasize the role of social interaction with others and within the game. This cooperative sentiment is one diametrically opposed to the male competition model. Both male and female groups crave social interaction through and around video games, but the model for that interaction is often framed as competitive for boys and cooperative for girls. This division does not allow for play across the gulf between those two categories and creates further designs exclusionary of one or the other.

As we will see in Chapter IV, the way video game companies have articulated the marketplace for video game play has resulted in an environment where only a mass market of expert players are appealed to. The real design challenge is to create games which are fun and accessible for all players, novice, expert, male or female.

3.2.4 Addiction and Displacement

However, it is the non-social uses of video games that remain at the center of video game research in relation to addiction. One such examination of whether or not video game play is addictive was undertaken by Mark Griffiths and Catherine Hilton of the University of Plymouth. Griffiths and Hilton surveyed 147 11-year olds attending a summer camp about their computer game use. They used a model of addiction based upon a list of criteria used to diagnose gambling and drug addictions, and concluded that the games can be as addictive for children as drugs and gambling for adults.\(^44\)

The model of addiction used seven questions which the subjects could answer "yes" or "no" to. If a subject recorded a "yes" response to four or more of the questions, the researchers concluded that was an indication of addiction. The questions included whether the children played computer games every day, whether they played for three or more hours at a time, if they sacrificed other activities and other such queries. The study concluded that 48% of the children played computer games "most days" and more than one-third of the subjects could be considered "addicted".\(^45\)

However, the sample was not representative as the sample of children consisted of a middle to upper class group of kids and the games in question were primarily educational computer games. Getting children to play educational games instead of video games is a goal of many parents. The


\(^{45}\) Ibid Reuter., pg.A14.
problem with using this kind of addiction model is equating the consequences of a great deal of video game play with the consequences of a great deal of gambling or drug use.

The consequences of long-term play of educational computer games is likely to differ significantly from the consequences of long-term drinking and gambling. The same addiction test could be applied to books, food and other activities people enjoy and achieve the same conclusions. It is this tendency to group video games with other "addictive" behaviors that ignores the social constructs around the activity which play a major role in managing play. Whether or not the games provide social connections or educational benefits should be considered when measuring frequency of use or desire to play.

The social aspects of play and competition are important motivating factors to video game play. These studies of the “addicting” nature of video games often fail to recognize that players master the technology and move on to other pursuits. If the game in itself was an addicting force, players would not be looking to newer technology but would be happily playing their Atari’s and Pong’s. It is this willingness to abandon the video game which is a constant challenge for game developers, designers and researchers.

A study undertaken by Gary L. Creasy and Barbara J. Myers in 1984 examined the role of video games in children’s lives. In Video Games and Children: Effects on Leisure Activities, Schoolwork, and Peer Involvement,46

Creasy and Myers followed a group of children for a five month period, examining their use of leisure time. The group consisted of children who received a new video game system at the beginning of the study, children who already owned a game, and children with no game at all.

What Creasy and Meyers found was that children with a new game system would spend a large amount of time playing the game at first. That level of interest would then diminish over time. Even the purchase of new game cartridges did not seem to halt the slide of diminishing play time. For all three groups, new game, old game and no game, leisure activities and the time devoted to them were about the same. The only difference was in television viewing, those with video games watched less television, presumably because they were using the television set to play their video game.

It was implied from this study that there is some sort of obsolescing feature of video games. The player's desire to maintain interest decays over time. This feature of video game play remains with us to this day. New technology designs are always in development to service a constant demand for new experience.

For many parents, the concern around video game play is how the introduction of the games into the home will disrupt family life. The effect of video games with attention to family activities was studied by Edna Mitchell in 1981, the results of which were summarized in a study entitled, *The
Dynamics of Family Interaction Around Home Video Games. The study examined twenty families who had purchased a new home video game and followed their patterns of use over a six month period. At the time of the study, the video game phenomenon was experiencing a boom in both number of players and the increasing volume of controversy.

Although there were differences in play frequency, interest and skill among family members, most families developed new interpersonal relationships around the video game play. The study also found that for almost all cases, the amount of time spent playing video games decreased after the games had been in the home for several months. The study did not find that the video games dominated family life, were addictive or encouraged isolation. Families were in control of their video game use and balanced it with other activities.

The video game has a quality of obsolescence about it that is seldom examined by researchers. The video game is designed as an experience to be consumed. Once the child has mastered a particular video game, the general response is to move on to another challenge. Many of the game designs today emphasize this progression of winning "levels", moving from one discrete game segment to the next until the player faces the final challenge. Once the player achieves that end point, the mystery of the game is over. The player has traversed the entire landscape of the game and won.

3.2.5 Benefits and Learning

In spite of all the negative conceptions of the video game, there is a willingness by parents to see the video game as having positive qualities. Three of the primary arguments in support of video game play are that video games provide an introduction to computers, teach problem solving skills, and provide practice in hand-eye coordination.

Loftus and Loftus discuss the role of the video game in providing an introduction or gateway to an interest in computers. The authors argue that kids who play video games know that they are based on technology related to computers. Therefore, it is argued, that when the opportunity presents itself to learn about computers, the child’s interest in video games provides a natural interest and excitement around the computer.\(^{48}\) In their argument the computer provides a platform to program the video games they want to play.

This connection between computers and video games was clear in the mid-eighties when it was still possible to create video games on a home computer. In the nineties, the video games are so highly polished and labor-intensive that it is impossible for the video game player to create video games on their home computers which even approach the games they are used to playing. As such, the direct connection between the video game and the computer is thinner and less distinct as it was in the earlier days of video game play.

\(^{48}\) Ibid Loftus, pg.122-23.
Another argued benefit of video game play is their potential learning value. Piaget differentiated four kinds of games as they relate to childhood and development: practice games, symbolic games, games with rules and games of construction. Practice games are games which allow the player to exercise and develop a skill which they already know. These games allow the player to master a concept they have already grasped.

Symbolic games put objects and situations from the real world into a symbolic game context. These games allow the players to pretend to negotiate real world experiences they are unable to participate in regularly. Children playing house or pretending to drive cars are examples of these kinds of games.

Games with rules are games which have an accepted set of rules among the participants. Many games such as board games, card games, hide-and-go-seek and sports games are examples of games with rules. Finally, games of construction are games which use visible materials for expression. Piaget maintains that these games are not really games at all, but an expression of intelligent thought through materials and objects.

The interesting quality of the video game is its ability to combine all these forms of play into a single experience. The average video game fuses the first three types of games and many video games fuse all four forms of play. The element of practice games is a major component of video game play. The player learns the basic “moves” or series of controller button sequences early

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on in the game. Further game play stretches and hones those manipulation skills as the player progresses in the game. Sequels to popular games allow players to build on manual dexterity skill sets in new situations.

Most video game play is symbolic. The figures on the screen represent some object from either the real world or a fantasy world. The player often assumes the persona of the on-screen figure they are controlling. The video game player can often be heard to exclaim, "Oh I died", or "He got me". The symbols of the real and the fantastic play across the screen.

Video games provide a new variation on games with rules as they allow a single player to engage in a game with rules. Most rule based games require more than one player, with the exception of various forms of solitaire. A player is unlikely to play Monopoly or chess by themselves, likewise a one-person game of hide-and-go-seek is seldom challenging. Video games provide the excitement and challenge of rule based play without the necessity for multiple players.

Finally, some video games also bring games of construction into the video game play experience. Simulation gaming allows players to construct symbolic worlds and interact with them. In these simulation games, all four forms of play are incorporated into a single game.

Steven Silvern argues the qualities of video games and the rule based nature of their design makes them valuable as an educational tool.\textsuperscript{50} One of

\textsuperscript{50} Silvern, Steven B., “Classroom use of video games. Special Issue:
the primary tasks the player engages in is discovering the rules that govern the game. Discovery of the rules, what to do and what not to do and the timing of the actions make up the necessary body of knowledge to succeed at the game. In order to deduce those rules, Silvern argues the players develop skills in the following areas:

1) trial and error  
2) pattern generation  
3) rule generation  
4) hypothesis testing  
5) generalization  
6) estimation  
7) organizing information

Silvern breaks the process down further by stressing that these seven areas of problem solving are broken down into two distinct phases. There is a practice phase where the player attempts to solve problems by themselves and a social phase where they deduce rules from watching other players play and talking to those other players.

In addition to these seven problem-solving processes, arcade style video games provide social interaction. Games are not learned simply by playing but also through observation of others and discussion with other players. Players watch other players to learn strategies and to create new generalizations. The players talk about their common experiences and compare the results of different tests. Much of the learning in arcades seems to come from interacting with the expert player.

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51 Ibid Silvern. pg.12.  
It is Silvern's contention that the arcade video game can be used to help players identify these processes in their own play. Through play and discussion, the students have a frame through which to discuss issues around problem solving strategies. It is important to note that Silvern suggests such learning activities are most likely to occur when careful consideration of the games to be used is taken. He also suggests careful management of subsequent discussions and activities by instructors is necessary to ensure learning objectives around problem solving.

Audrey Krause also studied the transfer of problem solving knowledge through video game play. She found that when video games were used in addition to strategy training exercises that children developed their problem solving skills to a higher level than children who played only video games or strategy training. It would seem that the learning benefits of video game play are best ensured through the careful application of instruction outside of the video game.

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3.3 Marketing to Parents of Video Game Players

Video game marketers must answer the concerns of parents about video game play, as parents are the gatekeepers who allow or forbid video game play in the home. The video game marketers address the parent’s uncertainty in a very careful manner. We all find ourselves in a rapidly changing world. We are constantly bombarded by the proclamations of the coming of a new economy, the information economy. This information economy will bring forth a new kind of workplace and a new kind of worker. Short on specifics, most prognostications have at least two common elements: an emphasis on education and computer skills. It is this uncertain future that parents try to prepare their children for, with many parents believing exposure to video games provides an important link to the world of computers.

Video game marketers are aware of these uncertainties and beliefs and incorporate them into their marketing. One must consider that video games are one of the first commercially successful players in the information economy. The sale of video games is primarily a sale of information encoded in game cartridges. The marketable qualities of the video games are the information within their cartridges, the characters, the game structures and the fantasy worlds. The marketers use the parents desire to provide for their children a technological familiarity to sell video games.

The marketing of a video game occurs on two fronts as parents as usually primary participants in the acquisition of game machines and game cartridges, while the children are the actual users of the video game system. The video game marketers present parents with a logical reasoned approach. An example of this would be the wordy brochures provided by both Sega and
Nintendo which espouse quality, educational value and long-term play for your investment.

**Figure 5: Sega Consumer Brochure**

The Sega Brochure (available at point-of-purchase in retail stores) emphasizes the rationale behind video game purchases. Games should be bought because they are "FUN!", but they also emphasize a broad range of appeals to various age groups, "Sega games are fun for kids and adults alike, delivering hours of entertainment, exploration and creativity right into your home. Video games can provide a safe, educational and interactive experience."
The Nintendo brochure (also available at retail point-of-purchase displays) also emphasizes choice, a choice between three Nintendo game systems. They include a glossary of terms for the uninitiated parent to follow along. Inside the brochure the parent will read, "Nintendo is dedicated to providing the best in family entertainment. We see our hardware systems simply as doors leading to all the excitement and adventure of our software. And because we are dedicated to quality entertainment, no matter which hardware system you choose, you can be assured of an unending supply of new, exciting games that will stretch the limits of your imagination."
While the appeal to the parents is logical and end the players is fun, fun, fun. They are blasted with hip, slick, \textquote{MTV}-style messages which provide a complete emotional and transformational appeal. The video game must maintain a level of parental consent targeted to the desires and fantasies of the young players.

Sometimes this tension to appeal to both the parent and the player produces bizarre contradictions. Consider the following ad for the \textit{Panasonic REAL 3DO MultiPlayer}, a new CD-ROM based game platform.

\textbf{Figure 7: Ad For 3DO MultiPlayer}^{54}

\begin{figure}[h]
\includegraphics[width=\textwidth]{figure7}
\caption{Ad for Panasonic REAL 3DO MultiPlayer.}
\end{figure}

\footnote{\textit{Family PC}, Nov./Dec. 1994, p.76-77.}
This ad ran in the November/December 1994 issue of *Family PC* magazine, a publication targeted to parents. The 3DO system is currently the most expensive video game platform on the market, and often referred to as the most technologically advanced. In the ad targeted at the parents, the appeal presented is wholesome fun. The ad emphasizes Educational CD's, Audio CD's, Photo CD's, Video CD's and Interactive CD's. The opening quote of the text reads as follows,

Panasonic presents a whole new kind of interactive video system the whole family can enjoy.

We'll bet the only thing your kids tell you about the REAL 3DO Interactive Multiplayer™ is that it plays great video games. And they're right.

But there's a lot more to it than that. So we'd like to give you an adult perspective.\(^{55}\)

The ad goes on to describe the other forms of entertainment which can be found on the 3DO system. It even includes a 1-800 telephone number to call if you have any questions. The appeal is rational, educational and family oriented.

Contrasted to this is the advertising strategy directed at the players of the 3DO which appeared in magazines devoted to video games. Consider the following ad from the June 1994 issue of *Video Games: The Ultimate Gaming Magazine*. (See Figure 4).

The appeal to the player is quite different. The box on the left of the page reads as follows,

They say one’s eyesight decreases 20% after the age of 35. With this fact in mind we designed an ad that you can show your parents.57

The ad is poking fun at parents, encouraging their children to attempt to fool their parents into reading the large print of the ad and ignore the fine print between the lines. The large text is the same appeal that was used in the ad placed in Family PC magazine, emphasizing the wholesome aspects of the 3DO software library. Between the lines is the primary appeal,

(Not to mention of course, lots of butt-kicking, thumb-blistering, mind-screwing games that are bound to piss off congressmen come next election year. Full screen, full color video, CD sound, and 3D effects give you realism that even you over-stimulated morally corrupt, youthful brain can’t imagine...Then there’s Way of the Warrior, the wicked fast, high resolution martial arts game, where you master over 600 brutal martial arts maneuvers while simultaneously ridding yourself of unnecessary teeth...These titles are only a few of the many. You get the idea. Even if your parents don’t.)58

The focus of software development is clearly laid out in this and other ads for the 3DO. The system is designed and geared for video game software, which will make up the primary volume of sales for the system. The attempt is to deliberately undermine parental concerns in choosing a video game system for their kids, to sell a wholesome product to the parents while providing violence and action for the player. It is little wonder that parents maintain a strong concern about the effects of video game play.

3.4 Conclusions

Parental concern about video game play has driven research into video game play while presenting a challenge to video game marketers. The video game has always had a significant relationship to violent and fantasy themes, but as this chapter points out it is crucial in any examination of video game play to remember the contexts of play and how players actually use the games in solitary or social play situations. This is especially true when examining the “addictive” or disruptive effects of video game play.

The technological feature of video game play makes long-term study a difficult process. In an environment where video game platforms are replaced by new technology every few years, it becomes a difficult field of research as the actual medium people are playing with is undergoing a constant process of striking change and development. It is likely then that parental concern will likely remain as the direction of the technological advance in video game play remains pointed at violence as we will see in the following chapters.
At first the evaluations were arbitrary and haphazard, but soon Ota adapted a system that had been used in Japan. He developed a forty-point scale on which each game was to be rated. The Big Three played every new game until they got a feel for it. Then they evaluated it for attributes such as challenge, graphics, and fun...If Arakawa wanted more feedback, the toughest critics of all were called in. Hidden in a room behind a one-way mirror, Arakawa and James watched kids play the game.  

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4.1 Introduction.

As video game players began to master video games and video game design began to increase in complexity, certain problems occurred. The expectation of instant accessibility had been cultivated by games such as PONG with their simple design and easy-to-grasp game metaphors, leaving game designers with a huge market of extremely fickle game players. Designers were having a difficult time coming up with new elegant game concepts and began to turn out a high number of poor quality video games.

This glut of poor quality video games is often given as one of the primary reasons for the first crash of the video game market in 1983. During the early eighties, the market consisted of primarily three systems: the Atari 2600, the Mattel Intellivision and the newcomer ColecoVision. ColecoVision had literally burst onto the scene, generating enthusiasm with its proclamations of advanced game technology comparable to arcade games. Enthusiasm within the video game industry was at an all time high, including a hoped for blockbuster with the Christmas release of a game based on the movie E.T. However, all that quickly changed as consumers suddenly stopped buying. All three companies went from billion dollar yearly sales to fantastic losses. Layoffs at Atari, Mattel and Coleco were rampant. Coleco survived only through sales of other products such as Cabbage Patch Dolls. Atari was parceled up and sold off, while Mattel liquidated its electronic division.60

During this period, toy sales, which had been hurt by the expansion of the video game market, were experiencing positive growth. The video game industry was pronounced dead, a fad whose time had past. Companies were returning to children's toys and "respectable" toy buyers avoided electronic toys like the plague. It was in this environment that Nintendo of America began to explore the North American market for its Japanese video game system called the Famicom. The Famicom was the Japanese name for the video game system that was to become the Nintendo Entertainment System (NES) in North America. According to Howard Lincoln, an early employee of Nintendo of America, their investigations into why the home video game industry crashed revealed that the "Suck Factor" was a major contributor to the industry's downfall. Kids would try a game and within minutes pronounce that "It sucks!". They would then never approach the game again.

Bad games such as these would never have survived in the arcades; kids would have tried them and deserted them. But there had been no easy way to test home games. Fancy boxes and expensive advertising campaigns made promises, and when the promises were unfulfilled, the customers stopped believing them. Systems and games went into the garbage. 61

The Nintendo strategy for entering and rebuilding this decimated American market included three factors: a security strategy, an evaluation strategy, and a promotional strategy. Nintendo undertook the creation and management of a relationship between the player and the video game manufacturer to encourage and maximize video game play. The common thread in all three aspects of Nintendo's strategy is an emphasis on control

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61 Ibid Sheff, pg.159.
and a careful consideration of past industry failures in motivating players to continue to play video games.

In order to ensure the mistakes of the past were not repeated, Nintendo undertook such measures as the strict control of the manufacturing of cartridges and forced the risk of investment on game manufacturers. This was a significant change for game hardware manufacturers as the final economic blow for Atari was its manufacture of nearly 6 million ET video games, the majority of which are rumored to have been bulldozed into a landfill.\textsuperscript{62} Nintendo of America has since endeavored to control every aspect of the video game development process from design and manufacture to promotion and distribution. The primary goal is to establish an environment and culture conducive to motivating kids to continue to play video games. In implementing this strategy Nintendo shaped the production process of video games into the form presented in Figure 4: The Model of Video Game Play.

4.2 Technologies of Control in Video Game Hardware: the Security Strategy.

The first element in Nintendo's strategy to rebuild the North American video game market involved the design of a security chip for the Nintendo Entertainment System (NES). This chip is based on a concept called the "lock-out" chip. The way it works is to include a chip (integrated circuit) in both the game unit and another in the game cartridge. Both chips have a set of computer code which they exchange when the cartridge is inserted and the

\textsuperscript{62} Ibid Sheff, pg.150.
power is turned on. If the chips do not "find each other" the game freezes.63 The chip itself and the code inside it are protected by copyright and patent. This means that the technology to make games which will run on the NES is completely controlled by Nintendo. While Nintendo emphasized that the "lock-out" system was designed to prevent cartridge pirating, the result was a situation where no one could make a game for the NES without the permission of Nintendo.

It is interesting to explore the anti-piracy justification of the "lock-out" chip system as this effort at controlling piracy ultimately can only attempt to minimize piracy. Technological "solutions" to these security efforts are usually quick to surface. With the original NES, methods of deactivating the security chip were quickly discovered.64 With the current Super Nintendo Entertainment System (SNES) which also employs a “lock-out” chip technology, a peripheral is available to copy video game cartridges onto floppy disks. This device is sold legally as a backup device for home video game cartridges.

The use of “lock-out” chip technology will not prevent the large scale piracy organization and Nintendo is the only video game manufacturer to continue to insist on the use of this security technology. Therefore the primary effect of this strategy is the creation of an environment which allows for strict control of legitimate companies' access to the SNES and NES markets. With the “lock-out” chip technology, Nintendo is able to insist on a legal

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64 Ibid Sheff, pg.286.
licensing agreement in order to design and sell games for the Nintendo systems. These licensing agreements form the basis of Nintendo’s control of game design and content on their platforms.

This environment of control continues into the next generation of video game hardware. While Sony, Sega and Atari are basing their upcoming hardware platforms around CD-ROM storage, Nintendo’s ULTRA-64 system will not be CD-ROM based. A move to CD-ROM technology would mean make it impossible to implement a “lock-out” chip technology. A software publisher would then be able to create games for a CD-ROM based system without any agreement with Nintendo.

However, control is not the only reason to employ a cartridge based system. The ability to include more technology in a cartridge is very useful to extending the life of a video game system. Once a video game system such as the Sega Genesis or SNES ships to the stores, the technology becomes fixed. The computer workings of the machine remain at a single level. As such, while new technologies arise, the home unit still has a specific memory size and processor speed. By adding more processing chips and hardware into the cartridge itself, Nintendo has added extra capabilities into its games such as Star Fox and Stunt Race FX which employ a RISC-based chip design to create graphic manipulations which were previously impossible under the basic design of the system.

Sega has taken a different approach to implementing new technology on an aging game system. Sega has introduced a peripheral called the 32X, which plugs into its Sega Genesis system and allows for greater processing power. New
cartridges plug into the 32X which shares processing with the original Genesis system. Such a decision makes the hardware costs a one time expense, as opposed to the Nintendo strategy where the technology must be included in every cartridge release. However, Sega's strategy does create a division in the market of Sega owners, those with the 32X and those without it. If not enough players buy the extra unit, software developers may be reluctant to write games for the extended platform.

Returning to the security chip, the "lock-out" technology allows the manufacturer of the system to pick and choose which developers it will allow to create games for their system and which developers will be excluded. This agreement between the manufacturer and the developer is called a licensing agreement. Nintendo was able to enforce strict terms under the licensing agreement because of the unbelievable popularity of the system which made demand for games very attractive to potential developers.

This ability to pick and choose manufacturers had the effect of allowing Nintendo to decide who would create games and who would not. Those software developers who agreed to Nintendo's strict guidelines and conditions would be allowed to create games for the system. The licensing guidelines also meant that only well financed companies would be able to meet license terms and conditions. The popularity of Nintendo, in turn, meant these companies which played by Nintendo rules made a great deal of money and have become industry leaders in the video game industry.

If one refers back to Figure 4: The Model of Video Game Play, the ability of the hardware manufacturer to pick and choose companies who fit a certain
philosophy of development infrastructure creates a single method of industry wide practice. In this way, the large company production method becomes the norm. Steve Ackrich, the associate director of third-party licensing at Sega of America, insists on specific infrastructure criteria,

Becoming a licensed publisher or developer is free, but not easy. We make it very hard to become a licensee. SOA [Sega of America] needs to see everything: the ability to develop games, the ability to distribute, market, and support games, and the ability to make quality games. We exercise two checks on individual game quality: first at the concept approval stage, and then in testing before final approval...All this is not to stifle competition because that competition gives you the best games.65

This insistence on big organizations narrows the field of games that companies are willing to make. Original game ideas become rare and risky in such an environment, a problem intensified by the evaluation process.

4.3 Limited Options: The Evaluation Strategy

Under the terms of the licensing agreement between Nintendo and a software developer, Nintendo provides development support and information. Nintendo also has final approval over the packaging, artwork and commercials the licensee creates for the game. Other licensing conditions include a restriction on the number of video games a company is allowed to release each year. Initially, a maximum of five games could be released per year for any of the Nintendo platforms (SNES, NES & GameBoy), but the games had to be exclusively for the Nintendo system. This exclusivity clause meant that the games could not be released on other platforms, such as the Sega

Genesis and IBM PC. For the developer, this meant that the development costs had to be reclaimed only through Nintendo cartridge sales. Due to pressure from threatened lawsuits and competitive pressure from Sega, Nintendo dropped the exclusivity clause and lowered the number of games a company release for Nintendo to three games a year. 66

Another condition of the license is related to game testing and evaluation. After a game is developed, but before it is sent off to be manufactured into cartridges, the game must be evaluated by Nintendo (See Sega/Nintendo Testing on Figure 4: The Model of Video Game Play). The evaluation process at Nintendo consists of two types of evaluations. Nintendo’s in-house evaluators run a series of “expert” evaluations of incoming games and groups of players from the general population are also engaged in an evaluation process.

The Nintendo in-house evaluation includes a screening process. Each game released by Nintendo must adhere to a 10 point guideline. If a game is considered to violate any of these guidelines it will be sent back to the game designers for revision. The list is as follows:

**Figure 9: Nintendo Ten Point Guidelines.** 67

- No random, gratuitous, and/or excessive violence.
- No subliminal or overt political messages.

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66 Ibid Sheff, pg. 365.

67 1993 Nintendo Parents’ Informational Brochure
• No domestic violence and/or abuse.
• No ethnic, racial, religious, nationalistic, or sexual stereotypes of language.
• No use of illegal drugs, smoking materials, alcohol.
• No graphic illustration of death.
• No sexually suggestive or explicit content.
• No excessive force in sports games.
• No profanity or obscenity.
• No sexist language or depiction's.

The intent of this policy was to maintain a standard in terms of content of Nintendo video games. However, on September 9, 1994, Nintendo made an exception to their guidelines with the release of the sequel to Mortal Kombat. When Nintendo released Mortal Kombat for their SNES system in 1993, they removed the blood and gore of the arcade game so that the home version of Mortal Kombat would adhere to the 10 point guidelines. Sega also released their version of Mortal Kombat at the same time with all the blood and violence of the original arcade game intact. The Sega version outsold the Nintendo version, which also translated into sales of the Genesis game unit as well.

In response to this loss of market share, Nintendo decided that Mortal Kombat II would enter player's homes with all the violence and gore of the arcade version intact. The "uncensored" game will include a warning label to consumers. In addition, Nintendo cancelled the prohibition on "graphic illustration of death" and "excessive force in sports games" in games approved.
by Nintendo. The relaxing of content guidelines will probably continue as the use of an industry-wide ratings system becomes widespread.

In Figure 4: The Model of Video Game Play it is possible to see how a popular game can affect the entire production process of video games. As the chart shows, marketing data, sales figures and player feedback flow back to every level of the process. High sales will affect the testing process as was the case with Nintendo's guidelines, which in turn affects Game Creator testing guidelines. At the same time, the production team is kept very aware of trends and encouraged to emulate popular game features. Finally, these marketing trends return to the top of the model to affect future game development of sequels and clones of popular games.

The Nintendo in-house evaluation continues with the professional evaluation, where teams of "expert" players employed by Nintendo play and rate the games coming into Nintendo for approval. Their final ratings are printed in the Nintendo Power Magazine as Power Meter ratings. These "pro" players rate each video game they play in eight categories:

**Figure 10: Eight Categories For Rating Video Games.**

- Graphics
- Sound
- Initial Feel
- Play Control

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69 Nintendo Power, January 1993, Vol.44 p.20
A game can receive a maximum score of 5 points in each of the categories. The final scores are averaged in each category and then combined into the following combination:

**Figure 11: Combined Video Rating Categories.**

<table>
<thead>
<tr>
<th>Categories Combined:</th>
<th>New Name:</th>
<th>Max Score:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics and Sound</td>
<td>Graphics &amp; Sound</td>
<td>5</td>
</tr>
<tr>
<td>Initial Feel and Play Control</td>
<td>Play Control</td>
<td>5</td>
</tr>
<tr>
<td>Concept/Story and Excitement/Thrill</td>
<td>Theme &amp; Fun</td>
<td>5</td>
</tr>
<tr>
<td>Lasting Interest &amp; Challenge and Overall</td>
<td>Challenge</td>
<td>5</td>
</tr>
</tbody>
</table>

The use of these "pro" evaluations is to control for different types of games.

Since each of these pros has played hundreds of games, their ratings are comparative, or based on their knowledge of how good and poor games can be. They also take into account the norm for different categories of games...a high rating in a particular category may be more significant for certain types of games. An RPG [role playing game] should have a high rating in the

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70 Nintendo Power, January 1993, Vol.44 p.20
Challenge and Theme & Fun categories. For this type of game, Graphics and Control are secondary factors.71

These professional players also take on the role of advisors to video game developers, they will review games in development and give suggestions for changes before final submission. Final evaluation scores are important, as games that earn more than 30/40 on the evaluation do not count against the three games a year restriction and higher scoring games earn feature coverage in Nintendo's Nintendo Power magazine. The justification for the stringent licensing and evaluation process is to "ensure" the highest quality of games. Since the video game companies are generally looking for blockbusters and sell most of their cartridges around the Christmas season, the ability to score highly under this process is critical in deciding which games get off the drawing board and which do not.

This intense pressure to achieve blockbuster sales and the necessity of scoring highly on the corporate evaluations becomes a disincentive to break new ground and create new games. There have been no blockbuster games targeted at females for the major game platforms. Therefore to create a game for that specific market there are no benchmarks. How will it be scored on Challenge/Fun when the likes and dislikes of female players are not clearly defined. It becomes a major risk to introduce games that do not fit existing categories, as literally millions of dollars in development costs may be lost at the evaluation stage if the game does not pass Nintendo or Sega's evaluation.

In Figure 4: The Model of Video Game Play this return path of a rejected game is represented as a dotted line. If a game is turned back at this point, it may be easier to abandon it than to attempt to fix the problem. A returned game that needs major modification will not be able to filter back through the production process in time to make the peak selling periods, usually around Christmas. At best the game release will be put off by a year. However, if the game has been in development for a year, that means the graphics, design and other aesthetics of the game may already be extremely dated when released a year late, making it a harder sell to increasingly demanding players. Abandoning such a game may seem very attractive at that point.

Returning to the Nintendo in-house evaluation, games are also reviewed by consumers. Nintendo maintains a data base of interested participants of all ages and skill levels (although the concentration is males between the ages of 10 and 14, the largest base of SNES users). The subjects fill out an application and questionnaire including information on skill levels and video game systems owned. When a player is selected for an evaluation session they attend four sessions within a two week period. During each two-hour session, the players play four different games for approximately half-an-hour. The session is recorded on videotape with audio. Cameras are placed behind one-way glass and the evaluators can remotely move and zoom the cameras to study either the subject or the screen they are playing on simultaneously. For each game the players fill out an evaluation form (see below) and a questionnaire. They are then put on a non-active list for six months.
The use of tools such as this evaluation chart begins to create a system by which imitation of successful products will allow a game to score highly while not necessarily fostering an innovative and diverse market of games. Once the elements of a successful Role Playing Game or Sports Game are established on such a database, games which do not fit the mold will be undervalued. The aesthetics for video game play and the form of video game play becomes a fixed set of rules to be followed.

This evaluation chart is the basis for whether or not a game does well and is produced or whether it is returned to the programming team. The

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chart only reflects a limited thirty-minute play session in four primary dimensions. Games which make good first impressions are likely to score very highly even if they do not have lasting play value. This emphasizes game features which are easily marketable such as graphics to have a significant impact over game play issues. A quick impression such as this evaluation chart provides is designed to primarily find the games which are affected by the "Suck Factor".

This is a problem in evaluating video games when the player brought in to test a game is likely unable to advance very far in the game during the testing session. The player can really only evaluate the initial stages of a game. If a game is designed for 60-200 hours of game play before the player is able to complete the game, the player can only be expected to advance a modest amount in a 30 minute testing session. Allowing a player access to later levels of a game is not a solution to this problem, as later stages of a game depend on skills and information gained from playing the stages in order.

Nintendo solves this problem through the use of expert players who play the games until completion. This creates a situation where the evaluation and criticism on the majority of the game is undertaken by expert players who are a very specific group. The result of this evaluation method is a market of video game play that excludes the novice. A video game such as Mortal Kombat III or NHL Hockey '95, requires a great deal of practice and knowledge in order to play it. Novice players often find the controls confusing and difficult. Such a strategy of using expert players for evaluation attempts to
maintain challenge for an increasingly fickle expert player while excluding novices from play by creating extremely complex interfaces and game designs.

It is important to realize that by the time Nintendo is conducting their evaluations, many of these games have already undergone testing and evaluation by the software developer to ensure the games will pass the Nintendo evaluation. (This evaluation is labelled Internal Testing/Evaluation in Figure 4: The Model of Video Game Play) Since the licensing agreements stipulate specific cartridge manufacturers overseas, the game cannot be returned for changes, re-submitted and reevaluated in time to manufacture the cartridges and get them in stores for the all important Christmas season. The games must pass the Nintendo evaluation gauntlet on the first pass.

A look at the top ten lists of video game sales reveals that the majority of games sold for the two major video game platforms are primarily variations of successful games.

Figure 13: Top Ten Super NES and Genesis Games Nov.1994.\textsuperscript{73}

<table>
<thead>
<tr>
<th>Super NES</th>
<th>Genesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Mortal Kombat II</td>
<td>1) Mortal Kombat II</td>
</tr>
<tr>
<td>2) Earthworm Jim</td>
<td>2) Earthworm Jim</td>
</tr>
<tr>
<td>3) Super Street Fighter II</td>
<td>3) Jurassic Park: Rampage Edition</td>
</tr>
<tr>
<td>4) The Jungle Book</td>
<td>4) Maximum Carnage</td>
</tr>
<tr>
<td>5) Maximum Carnage</td>
<td>5) The Jungle Book</td>
</tr>
<tr>
<td>6) Incredible Hulk</td>
<td>6) Bill Walsh College Football</td>
</tr>
</tbody>
</table>

\textsuperscript{73} Blockbuster Video November Hot Sheet, GamePro, November 1994, Vol.6, No.11, pg.275
<table>
<thead>
<tr>
<th>7) Troy Aikman NFL Football</th>
<th>7) Super Street Fighter II</th>
</tr>
</thead>
<tbody>
<tr>
<td>8) Double Dragon V</td>
<td>8) NHL '95</td>
</tr>
<tr>
<td>9) Stunt Race FX</td>
<td>9) Troy Aikman NFL Football</td>
</tr>
<tr>
<td>10) King of the Monsters 2</td>
<td>10) Urban Strike</td>
</tr>
</tbody>
</table>

All these games are based on four game design concepts. The fighting game accounts for *Mortal Kombat II, Super Street Fighter II*, and *Double Dragon V*. The football and hockey games fall into the category of the sports simulation. *Earthworm Jim, The Jungle Book, Urban Strike, King of the Monsters 2, Jurassic Park: Rampage Edition, Incredible Hulk* and *Maximum Carnage* are all based around a Mario type of game design with varying levels of violence and would fall in the Action category. *Stunt Race FX* is a first person perspective driving game.

All these games share fundamentally similar play experiences. They are differentiated primarily by the license they hold on a series of characters or sports figures. The *Jungle Book* bases its visual look on the animated movie of the same name, while *Maximum Carnage* bases its visual look on the Spider-Man comic of the same name. *Incredible Hulk* also bases its visual look on the comic character. The process of game play has become so narrowly articulated through the evaluation process that the primary means of creation of new game titles involves putting new faces on old game designs. The promotional strategy of video game creators further solidifies these limited game designs.

If we were to place each one of the games in the Top Ten Lists into the Model of Video Game Play, they would all fit into one (or more) of the four boxes labelled *Platform Translation, Clone of Successful Game Type, Licensed*.

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Property or Sequel. None of the games would fit in the New Game Idea box. This experiment can be easily repeated with almost any top ten list for video game consoles over a long period of time. New Game Ideas are extremely rare where as Platform Translations, Clones, Licensed Properties and Sequels are the norm.

The necessity of using successful game designs as a starting point for new game designs is the normal procedure in video game design. Nicholas Lavroff, editor of Sega Visions magazine has the following to say about the genesis of a new video game,

The decision as to the type of game does not always require a lot of thought. Some game designers specialize in particular kinds of games, so the decision to create a new game usually defines the game type as well. Or a programmer may have perfected a particular type of game engine and is looking for a design using that engine. In other cases, the designer may simply be required to create a particular kind of game for financial or marketing reasons.74

Comments like these emphasize the economic realities of video game design and the necessity of video games to maintain the forms and styles which have been successful in the past.

Not all game creators are convinced that the rigorous control and evaluations ensure continued high-quality gaming experiences. Some game designers feel that the current system is restrictive to video game

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74 Lavroff, Nicholas, *Behind the Scenes at SEGA*, 1995, Prima Publishing, Rocklin, CA, pg.16
development. Id Software has two major IBM-PC based game hits, Castle Wolfenstein 3-D, and Doom. They have created a version of Wolfenstein for the SNES, but have canceled any further development for the company.

The next project was to be Doom for the SNES, but in making Wolfenstein for Nintendo, all that changed. Wolfenstein for the SNES was technically very easy, it was Nintendo that made it hard. Nintendo had Id remove the Nazi imagery and change the German Shepherds into giant rats, which wasn't a problem. Over the next couple of months, Nintendo picked over little details and frustrated the Id team to the point that it dropped all future SNES development. 75

4.4 Join the Club: Promotional Strategy and the Culture of Video Game Play.

The stringent evaluation process undertaken by Nintendo creates a surplus of game information. That information is not only used within Nintendo, it forms the basis of their promotional strategy. The cornerstone of Nintendo promotional effort is the Nintendo Power (NP) magazine. Subscribers are automatically a member of the Nintendo Power Super Power Club. NP addresses the issue of managing complexity in video game development. Game players range in skill and dexterity across the market which creates a problem, how does one create a game complex enough to challenge the expert players who spend a great deal of time and money on video gaming, yet accessible to novice game players who are testing the waters of this new entertainment?

Many complex adventure-type games were attempted on the Atari/Mattel/Coleco platforms of the eighties but they all suffered from one problem, the players would get stuck. Any game which relied on the discovery of solutions to various puzzles would invariably stump a large number of players. However, other groups of players wanted increased complexity and would be willing to abandon games they felt were too simplistic or easy, (the dreaded "Suck Factor").

With the creation of NP, Nintendo devised a way to manage complexity. The magazine would provide tips, secrets and maps to the emerging complex games. This magazine is available only by subscription, it is not available on the newsstand. The magazine teases the reader with maps and secret information which allows the player to advance in a game, but holds back on revealing all a game's secrets. Nintendo also instituted two phone lines, one which is automated and another staffed by live "Game Counselors". These game playing experts have a special game machine which allows them to go to any level of any game Nintendo makes (licensees have since set up their own phone lines to support their games for the Nintendo systems), and talk the home player through difficult sequences. The Game Counselor also has a massive Green Book, which includes known secrets, hints, codes and suggestions.

After the advent of Nintendo Power, a player would be able to buy a game and be sure they would be able to find out how to finish it. Whether or not they lived in an area with lots of Nintendo players or few Nintendo players, the player knows the information they need is only a phone call away. Even if the player never calls, they know that the information needed to
complete a game is available. Unlike other game magazines, a player who subscribes to NP could be sure the games they were buying would be covered in the magazine. This player support was critical to reviving the video game industry as it removed the risk from a new game purchase. The magazine and phone service also helped build the culture of video game players and cultivated a sense of community between players. Nintendo's on-going promotional goal is to extend those feelings to a loyalty to Nintendo systems.

With this direct connection to the player, Nintendo has the opportunity to define the language of play. The games in the magazine are reviewed with reference to Nintendo’s style of evaluation. In addition Nintendo includes articles which instruct players on how to understand different types of video games, attempting to attract players to different play categories. This type of editorial content further shapes the language and terms of reference for video game players. The Nintendo perspective becomes the language of play and the criteria for expectations players form about video games.

This direct communication between Nintendo and Players is illustrated in Figure 4: The Model of Video Game Play as the Player Feedback box. This allows for communication of information outside the game. By controlling the major magazine for a platform Nintendo created a powerful device for not only promoting games and disseminating information but also for collecting information. Nintendo Power sponsors contests every month which require the subscriber to send in information about likes and dislikes with reference to games. The prizes are attractive as well, trips to major sporting events, pinball

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machines, even cars have been given away. These attractive prizes maintain a high rate of return for player polls.

*Nintendo Power* also provides the link to the live game counsellors, the automated phone help line, as well as directing players to Nintendo’s new on-line discussion groups on the Internet. Sega also employs a similar strategy with their magazine *Sega Visions*, a phone line, and an Internet Web Page. The Web Page is an interactive site on the Internet where players can read press releases, find out about new games, order Sega Products and give feedback directly to Sega. Maintaining links with players has become a fundamental part of the video game play environment.

As mentioned earlier, games scoring over 30 points on the 40 point Power Meter scale are featured in *Nintendo Power*. This is an intense incentive as there is a solid subscription base for *Nintendo Power* among Nintendo owners (1.2 million subscribers in North America and 4 million readers as of 1991). In addition to the reader base, there is a strong word of mouth network reaching the young consumers of Nintendo. *NP* is published monthly by Nintendo, includes no outside advertising and is available only through subscription or in extremely limited quantities from some direct Nintendo distributors (Famcom Games in Canada). The magazine includes reviews, maps, game secrets and is, in essence, nothing but a cover-to-cover ad for Nintendo. To be featured in the magazine ensures a national coverage at no extra cost to the video game developer. The free advertising in the *Nintendo*

77 Ibid Sheff, pg.362.
*Power* magazine ensures that kids know about your game before it is released on the market.

The best way to ensure a good rating in *Nintendo Power* is to follow the advice of Nintendo and maintain the status-quo in video game design. Further economic constraints of video game production make adherence to the status-quo the only sensible way to create video games. It takes approximately four months from the time a company puts in an order to have its games manufactured, shipped back to North America and into the stores. This is after the game has passed all the evaluation hurdles. The company must put up a bank credit note at the time of the order and pay for the resulting shipment outright before it is unloaded. The company begins to see the money come back in about six months after the initial order. The minimum order is 30,000 cartridges and re-orders are in 10,000 minimum. Extras in a cartridge such as a battery back-up ($25/per unit extra) add up to a huge up-front investment for the company.78

As such, estimating how many to make for the primary selling season at the end of the year is extremely risky, too few cartridges is safer, but may preclude the blockbuster sales. If you sell out quickly, demand must be maintained for an additional three to four months. Having an inventory of too many cartridges could cause a game to be unprofitable if not enough units are sold.

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Nintendo's use of the "lock-out" chip, the evaluation system and the promotional strategy of *Nintendo Power* have created an static environment for video game development. The result is that video games are being produced exclusively by large companies who can afford the up-front developing and manufacturing costs. The evaluation scheme used by Nintendo has limited the potentials of video game creation to strict categories and aesthetics determined by expert players. The promotional incentive provided by the "free" marketing through *Nintendo Power* further entrenches those categories and classifications into a single Nintendo aesthetic of video game play.

Creation of video game material is constantly measured against narrow conceptions of quality and success, that of the mass market blockbuster video game. Such a model makes servicing smaller or less developed markets (such as female players) economically unattractive and extremely risky. While attempts have been made to try and experiment outside the boundaries of the conventions of video game play, there have been few successes on the major video game platforms. The economic constraints and creative pressures have created a game market dominated by large video game development companies and recycled game designs.

4.5 The Future of Control: Implications of Emerging Distribution Channels on the Shape of Video Game Creation.

Facing the challenges of moving beyond the constraints of the mass-market video game lies partially in new distribution methods. New methods of distribution have been developed which threaten to change the way gamers get their hands on the latest release which in turn is going to affect the types
of games available. Sega has played a major role in spearheading alternate media and forms of distribution. In Figure 4: The Model of Video Game Play you will notice that Marketing and Distribution are at the center of most of the activity. Marketing and Distribution is the gateway to the consumer. It is also the conduit for player feedback. Players find out about new games from marketing and get them into their homes thanks to distribution. This area of Marketing and Distribution is at the nexus of the video game play environment.

One of the first means of alternative distribution other than retail sales was the rental of video games at movie rental stores. The renting of video games was at first vigorously opposed by both Sega and Nintendo, with Nintendo suing companies for illegal distribution of copyrighted material. Nintendo won a court case against the Blockbuster video rental chain, not for renting video games, but for photocopying the game manuals. However since then, the video game companies have realized the promotional value of video game rental and changed their attitudes towards rental outlets.

Among the factors that have changed Nintendo and Sega's policies towards rentals is the large volume of purchases that video stores undertake. The video game rental business was worth US$1.5 billion in sales and royalties in the US last year. With the market price of the average video game at Cdn$70-$100 there are a limited number of purchases any one consumer can make.79 The video rental allows players to play games they might never risk $70 on, and an enjoyable game play experience may entice an extra sale out

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of them. In response to this player use of video game rentals, many of the
game manufacturers and licensees sponsor "try-before-you-buy" style
promotions were a video rental charge is discounted from the purchase price
if you decide to purchase a new copy of the game.

Sega has examined the rental market and is attempting to take it one
step further. One of the problems with any rental undertaking is how many
copies to keep in stock. A new game may have intense demand for only a
number of weeks, but a limited number of copies means many customers,
some estimates place the number at 40%, are turned away. Conversely, too
many copies means shelves of inventory earning no money. As a result, IBM,
Sega and Blockbuster Entertainment Corp. have created a machine to copy
games onto a blank, re-usable cartridge in under a minute. This means the
entire rental inventory can be customized to consumer demand at any time.
If every customer who comes in wants the latest copy of Mortal Kombat, each
customer will be able to rent one. The investment in cartridges is also a one-
time proposition, as older games wane, there is no need to sell off excess
inventory. The result for the consumer is also positive as the number of games
available at any one time increases.

The promotional possibilities are also lucrative. Advance previews can
be sent to rental stores, and demand gauged before cartridge production
starts, allowing for better inventory control. Game data can be sent instantly
by phone, satellite or cable. With this type of technology, the video game
industry steps one step closer to selling purely information. This ability to

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customize a rental library eliminates the most expensive parts of the video game manufacturing. It eliminates the manufacturing, packaging and distribution of the game. This savings means that it is possible to divert those funds to the creation of a wider variety of games, and ensuring larger profit margins for video game companies.

The other area of distribution which Sega is heavily involved in is the transmission of games over phone and cable lines. Working with AT&T in the US, a modem has been developed which allows players to compete across phone lines while talking to each other.\textsuperscript{81} The Sega Channel is a game network Sega is setting up which would allow players to download games to their home system over their television cable line (in effect a video game on demand rental) that they are able to play until they turn their home unit off.

\textbf{Figure 14: Sega Channel Offerings.}\textsuperscript{82}

\begin{tabular}{|l|}
\hline
\textbf{SEGA Channel features:} \\
About 50 games per month \\
Test Drives of brand new games including games that have not been released yet. \\
Game tips, cheat codes, passwords and news on the video game industry. \\
Exclusive games, only available on SEGA Channel. \\
Special promotions and contests exclusively for subscribers. \\
\hline
\end{tabular}

\footnotesize{\textsuperscript{81} ProNews “Sega, Catapult Agree on Modem.” \textit{GamePro}, Dec. 1994, Vol.6, No.12 pg.282}

\footnotesize{\textsuperscript{82} Source: SegaWeb, http://www.segaoa.com}
The combination of these two technologies, the rewriteable cartridge and the transmission of data over cable provide an environment were the costs of distribution and the time it takes for a video game to get to the consumer are greatly decreased. If access to such distribution networks becomes widespread it would be possible to involve more software developers attempting to reach more diversified markets. A development system for the Super Nintendo (SNES) or Sega Genesis cost approximately US$15,000, it has been the large amount of capital necessary to manufacture and distribute games that has made involvement in video game production prohibitive.

In Canada, Sega has received an exemption from the Canadian Radio-television and Telecommunications Commission (CRTC) so that the Sega Channel would not require the standard licensing requirements of a broadcaster. In return for the exemption, Sega is establishing an Interactive Entertainment Development Fund to supply funding to Canadians developing multi-media products. The fund would receive a 3% -5% contribution of the Sega Channel’s gross revenues of the previous month.

Sega is also required to address the violent content of video games,

Built into the channel adaptor would be a "V-chip" device to allow parents, by way of an encoded message, to prevent access to games that they deem unacceptable for their children's use, based upon the rating levels assigned to these games. Sega committed to ensure that all games would be rated in accordance with a videogame classification system into age-specific categories and

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83 Game Developer, June 1994, pg.13

91
that this classification would be performed by an independent Canadian, video game rating body. Moreover, Sega committed to comply with relevant industry codes on violence, advertising to children and gender portrayal and has introduced toll-free lines to provide parents with easy access to information on the content of its video games.84

Addressing the concerns around violence is a key element in achieving consent by parents to allow their children access to a wide variety of games. It is unclear however how any of the popular games rated MA-17 such as Mortal Kombat will comply with industry codes on violence. The coming wave of instantaneous video game distribution will continue to generate concern and public debate as the Sega Channel moves off the drawing board and into Canadian homes.

The creation of the Sega Channel allows for instantaneous distribution networks. The integration of instantly programmable cartridges and games available through cable distribution means a streamlining of distribution and costs in game manufacture and distribution as well as a longer shelf life for games as players will not be subject to inventory levels at their local stores.

This alternate form of distribution has already proven itself in the marketplace. The computer game DOOM provides a gripping example of the potential video games have in becoming a reactive, highly interactive media. It also confirms the worst fears of those concerned about social responsibility and violence issues.

DOOM is a computer game with a unique form of distribution. The first ten levels of the game are available for free on the Internet. Anyone with access to a modem and the Internet or other BBS's is able to download a copy of the game. Since the game is freely distributable, the game is passed around freely between friends. The game gives the player an address to write and send $50 if they want the rest of the levels of the game. This in itself is not unique as freeware and shareware programs have been available for a long time. Illicit copies of commercial programs are also sometimes pirated by these channels as well. However, DOOM used this form of “free” distribution and it was fabulously successful, bringing in over $1 million to date.\textsuperscript{85} The game is now being released for other video game systems in a cartridge form.

An interesting phenomenon occurred with this game during its distribution. Players and programmers who downloaded the first ten “free” levels began writing utilities to change elements of the ten-level game. Map editors were created to create new dungeons, new characters were created, new weapons and options were introduced and placed on the Internet for others to download. Instead of attempting to stop this unauthorized use of their game environment, Id encouraged others to modify to their hearts content. Future releases of the game will include the programming data to make this kind of modification easier and more efficient. The result of this activity, which would have normally been considered some form of copyright violation, actually helped promote the game, which in turn brought more sales to Id.\textsuperscript{86}

\textsuperscript{85} Ibid Cooper, pg.33.

\textsuperscript{86} Ibid Antoniades, pg..12-13.
It's not the sales totals that makes this distribution revolutionary, but the profit margin...In the case of a Nintendo cartridge of Wolfenstein, the return would only be about $2.00. But by using a shareware distribution system, Id was able to recoup the total price of the game minus the actual cost or materials and having an operator take orders. In the case of Wolfenstein, the cost of materials was less than $5.00, and the complete game cost $50. Although they did split the profit with Apogee, this gave them a profit margin any software company would envy.87

However, it is important to consider that this highly successful game, free of the evaluation and rigors of the Nintendo or Sega system of production emphasizes all the ultra-violent themes the evaluation schemes have sought to screen out. The action is predicated on killing everything that comes into sight. The killing occurs in as much gory detail as is possible on the screen. As was the case for Mortal Kombat, economic and marketing success have an impact on the standards and production values throughout the industry.

4.6 Conclusions

Using a strategy based on security, evaluation and promotion, Nintendo brought a decimated industry from financial ruin to global economic importance. Sega also employed a similar strategy in competition with Nintendo. The resulting industry is dominated by blockbuster video games which are often clones of themselves.

Using feedback mechanisms such as player evaluations, player polling, sales results and game counsellor information, the large video game companies such as Nintendo and Sega have formed a feedback loop on video

87 Ibid Antoniades, pg.9.
game design which favors the expert player, the initial impressions of game play and marketing elements such as graphics and licensed properties. As a result of the development of this feedback loop, the games which are produced are refinements of successful games, many of which are violent. The motivations to leave the successful terrain of the current market are few.

Finally, through the use of large scale promotional magazines such as *Nintendo Power* and *Sega Visions*, the major video game companies are able to define the terms of reference for video game play and video game evaluation. Video game players become media literate about video games by reading these magazines. The terms and conditions of evaluations are explained, the categories defined and ratings given. This is a powerful tool in creating a language for players to use when communicating to each other about video game play. When considering the motivations of video game players to play, these magazines ensure the players are already talking about a games characters, special moves and secret places before the game is even released.

However, beyond the structural constraints of the video game industry, there are also constraints in video game design which are the result of an interesting technological evolution. We will now look at how the video game communicates its content and messages to the player.
Chapter V:  

1984-  
[An] element of all games is conflict. Conflict arises naturally from the interaction in a game. The player is actively pursuing some goal, which obstacles prevent him from achieving easily...Conflict is fundamental to all games. Some people shrink from this aspect of games. A number of attempts have been made to design games cleansed of conflict. Such attempts emphasize cooperative efforts rather than conflict. Few people seem to enjoy them.\(^8\)

Chris Crawford, successful Atari game designer.

1994-  
Ninety percent of the games are based around a conflict. You may be attacking a giant mushroom or fighting your way through thugs. There is always a goal, and there's got to be an obstruction to that goal....If the parent is concerned about what the child is playing, I think the parent needs to take an active role when purchasing a cartridge. Read the back of the box. I can't be expected to dictate what is good or bad for your child.\(^9\)

Scott Smith, product-development co-ordinator for Capcom (makers of Street Fighter II) responding to the question "Can't you make an enjoyable video game without its being violent?"


5.1 Introduction

The history of video game design is a history of attraction. The first video games sat in stores, bars and arcades waiting for a player to come up and play them. When the games were not being played, their screens went into what was called “attract” mode. The screen would demonstrate the game play with the purpose of “attracting” the player with the flashing visuals. The game would play for a short period, and then other screens would come up showing high scores of previous players, the title of the game and other graphic displays to entice the viewer to play.

The video game has always attempted to attract players to itself. It is the attraction, the motivation to engage the game that has always been one of the primary features of the video game. Looking at the history and development of game design, it is possible to decode some of the motivational factors programmed into video games. The features of game design give clues as to why games are structured one way and not another, and also point to assumptions the game designers have made about their players.

5.2 Classification: The First Three Generations of Home Video Game Play

PONG was considered a first-generation video game. The first generation of home video games were self-contained units that played one kind of game. A player purchased a PONG game, brought it home, hooked it up to their television and played PONG. In a month or two you couldn’t upgrade it or
plug anything into it, you could play *PONG*. If you wanted a new challenge, you would have to buy an entirely new unit.

The next generation of video games separated the computing components from the video game instructions through a cartridge based system. The *Atari 2600* (later renamed the *Atari VCS*) used plug-in cartridges which allowed the player to buy new games without having to buy a new game unit. This strategy allowed a longer life for the main game unit and also made it profitable to form companies which created only video games and not the hardware to run them on.

Activision was one of the first companies to begin creating games for the Atari system. Staffed with ex-Atari employees, the company began to push the technology of the Atari system, creating games which used more colors and variety of play options than the corporately produced Atari games. In response to impressive consumer demand, the market was quickly flooded with game cartridges.

The *Atari 2600* provided a platform which included specialized circuitry designed to ease some of the difficulties of programming of video games. This system was called Player-Missile graphics. One of the fundamental features of video games is their use of fast moving screen graphics, from the ball in *PONG* to *Mortal Kombat*’s flurry of kicks and punches. The graphics on the *Atari 2600* system were comprised of collections of blocks which formed crude representations of tanks, planes, and race cars. The coarse blocky nature of the graphics made the implementation of human figures into the game exceedingly difficult. Space ships, tanks and other mechanical representations
were easier to create and more realistic, which is one of the reasons why so many of the first games for the Atari 2600 avoided using people altogether.

Figure 15: Atari 2600 Combat Game

Figure 16: Atari 2600 Gunslinger Game

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90 Atari 1978.

91 Atari 1978.
In addition to the lack of detail possible on the game, animation of game elements such as space ships or race cars put a heavy burden on the microprocessor (the main chip which performs computing functions). To move a one color on-screen object made up of only 28 blocks would require approximately 35 computer instructions to move it once.\textsuperscript{92} With computer memory at a premium in these early games, the game programming had to be as streamlined as possible. The on-screen movement is only one of the many tasks the microprocessor must manage, it must also monitor the input devices such as joysticks and paddles, keep score and search for object collisions.

In order to increase the efficiency of their video game console, Atari introduced the implementation of Player-Missile graphics, a hardware system which could replace those 35 commands needed to move an on-screen figure with one command. Simply put, a "Player" is a section of memory assigned to a specific hardware location. By changing the number at that location, the game displays the figure in a different location on the screen. The inclusion of two "Players" and four "Missiles" (which are essentially small "Players") allowed the Atari 2600 to create high speed animation with relatively few commands. The Player-Missile system also automatically detected collisions between objects, minimizing another potentially microprocessor-intensive task.

While creating a flexible animation system, the implementation of the Player-Missile system had wider implications. The system privileged, at the level of the hardware, a game design predicated on armed conflict. The first game cartridge, included with the system purchase, was entitled *Combat*. The games were all war-based conflict using tanks and planes. Other titles included *Gunslinger*, where opponents shot each other across a cactus field. Target shooting games also abounded on this platform, taking advantage of the speed made possible with Player-Missile graphics.

This situation meant the proliferation of games based on shooting things. One of the most successful categories of this period was the Space Game. Hundreds of video games appeared which put the player in an armed ship to blow other armed ships out of the sky. The shape of the ships changed, but the play theme remained constant. The market became articulated around shooting.

The next generation of video game systems comprised of the Mattel *Intellivision* which was followed by the *ColecoVision* system. These machines built upon the basic framework of the *Atari 2600* and applied faster microprocessors and more memory to the design. The introduction and marketing of these second and third generation game consoles defined the terms under which video game companies would compete for market share.

Mattel *Intellivision* was the first system to follow the *Atari 2600*. Through an extensive television campaign, Intellivision sought to position itself as graphically superior to the Atari console. The level of graphic detail was articulated in terms of realism. A print ad from the March 1983 issue of
Video Games magazine articulates the logical, reasoned comparison between platforms, "As you can see from the independent research figures shown, baseball and football fans were well and truly on our side. It just goes to prove what we've said all along. Intellivision NFL Football and Major League Baseball are the closest thing to the real thing." 93 Currently, no sports game on any platform makes it to the retail shelves without a license from a professional league, players association or individual.

Figure 17: Mattel Intellivision Magazine Ad

The Intellivision ad does mention that their research figures were based on the opinions of 300 baseball fans and 300 football fans who did not

93 Advertisement, Video Games, Vol.1 No.6, March 1983, pg.9-10.
actually play the games, but watched videotaped clips of the various games. Merely the visual quality of the game is given as evidence for a better video game. In current video game marketing, sports figures are always quoted in video game advertising, remarking that playing the video game is “just like” playing the real thing. Whether or not they actually play video games is seldom considered or mentioned.

John Madden, whose current endorsement on video football games virtually guarantees blockbuster sales, recognized the marketing potential of endorsements and tie-ins and was endorsing video games as early as spring 1983.\(^4\) It is this focus on realism which has propelled the marketing of many categories of video games. Greater visual resolution, more options and accurate sound effects are equated with better game play. The level of realism is still a critical issue in the marketing of sports based video games, John Madden's football simulation games are considered realistic as they even include his television commentary as the video game unfolds. Real football, it seems, is televised football.

*Intellivision* was also the first system to recognize the potential market clout of licensed properties. In addition to sports leagues, Mattel bought the rights to the Walt Disney movie *Tron*. While the video game market crashed for Intellivision before they could realize the returns from their licenses, the use of licensed properties has flourished. The next generation of video game again raised the realism benchmarks, promising realism of a different sort. The *ColecoVision* games promised the real arcade experience at home.

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ColecoVision licensed the arcade hits of the time and created a platform which could reproduce them at home. Such technological sophistication did not come without a price. The ColecoVision system was the most expensive video game ever sold up to that point. In order to justify the higher cost (especially when the number of available games for the ColecoVision was less than a dozen instead of the hundreds available for the competing systems) Coleco stressed the expandable nature of their system. During this period, the home computer was also gaining a foothold in the same homes video games were competing for market share in. Coleco positioned itself to compete in both the home computer and video game markets.

The first three generations of video game systems have solidified certain features of both the video game and the video game market that are still present today. The design imperative of simplicity and a minimum of rules created the sense that video games must be completely intuitive to the player. The player must approach the game and instantly know what to do. The technological innovation of "Player-Missile" graphics (called "Sprites" on other non-Atari systems) and automatic collision detection, created a technological starting point predicated on violent themes and armed conflict. The marketing influence of licensing popular movies, personalities and sports leagues, was established as an efficient way of creating player acceptance before players played the video game. The video game manufacturers also identified the importance of parental acceptance and helped create the link between video game use and computer use.
In an attempt to examine the content of video games, one must examine the groups into which games are categorized. So many different types of games exist for video game play that many games are not even directly comparable. Examining game categories allows the researcher to better understand how the landscape of video game play is divided up. David Myers explores the categories of video games in his paper *Computer Game Genres.*

Myers concludes that, “The most fundamental characteristics of computer games, those that properly determine genre, lie in the pattern of interactivity between the player and game.”

For Myers, the interactivity stems from the computer game’s plot-structure. He defines this as the way the game sequences object events. For example, in a standard arcade type game Myers would define the plot-structure as stimulus-response and the player interactions as discover/learn. When the player plays the game, a stimulus is presented such as an alien space ship and the player response is to shoot it. During play the player may discover the timing of the ship’s appearance and learn to anticipate it.

At the other end of Myers’s scale of video game genre is the strategy game. For this game the plot-structures are competition and the player interactions are discover/learn/manipulate/test. This interaction is much more complex as the underlying rules and structure are not as easily apparent. The player must assimilate and react to a large number of factors over longer periods of time.

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96 Ibid Myers. pg.298.
Myers continued his study of computer game interactions in a study entitled, *Computer Game Semiotics*. Myers continues to develop a notion of how to think about and categorize the elements of video game play interaction. In this study, Myers continues to examine the simulation type of game. He discovers the extreme difficulty in untangling the various elements of the play experience due to the complex fusion of game play processes. The simulation game includes all the types of game play identified by Piaget (see section 3.2.5) and as such is difficult to dissect for analysis. What one finds when they attempt to define a video game is a potpourri of potential categories which affect video game play excitement: challenge, fantasy, interactivity, violence, speed, sound, color and a host of others. Separating out how each element interacts with the player is a difficult task.

### 5.3 Interactivity and Video Game Design

For all the technological advances of the video game itself, the game design features have remained relatively constant. The video game itself has moved along in fits and spurts of original game design, followed by endless variations upon a few blockbuster hits such as *Mario*, *Tetris* and the like. When *Pac Man* became popular, it inspired an entire genre of games called maze games. Today the success of *Tetris* has spawned a new category of gaming called puzzle games.

In the early game designs of the eighties, games such as Asteroids and *Space Invaders* managed difficulty and challenge by introducing more

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adversaries and increasing the speed at which they moved. In the games of the nineties, sequels to *Street Fighter II* and *Mortal Kombat* take the same approach by adding more characters and faster moves to create a greater challenge. In both cases, the approach to variation is easily charted along these two dimensions of speed and number of adversaries.

When Atari was manufacturing video games in the early eighties, the questions in terms of game complexity were how to increase the difficulty of a game in order to maintain a player's interest as their skill increased. The games of the time had simple structures which left designers relying on increasing the speed at which a game unfolded as the primary means of increasing difficulty.

A variable difficulty level is often used to alter the game's level of play...The increasing skill level requirement presents an added challenge, while preventing the player from growing complacent. Often the technique is to speed up the game or place additional enemy craft into battle. The player is required to play faster and better, honing his reflexes during the process. Another variation allows less time to complete your objective as the difficulty increases.98

If one looks at some of the games of the period, it is possible to discover how the problem of increasing difficulty while maintaining interest was approached. In the Microsoft Arcade program for IBM compatible computers, five of the top arcade games of the eighties are included with some features not open to the player in the arcade. In the Microsoft version, the player is

able to customize the game features. Such an ability was available to arcade owners who had access to the inside of the arcade game and were interested in increasing the difficulty in response to players playing the game for extended periods of time on a single quarter. A look at these options provides a glimpse at the potentials of game complexity.

In *Asteroids*, the player is piloting a space ship in a field of asteroid rocks. The goal of the game is one of survival, the result of which will be a high score. The player's ship has a gun by which they can reduce bigger asteroids into smaller and smaller chunks, eventually vaporizing them. Occasionally a big or small space ship will enter the play area and fire upon the player. The options given for customizing the game are as follows:

**Figure 18: Asteroids Options**

- Number of Lives
- Points for Bonus Life
- Spaceship Speed
- Missile Range
- Asteroid Speed
- Flying Saucer Speed
- Flying Saucer Appearance Rate
- Flying Saucer Firing Delay

One will notice that the majority of potential changes in the game play are achieved by changing the speed of one or more elements in the game. The

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99 Help File, “Asteroids” Microsoft Arcade, (Software Program)
task of the designer was to find the optimum rate of speed for each subsequent screen of asteroids the player cleared, smoothly advancing the need for reaction time improvements as more and more asteroids were destroyed.

Figure 19: Asteroids

It is interesting to note that the highest scoring players defeated this carefully crafted learning curve by leaving one big slow asteroid on the screen and firing only at the Flying Saucers. This strategy allowed players to attain the highest scores without engaging wave after wave of asteroids.

Another game of the period was Missile Command. The object of this game was to protect cities from incoming nuclear attack using Inter-Continental Ballistic Missiles (ICBM's). This game’s potential options are as follows:

100 Atari 1979.
Figure 20: *Missile Command* Options\textsuperscript{101}

- Number of Starting Cities
- Points for bonus city
- Attack Missile Speed
- Center Base Missile Speed
  Side Base Missile Speed
- Bomber and Satellite Speed
- Smart Bomb IQ

Figure 21: *Missile Command*\textsuperscript{102}

Again one finds the primary considerations to be the potential speed of the player's on-screen manipulations and the speed of the computer's responses to them. This game required the player to make each ICBM disable as many incoming missiles as possible. This asymmetric relationship between

\textsuperscript{101} Help File, “Missile Command” Microsoft Arcade, (Software Program)

\textsuperscript{102} Atari, 1982.
the player's defensive capability and the offensive onslaught made the game both strategic and dependent on quick reflexes.

However, in both cases the games have a single play concept. Only limited actions are available to the player and all within the confines of a single screen. Complexity is managed by increasing the number of screen elements for the player to destroy or otherwise clear and the subsequent speed of the interactions increases gradually over time. Adding additional game features was not seen as an effective way to increase difficulty. One of the \textit{Missile Command} programmers, Dave Theurer had the following to say,

...when we first developed the game, we added railroads to transport missiles from the cities to the missile bases. That got too complicated and people got confused. If you get too complicated people won't play.\footnote{Help File, "Missile Command" \textit{Microsoft Arcade}, (Software Program)}

One of the critical elements Nintendo was to bring to video game design was how to manage complexity. Nintendo created games which were very difficult to challenge the very best players, without excluding those who could not figure out the more difficult passages.

Using elegant interfaces, games can now be increasingly complex. For example, the \textit{Legend of Zelda} series for Nintendo is a text-book example in managing complexity. The game, which is loosely based around a medieval adventure not unlike King Arthur or The Lord of the Rings is an action adventure game with no score, no clock and a huge landscape to explore. Only
by solving puzzles and collecting items may a character advance through the game. It is entirely possible that a player may become completely stuck and unable to continue because they never picked up the correct item or searched the right place.

Figure 22: The Legend of Zelda: A Link to the Past

In order to allow most players to finish the game, Zelda comes with a 46-page manual (including 7 pages of prose describing the adventure and potential secret information), a detailed map of the initial stage of the adventure and a sealed leaflet describing how to solve some of the more difficult puzzles in the game with instructions to use it only as a last resort. In addition, a 168-page full color "guide" to the world of Hyrule (as it is called in

the game) is also available by mail. The game is also covered in the Nintendo Power and other magazines. If the player is still stumped, there are always the Nintendo game counselors who are available by phone daily to walk the player through a problem.

The game is designed as a carefully expanding tree of possibilities. The first three challenges are almost a tutorial to teach the player the basic goals, potential moves and strategies that will prove helpful for the completion of the game. The twenty-plus objects available to the player are made available one at a time as the game progresses. As the player gains familiarity with the game the complexity of the problems increase. The game also has a battery back-up feature enabling players to save their progress and not have to finish the game in a single five or six hour sitting.

**Figure 23: Overview Map: Legend of Zelda: A Link to the Past**

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There is almost no possibility of a player being unable to finish the entire game or at least know how to finish the game with these resources available. Each problem is known to have a "logical" solution. The worlds of video game have a logic and problem base unique to them. Keys always have keyholes, bombs open holes in walls, magic powder changes things. The video game world is one where solutions are often singular, neat and tidy.

This has created a game play dynamic where problems are created in anticipation of solutions. The problem solving goals are narrow and tightly related to video game logistics. Video game players are attracted to challenging video games, but only ones that provide just enough resistance to the player. The problem solving skills taught are that there is one solution and if it is too difficult, it is the designer’s fault. It is a way of thinking predicated on consumption of puzzles and problem solving as entertainment.

The other dynamic feature of video game design relates to its content. A player’s knowledge and skill allow differing levels of access to parts of a video game by different players. This can create problems for parents who wish to monitor the content of their children’s video games. The ramifications for parents are most easily articulated around arguments dealing with violent content in video games. Industry insiders often admonish the parent to keep on top of what games their kids are playing, however, the parents are at a clear disadvantage in obtaining information about video games.

Through the use of secret "codes", violent features may be accessed in certain video games. While such codes are easily accessed through video game magazines and peer networks, parents do not know whether or not a game has
a code attached to it. These codes are usually published months after a
game's initial release. It is now normal for a game to have a number of secret
codes to access special levels and features of games, although the great
majority of these are not about intensifying violence.

One example of such a code appeared in the June 1994 edition of Video
Games: the ultimate game magazine.

MA-17 CODE!

Virgin's original Genesis version of Robocop Versus The Terminator
wasn't approved by Sega because of its explicit subject matter
(Lots o' screaming!). Fortunately, we've found a way to restore the
"uncensored" version to your TV screen. Check out this spicy code
and find a whole new world of gore and carnage:

if you did it correctly. The MA-17 version has added enemies,
deaths, and destruction...

During the MA-13 game, all the enemies are male. To change
things, press [code]. Now the game includes lady killers...skeletons
afire...and a new Game Over message.106

It is this quality of video games which makes it clearly different from all
other children's media. A parent can read a comic through, listen to a CD or
watch a movie and be sure of what its content is. They can then make
decisions on appropriateness or inappropriateness. With a video game, the
access to later parts of a game is purely determined on skill and/or specialized
knowledge such as codes. This situates the games squarely in the control of
the player. This control and lack of accessibility by parents is part of why the

106 "MA-17 Code!", Video Games: the ultimate gaming magazine, Vol.6 No.6, June 1994, p.25.
games are so popular. The child with a level of mastery over the video game can control not only their own access to game levels but their parent's access as well.

The history of video games has been a history of violent gaming themes which reaches back to the very first home video game hardware designs. For all the possible complexity available to video game designers, video games rely on the two dimensions of number of adversaries and speed of movement as the fundamentals of video game challenge. One should recall the words of the game designers quoted at the beginning of the chapter who maintain that conflict (usually violent conflict) is the fundamental feature of video game play. As long as the mind set remains that conflict is the primary motivating factor for players, we will likely see many more violent games in the future.
Chapter VI:

The Player: Motivation to Play

Look at...virtually any multi-panel sequence in any comic book. Your mind “saw” the action taking place, but in reality you’re looking at two-dimensional static images printed on a page. So where did the “action” come from? You brought it with you to the comic. The unmoving images interacted with your imagination - your own personal set of expectations and suspension of disbelief. The action unfolded as quickly or as leisurely as you desired because you controlled the pacing. You “heard” the voices and their inflections and even the sound effects, yet no sound was generated (not to mention that the sounds you “heard” were unique to your reading of the page - your friends will “hear” their own version). You didn’t have to insert a disk or tape, you didn’t have to push a button or move a controller, and no special equipment was required. Does “interactive” get any better than that?107

Randy Stradley

Dark Horse Comics creative director

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5.1 Introduction

Video games and other children's media are the products of armies of marketers, researchers, designers, engineers, writers, artists, editors, distributors and sales people. Every element of any artifact of children's culture is carefully screened by focus groups, experts and marketers to make sure the name, color and shape of the character or product being offered for sale will be well received by the consumer.

Contrast this with the methods used in the creation of other children's media, such as Dr. Seuss books. There were roles for the editor and publisher, but the main load of the development of the characters and stories was upon the author. One person conceived of the story and the characters and fixed them on paper to be published in a book. No one was concerned if the characters responded well to reader input, that they were animated smoothly and provided enough “action” to keep the reader interested.

The player of a video game uses the criteria provided by the video game companies for evaluating new video games. The question is not just “Is it a good game?”, but rather “How does it rate on Play Control? Is it Challenging enough? How are the Graphics and Sound?”. The expensive price of video games forces the player to carefully respond to the intensive marketing, actively slicing a game into its discrete parts for careful analysis. The user expects a package of entertainment: lots of color and action, name-recognition characters, lasting play-value and a smooth learning curve.

This consumer is demanding a product which is highly responsive to them, challenging enough to interest them but not so hard as to frustrate
them. They demand a designed experience of their video games. How do players respond to video game designs when they have such well defined criteria?

5.2 Expectation and Motivation to Play

The expectations of the audience are playing an increasingly important role in the creation of content for various media. Market research, focus groups and marketing initiatives attempt to fine tune media offerings to specific target audiences. Movie endings are sometimes selected by focus groups, and plans are in the works to allow the home viewers of the popular daytime Soap Opera *All My Children* to determine plot twists and other story elements by using an interactive set-top box to register their opinion. The reasons for doing this often occur in response to pressure to maximize an audience.

It is the audience expectations which fuel the impetus to change a media text to suit a particular audience. However, this creation of content through the use of polling devices is not always a guarantee of attracting and holding the target audience. When an audience goes to see a George Lucas film or read a Stephen King novel, they do so not because they want to control the outcome of a story or shape the characters into something else, they go to see the vision Lucas or King has created for a story they are communicating. It is the very fact that the audience is unable to control the outcome, the plot, and the characters that makes the experience appealing.

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If something bad or uncomfortable happens in the film, they as viewers/observers are not responsible for what occurs in the story, they are voyeurs looking in. However, the video game is changing those expectations. The video game has introduced a powerful expectation of control. The video game player wants control of the on-screen action, mastery over the game play and desires situations, sounds and visuals that will tantalize them.

It is important to consider that the player does not want ultimate control. If the player controls all the rules, or does not consent to abide by the game they are unable to participate. A game with all-powerful characters makes for stagnant game play because it removes the delicate balance of challenge needed to engage the player. In his book *Understanding Media: the extensions of man*, Marshall McLuhan makes this point in his discussion on games, “A game is a machine that can get into action only if the players consent to become puppets for a time...The uncertainty of the outcomes of our contests makes a rational excuse for the mechanical rigor of the rules and procedures of the game.”109

This delicate balance of suspending and exerting control is one of the elements of motivation for video game players. Another technique for attracting players to video games is the use of licensed properties. A licensed property is any existing character, setting or real-life personality whose likeness is used in a video game. The enticement to use licensed properties is

that these characters and settings have already established relationships with their audiences in other areas of popular culture.

It is interesting that in spite of the relationships that exist with licensed characters, both players and designers often bemoan the constrictions of maintaining the integrity of the license as it moves from one medium to another. In regard to games which rely on movie plots for their design, the player says, “I already know what will happen so where is the surprise?” while the designer says, “We had so many good ideas that make a good video game but couldn’t implement them because we had to adhere to the film.”

During such conflicts the marketing and license demands are maintained, often the result is an accurate graphical representation of the licensed character attached to a conventional successful video game design. Many successful games have been created using film and licensed properties as their subjects (Aladdin, Lion King, Beavis and Butthead). The video game is also moving its successes across to other media, Double Dragon and Mortal Kombat are moving onto the silver screen in their movie incarnations. It will be interesting to see how their video game roots affect the translation to cinema.

The allure of video games and the motivation they inspire in their players is often expressed within the concept of interactivity. Interactivity is usually credited with the greater appeal of video games over other media. If a child is more enthusiastic about a video game than television, the fact that the child can interact with the video game is often given as the reason for a preference over television. However the term interactivity is often limited to
the small cycle within the video game of pressing the buttons and having an on screen character move accordingly. The wider context of possible interactions and depth of interaction are seldom defined or considered.

Therefore the starting point in the creation of a more comprehensive notion of interactivity is to consider the interactivity of other media. If one starts with the interactive nature of a book, the following simple model may be created:

**Figure 24: The Relationship Between a Book’s Creator and Reader**

Author \[\rightarrow\] Text of Book \[\rightarrow\] Reader

The author codes a story into language (sometimes including illustrations and/or pictures) which is reproduced into a book of sequential pages usually bound in order. The reader may then acquire a copy and read it. Usually the reader starts at the beginning of the book and continues on to the end. As such, a book is considered a linear medium. The story only unfolds as it is written. Each page is bound into place, so that every reader starts on the first page and moves on to the final page one at a time. As the book is designed this way, it is often labelled as a non-interactive media in comparison with interactive media such as video games.

However, the audience is able to interact with the book in a number of ways. For example, the reader does not have to start at the beginning of the book, she or he may start in the middle or look at all the chapter titles first. This is often the way many readers approach non-fiction, reference and
instruction books. People use the browsing devices such as indexes and tables of contents to navigate through a book to find their area of interest. The reader is also free to annotate the book with margin notes, high-lighting and bookmarks. Another possibility for the reader is the ability to re-read portions of a book out of sequence in order to recall what happened earlier.

In terms of interactivity, the pace at which a reader moves through a text is entirely up to them. The reader may carefully examine every word or blaze through chapter after chapter, it is their choice. Many books such as coffee-table books, cook books and instructional books are created for browsing and flipping by the reader. A reader may decide not to finish a book or may continue on even if they cannot recall what came before. While the narrative is fixed, the reader's approach to the material is not.

Another issue of interactivity is the fact that the text narrative provides only description. The interpretive work must still be done by the reader. Using the text as a guide, the reader must visualize and create an interpretation of the text. As each reader's "vision" of the text differs based on individual factors, the process of reading may be defined as highly interactive. A person's experiences, the other books and authors they have read all affect the reader's interpretation. While many people read the same book, their responses to the same material are as varied as the people who read it.

It is also possible for the narrative to be non-linear, even though it is set on paper. Narrative techniques such as foreshadowing, flashbacks and parallel storylines allow the author to communicate a story in a non-linear fashion. Beyond literary technique, an entire genre of books created to be interactive
texts have also been published where the reader reaches story branches and is faced with a limited number of choices. The reader picks one or the other and is instructed to turn to a specific page and pick up the story from there. As such, several story possibilities are encoded into the story. It is all these possibilities that make what is often referred to by designers as the least interactive medium, exceedingly complex.

Even author's no longer work in isolation. The writing process involves editors, marketers, researchers, cover and illustration artists, distributors and booksellers, each of which play a role in getting the book to the reader. Any model of media must consider not only the author's vision, but the effect of the other players on the process.

The creation of a model for the interactive media is made complex in the same manner as careful examination a model for the book is. It is interesting when considering the level or type of interactivity a media contains, one discovers that many media purported to be interactive are often as limited as a book or film. The range of potential outcomes is fixed and preconceived by the designer. Any such game is no more interactive than a book or film, the number of stories is simply multiplied.

The audience expectation is also critical to this notion of interactivity. The issue of control is central to the definitional difference between a video game and a book or film. A film is enjoyable precisely because you have no control at all. The process of watching a film is one of suspending disbelief, the viewer's control is limited to whether or not to enter the theater and
where to sit. The only other choice is when to stop watching, either by leaving the theater or covering one's eyes.

The film allows the viewer to let themselves be led by the filmmaker's vision. It is like a roller coaster that one cannot get off of. The viewer expects to watch. Contrast this to the expectation of the video game player. The video game player expects to interact. Whenever a non-interactive sequence appears, the player reports listlessness and boredom at the interruption to play. The player expects to spend most of their time controlling actions on screen. Limited interactivity is often given as a source of frustration or as a game flaw by professional game reviewers and game players.

Simply controlling an on-screen protagonist does not create interactivity superior to a book or film. With the popularity of the home VCR's, an element of control has been added to the cinematic film. The viewer may start and stop a scene or watch it one frame at a time or view it at high speed in either direction. This changes the editor's control of pacing as the viewer may stop the film whenever they like. These simple elements of control are available in most media. Many games allow a player to engage a character in a landscape and walk them through an imaginary game. However there is a sequence of play determined by the designers. Such a process is not non-linear as the outcomes are fixed, one must solve a certain puzzle before the next segment of the game appears. There are only the potentials conceived by the designers available to the player.

Such an argument that many video games lack true interactivity is often disputed by claiming that the capacity for true interactivity does not
yet exist; given more memory, and bigger capacity storage devices, a great number more potential paths may be created. However, this increase in volume still means that the author/game designers determine the possibilities. Such games will no doubt be popular, the problem with true interactivity is that it is very demanding upon the player. When one reads a book, watches a film or plays a game, they are enjoying the intense work of other individuals. It is much easier to consume an experience than to create one. The goal of making a game truly interactive may not be the type of the experience the audiences desire. The ability of movies, books and games to tantalize with other people’s visions makes them entertaining.

Games which approach this notion of true interactivity are possible in the interactive game. One such example is SimCity. SimCity is what is called a simulation game. The player takes on the role of Mayor in a city of their creation. The player picks from a series of land formations (later editions allow creation of land and terrain to player specifications), and proceeds to build a city. The player does this by zoning areas as commercial, industrial and residential and creating roads and services. The city evolves according to unseen rules, people move in, build houses, businesses and factories.

The player has a fixed budget, may raise money through taxes and borrowing. The true interactivity results from the game design where the goals of the game are set by the player. The size of the city, the look, the population are all under the control of the player. The player may let the city grow uncontrolled or may tightly impose control upon their creation. There is no time limit and no imposed end to the game. The player may play a city for
literally months or just an hour or two. The player may create a city without tearing down any trees or build a polluted wasteland.

The ability of the player to create outcomes using tools is what makes this game truly interactive. Another example of such a game is MarioPaint for the SNES. This game is a paint sound and animation program. With it, the player gets a computerized blank screen of paper which they may draw on, create animations and sound tracks. The player creates the outcome.

In trying to describe the experience of video game or any other computer mediated interactive experience is that mapping what occurs becomes incredibly complex. Even when it is possible to describe the events of a game, it is impossible to define exactly what will occur as the player's actions affect the outcome. As games increase their interactive possibilities with their players, the complexity will only increase.

Most video games fit a similar model to the one I earlier used to describe the interaction between author and reader:

**Figure 25: The Relationship of Production Staff to Audiences**

(editable and artistic support)Author→ Text of Book ↔ Reader
(grips, camera people etc.) Filmmaker→ Film ↔ Viewer
(programmers, producers etc.) Game Designer→ Video Game ↔ Player

The product, the book, film or video game is a single entity that is the same for each purchaser of the media. Once the film, book or video game is
released, it is gone from the designer and the user interacts with it as they wish. What interactivity can do is change the content of the media. Consider the following:

**Figure 26: The Relationships between Players and Game Creators**

![Diagram showing relationships between players, game creators, and games]

Multiple players increase the potentials for interactivity. In addition the feedback lines of communication between the game designers and players are increasing in use and types of information communicated as was shown in the Model of Video Game Play. The creation of links between the players and designers in ways which affect the content and style of play creates a situation where players actions truly play a role in the interactive nature of their video games.

Player expectations play a large role in the acceptance of popular video games. Whether the expectation is for a non-interactive roller coaster ride, a new challenging experience or the extension of a familiar game experience, players have differing expectations at differing times. The popular video games which match those player expectations either by good fortune or design become the blockbusters. Those which do not meet the expectations are doomed to fail. This issue of expectation relates to the gender issue in video
games as an entire generation of females have grown up expecting the video game to be a toy for their brothers and not for them.

5.3 The Magic of Video Game Play

Beyond the marketing data and game design features, video games are able to relate to players on some emotional level. As the video game technology advances, will the impressions of the video game make their way into the real world? The research in this area is scant and the technology advances in leaps, making the impact of video games on real world perceptions difficult to judge. There is anecdotal evidence that the video game can make a larger (but perhaps temporary) impact on perceptions we have about the world. To illustrate this idea and to close this section of the paper I leave you with the following quote,

The doorman at Arthur Siegel’s office building thought he was the most dedicated lawyer in San Francisco. Siegel would work long into the night; sometimes he would walk uncertainly out into the gray streets just before dawn, toting a heavy briefcase and squinting against the glare. But Siegel was not doing legal work in his ninth-floor office.

He was playing Myst.

“It was addictive,” he says, “but I knew it had an end. I was pretty sure, anyway. Most of the time. The only problem was when I began clicking on things in real life. I’d see a manhole cover and think, ‘I’mmmm, that looks pretty interesting,’ and my forefinger would start to twitch. And then I’d realize, ‘No, it’s real life. Real life is the thing that happens in between Myst.’”

The anecdote is not fictional, and it is something I have experienced as a player. The lush textures, graphics and sound of a game like Myst have the

\[110\] Carroll, Jon. “Guerrillas in the MYST.” Wired, 2.08, August 1994, pg.70.
effect of focusing one’s attention in a compelling way. Creating connections between a game experience and lived experience is done in a game like Myst through objects. Once Myst “teaches” you to “click” on objects, it is possible to walk through your daily experiences and imagine “clicking” the objects which surround you. This phenomenon is one that remains virtually unstudied and undocumented.

In the video game world, we experience a world where we interrogate objects by clicking on them. All the knowledge about objects is contained in the micro-world of the video game. If you click on it and nothing happens you move on. Objects contain all the pertinent knowledge about themselves. The links are fixed and immutable. As players we sit back and wait for others to create the new links. If we do not like the links and connections of a game, if they do not suit us we condemn it as badly designed and move on (“It Sucks!”). It is a design metaphor based on packaging for consumption and one that works best when confined to the video game world.
Chapter VII:
ICARUS

7.1 Introduction

In order to examine the role of interactivity and realism in violent and non-violent video game play on player response, a research model needed to be created which allowed numerous observational and recording techniques. The Model of Video Game Play (Figure 3) illustrates that the game play experience is affected by several factors including the marketing and promotion of video game, previous knowledge of video game play and social attitudes towards video games. The observational study attempts to examine how these factors relate when the player actually settles down into playing a video game.

The player’s video game experience is affected by attitudes cultivated among social relations as illustrated in The Model of Video Game Play (Figure 3) by the Parents, Peers and Organization ellipses. The player’s expectations and motivations are affected by their social environment, whether or not their friends play games and how parents monitor and control or do not monitor and control video game play. The video game activity can be either an act of rebellion, a supervised activity or a social event. To examine these elements of video game play, an interview was conducted with each of the subjects in the study at the end of the play session.

The player’s previous knowledge also plays a role in what they expect to encounter in a video game and whether or not the player considers it challenging. To uncover the knowledge players had about video game play,
the subjects were asked to fill out a questionnaire rating their skills and knowledge about the video games they were playing in the study.

The final piece of the research puzzle is the desire to elicit responses to video games while playing them. What interactions and motivations come into play at the moment of engagement with a video game? It would be possible to interview subjects while playing as many savvy video game players are easily able to converse while playing. However, the difficulty is the players who are best able to do this are usually game experts, novice players or players who are learning a game are more easily distracted. I wanted to examine the video game player’s response to the game in a way that did not involve the intrusion of the interviewing process. To do this I turned to the use of physiological monitoring.

Using a system called ICARUS, physiological measurements are taken of the subject’s Heart Rate, Galvanic Skin Response and Electromyograph in a setting similar to the home playing environment. The ICARUS system, developed by Dr. Stephen Kline provided a base on which to build this research model.

Using these three tools of questionnaire, physiological monitoring and interview, I wished to examine the following hypothesis:

There are differences in the physiological responses of players between playing and watching violent and non-violent video games.
Looking at the differences between playing and watching will enable us to look at the role of interactivity in involvement. Since the content of a game, its visuals and sound are the same for both playing and watching, the relative impact of interactivity may be examined. By using violent and non-violent games, we will be able to look for differences in reaction to certain types of visual and thematic content and see what impact those differences have.

7.2 Background

ICARUS stands for Integrated Communication Assessment and Response Uncoding System. The system, developed by Dr. Stephen Kline of the School of Communication at Simon Fraser University was created to examine emotional responses to television material. ICARUS was developed to address the problem of monitoring viewer response to media stimulus.

One of the problems the researcher faces when assessing reaction to a particular piece of media is that of interrupting the subject while the subject is watching the stimulus material. The researcher must wait until the material has ended and ask the subject to recall their impressions and reactions. When using complex stimulus material, the researcher must rely on a subject's recall abilities.

There is also the problem of the "halo effect" when interviewing players about their gaming preferences. Children may not report their feelings about a violent video game to an adult in the same way they may to a peer. Children may perceive the interviewer as an authority figure and give the "polite" answer about difficult or embarrassing issues with video games.
To solve this problem, ICARUS employs physiological monitoring of the subject to monitor a viewer's reactions as they occur. Based on the principles of psychophysiology, ICARUS measures three physiological responses: heart rate, galvanic skin response and electromyograph. Physiological measures are used to provide a glimpse of the autonomic responses of the body to stimulus. It is desired that the resulting physiological readings will tell us something about the physiological arousal that occurs when a subject plays a video game.

The function of the heart and it relationship to outside stimulus is described by noted psychologist, Elizabeth Duffy. Duffy was the first psychologist to measure the relations between physiological arousal and behavior in children. According to Duffy, changes in heart rate follow a chain of events,

In a situation calling for strong muscular exertion, cortical-hypothalamic-midbrain mechanisms initiate a sequence of physiological reactions including dilation of blood vessels in the muscles, constriction of vessels in the skin, increasing blood flow through the muscles, and (to the same end of providing metabolic support for the muscles) increased cardiac output.\footnote{Greenfield, Norman S. and Sternbach, Richard A. Eds. Handbook of Psychophysiology., 1972, Holt, Rinehart and Winston, Inc., New York, pg.970.}

This expectation for strong muscular exertion is interesting as the body prepares for an exertion, if it does not come, subsequent cardiac increases may habituate the subject into less dramatic increases in heart rate (HR) to a stimulus. In fact, studies have concluded that brief periods of heightened attention may actually bring a reduction in the cardiac output. This
phenomenon is often related to the carotid sinus reflex which prevents blood pressure from remaining at high levels over long periods of time.\textsuperscript{112}

The heart rate is intricately linked to other bodily functions and therefore is a good indicator of stress. The heart rate is also a relatively simple and reliable measurement to take which makes it useful in monitoring the video game player.

The Galvanic Skin Response (GSR) is used to measure electrical activity in the skin in response to one of three factors: movement, rapid changes in respiration or emotion-producing stimuli.\textsuperscript{113} The GSR is used in order to measure readings of response to emotional material. In this study, the GSR is employed to measure the frequency with which the player is surprised or startled by their interaction with the on-screen material.

Electromyography (EMG) measures the electrical activity of muscles beneath the skin. Some of the potential uses of EMG are to measure the tension in the neck to determine the depth of sleep, to measure muscle reaction time or to measure a muscle’s anticipation of stress.\textsuperscript{114}

These measurements of HR, GSR and EMG have been used with varying degrees of success to study a number of responses to stimuli. However, there are potential difficulties with using physiological responses. There are many

\begin{footnotes}
\item[112] Ibid Greenfield, pg.970.
\item[113] Ibid Greenfield, pg.180.
\item[114] Ibid Greenfield, pg.175
\end{footnotes}
potential differences in technique and electrode placement that a researcher may employ. The technology of amplification and recording is always improving and evolving, allowing for more accurate collection of data under a variety of conditions. Most importantly patterns of response are often difficult to decode and analyze. One must be careful about what conclusions are drawn from the data. Physiological monitoring is a powerful tool, but it does not give up its secrets easily.

ICARUS measures and records these three physiological responses of HR, GSR and EMG during the viewer’s exposure to a media stimulus. In addition to the computer data files, a video image of the computer screen is combined with the images of the subject and the image of the stimulus material and recorded to videotape. This provides a complete record of the ICARUS session for later analysis. A sample output screen from this study is presented in Figure 27:
The screen displays the real-time readouts of the heart rate, GSR and EMG for both subjects. The three graphs running down the left of the screen are (from top to bottom) HR, GSR and EMG and correspond to the subject seated on the left edge of the screen. The other three graphs correspond to the player on the right of the screen. The video game image is presented in the bottom right corner.
7.3 Strengths

ICARUS does provide a number of advantages as a research methodology due to the capacity to collect, organize and display information.

7.3.1 Comprehensive Data Collection

The primary strength of using the ICARUS system is the ability to generate computer based data on physiological readings in real time. Using ICARUS, the researcher may simultaneously collect sixteen physiological measurements at the same time. This allows for a wide variety of potential experimental setups depending on the number of subjects and which measurements the researcher wishes to take.

The computer based nature of the system allows the user to easily move data from one computer to another, enhancing potential analysis strategies. The data may be combined with coded questionnaire and interview data into statistical packages, as was done in this study. This provides the researcher with a complete set of player response data to examine and compare.

In addition to the computer data, the visual output screen of the system is also very useful. After the session it would be possible to undertake interaction analyses between the players, create transcripts of their comments, and analyze the games they played. The hallmark of the ICARUS system is its comprehensive data collection.

Finally, the accuracy of the real time monitoring of the system provides the researcher with relatively stable and accurate data. The ability to
manipulate the data electronically will only continue to improve as the technology and capacity of desktop computers advances.

7.3.2 Use of Physiological Response

In trying to examine the player’s response and level of interaction with a video game, physiological monitoring provides data which are simply impossible to get any other way. To examine how this use of physiology is useful, we will explore the concept of “activation”.

In her paper, *The Psychological Significance of the Concept of “Arousal” or “Activation”*, Elizabeth Duffy explores the use of physiological measures as an indicator of internal arousal. She argues that by measuring the intensity of response, one may achieve a rough idea of the level of arousal or activation.

Among the physiological measures which may be employed are skin conductance, muscle tension, the electroencephalogram (EEG), pulse rate, respiration, and others. These measures show intercorrelations, although the correlation coefficients are not always high since there is patterning in the excitation of the individual, the nature of which appears to depend upon the specific stimulus situation and upon organic factors within the individual. Nevertheless, there is evidence also of “generality” of the excitation. Hence a concept of arousal, or energy mobilization appears to be justified.\(^1^{15}\)

While the patterns of activation are not always clear and variation exists within individuals, the concept appears to be generalizable. Duffy goes on to argue that it is the response of the entire organism which indicates arousal and no single system or single aspect of response will clearly show

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\(^{15}\) Duffey Elizabeth, “The Psychological Significance of the Concept of “Arousal” or “Activation”. *Psychological Review*, Vol.64, No.5, 1957, pg.266.
activation reliably. This argument makes the use of as many responses as possible necessary to measure activation. While one video game player may respond clearly with HR another may respond more clearly on the GSR. Some subjects may potentially be responding on measurements not being taken by ICARUS, such as EEG.

Duffy argues that the measurement of arousal is necessary to study motivation,

In the study of "motivation," the concept of arousal is of distinct service. By means of the physiological measures which serve as indicants of arousal, we may secure a direct measure of the degree (intensity) of "motivation". Any other measure must of necessity be less direct.\textsuperscript{116}  

The ICARUS system provides data to support or negate the self reports of subjects. When asking the subjects questions about excitement and motivation, the researcher may look back into the physiological data and compare the response.

\textbf{7.4 Limitations}

As is the case with many research studies, the ICARUS methodology does have some limitations.

\textbf{7.4.1 ICARUS Analysis System}

One of the most obvious limitations of the system is its physical intrusiveness. The ICARUS system requires the subjects to be attached to the computer by means of wires and electrodes on the skin. The subject cannot

\textsuperscript{116} Ibid Duffey, pg.267.
help but notice they are in a testing situation. However, it was interesting to note that the subjects in the video game study expressed very little concern about being wired up, and quickly turned their focus onto the video games themselves.

Other limitations of the system are of a technical, operational nature. ICARUS was designed to examine physiological response to television stimulus material. As such, the system employs a script system for analysis. In a setup for examining response to a series of television advertisements, a stimulus tape is created for the sessions. Since every subject sees the same images at the same point during the stimulus material, a script may be created which identifies important points in the stimulus material. Several subjects reactions may then be compared, using the script as a virtual bookmark to navigate through the raw data. Since the stimulus material is exactly the same for each viewer, the researcher may examine the same portion of time for a variety of subjects.

When subjects play a video game, the timing of events and the resulting actions on the screen are always different. The players may experience similar successes and defeats in a video game, but the timing of each is different. Each subject may play an equal number of games, but the novice player may find themselves playing for a brief time while the expert player may never lose. The patterns of play can be similar, but the duration of any one game can vary widely from one session to the next. As a result, I used the taped log of each session to create a script file for every game by each player. The script noted the beginning and end of each discrete turn. In Mortal Kombat, each round of play beginning with the on-screen graphic and voice over
commanding the players to "FIGHT!" was marked on a script as was the end of each round.

For Bubsy, I recorded a mark when the player first moves the on-screen character of Bubsy until that player either reaches the end of the stage or "dies". For Bubsy this signified one turn. In this way I would be able to make comparisons based upon the start and end of game turns. I initially entered these points in real time during the session, but that system did not create accurate scripts. As a result all the game sessions were re-timed and scene files were created manually.

Having control of the game program would greatly assist the researcher in monitoring game events. A software monitoring system between the game and the player that records game movements for later analysis would have been a great asset. Through observation of the video record, it is possible to see the development patterns of play and strategy development style, but without a knowledge of what moves the player is attempting, it is impossible to guess at the development of strategy by looking at the game screen.

For example, if a player is trying to execute a particular move in Mortal Kombat, it would be easy to see that by looking at the sequence of controller buttons. The repetition of a combination of presses would indicate the knowledge of the move, but that the player has not mastered the timing. The researcher could then examine the physiological data at those points. Likewise, successful moves could be charted and examined. A computer log would also give the researcher the ability to map problem solving strategies: Faced with an obstacle what is the first player response? Is that response
repeated across obstacles? What problem solving methods are being employed? Is the player using simple trial and error or something else?

Software monitoring would provide an extra layer of description that would be invaluable in breaking down the design of the game and game events at that point of interface where the game is displaying and the player responding. During the interview segments conducted for this study, the players were asked about strategy development. Many of the responses were along the lines of, "I just press all the buttons and see what happens." (See Appendix 3) As an observer watching their play, it was possible to see they were employing strategy, but they were unable in many cases to articulate that strategy process. Further research in this area would be invaluable to designers of interactive games by more effectively mapping and describing the points of engagement. The automated monitoring could also be used to provide scripts to navigate through the raw ICARUS data.

7.4.2 Sample

One of the challenges in conducting in-depth analyses on subjects is that the ability to study a large sample group becomes impractical. The large amount of data generated by the physiological monitoring, questionnaire and interview tools taxes the ability of the researcher to manage large groups of subjects. Several types of data collection automation would be necessary to enable larger groups of subjects to be studied.

A way of coding the raw ICARUS data into heart rates and galvanic skin response rates would need to be programmed in order to speed the analysis of subject responses. For this study I counted the heart rates and GSR rates by
hand, working directly from the computer screen and printouts. While the process was accurate, it was tedious and time-consuming.

In addition, the architecture of the ICARUS script system would also have to be modified to allow for the use of dynamic stimulus material such as video games. As was mentioned earlier, interactive media pose unique problems because of their dynamic nature. If a researcher wished to discover the response to a particular element of a game, they have no guarantee that the player will even encounter that element in the game. If the researcher controls the software and forces the player to encounter the element, it compromises the player’s choice and the design of the game by changing the way it would appear or be used if discovered by the player.

The final technological step necessary would be to “read” video game controller button presses and log game events such as falls, wins, losses, time played and other elements in order to create an automatic record of game play events. Such modifications would enable a researcher to study large groups very quickly. The use of computer based questionnaires would also speed up the data coding process. These technological improvements would make larger sample groups feasible.

The use of more in-depth profiles of the video game players would help identify outside factors such as parental controls, peer relationships and other cultural factors which may have an impact on the responses and motivation for video game play. Integration of the parents into the interview process could verify attitudes and playing styles of the players.
The study also limited the number of available subjects as the equipment setup required the subjects to come to the lab facility at Simon Fraser University. This made the use of the system in a natural playing environment impossible. The geography of the lab is also such that it is most convenient for subjects who were able to be driven up to the university. Only one of the twenty-five subjects made the trip on public transit, all the other subjects were driven by their parents.

This limiting of subjects may have translated into a lower number of female subjects in the sample. The four girls made up 16% of the total sample. Estimates of video game players place the total number of female players between 10% and 30% of the total video game market\textsuperscript{117}, so the number of female subjects is representative of the overall population. However such a low number of subjects makes conclusions about the differences in motivation and response between gender somewhat more problematic.

7.4.3 Validity

Interpreting a person's physiological reactions to a stimulus can be a vague and imprecise undertaking. Is the person excited, aroused or scared? The researcher must rely on the subject's response in an interview to corroborate the physiological measurements. Such studies have been undertaken, one such example is Albert F. Ax's *The Physiological Differentiation between Fear and Anger in Humans*. In this study Dr. Ax attempts to build a physiological response profile to describe the physiological differences between fear and anger. He concluded that the physiological

\textsuperscript{117} Battelle, John and Bob Johnstone. "Seizing the Next Level", *WIRED* vol. 1.6, 1993. p.130.
response pattern was identifiable, but only when several measures were used. Isolation of single measurements produced no pattern.\(^{118}\)

What this study suggests is that emotional response may be identified as a physiological pattern, but only when the emotions are clearly and carefully defined and induced. This presents a problem if I wish to use the data to identify particular emotions at particular times. With the nature of the subjects and the dynamic speed of the video game, any number of emotions from excitement, to fear, to frustration, or mastery may be encountered in a few seconds. Therefore one must be careful about the conclusions drawn from the physiological data.

Another potential source of error is in the connection and placement of electrodes on the subjects. Since the subjects were children, sometimes the size of their hands and foreheads made placement of the electrodes difficult. In addition, some of the subjects simply sweated too much for the electrodes to stay connected to their skin. Such subjects have missing data on one dimension of physiological measurement for their session. The final technical problem is the potential buildup of electrical current on the skin once the electrodes have been attached makes long sessions of data collection problematic. The researcher must be rigorous in the application and monitoring of the transducers used and the amplification of physiological responses during the sessions.

\(^{118}\) Ax, Albert F. “The Physiological Differentiation between Fear and Anger in Humans,” Psychosomatic Medicine, Vol.15, 1953, pg.442.
7.4.4 Scope

As a methodology, this study only considers two kinds of games. It is very possible that one is measuring the excitement generated by a like or dislike of the game category. Within each category and within each game there are such a variety of game play issues with color, sound, pace, use of character and a number of other factors which make it very difficult to decode and analyze whether the player is responding to an aesthetic coloring, an interactive design, delightful sound or some combination of factors.

The other difficulty with a study such as this is it provides only a snapshot of response. A longer term studies would be able to chart the variation in physiological response with play experience. The Haier study mentioned earlier demonstrated that the possibility of changes in physiological response within the subject are possible over time. Game practice was identified as the factor which demonstrated the ability to change physiological response.

7.5 Physiology and Video Game Play

The ability to use physiological monitoring posed an attractive option for real-time recording of the player's responses to the video game material. The use of physiological monitoring to assess reaction to violent and non-violent television programming has been used for a number of years.

In a study by Cline, Croft and Courrier (1973) the desensitization of children to television violence was examined by measuring subject's Heart Rate and Galvanic Skin Response while alternately watching violent and non-
violent material.¹¹⁹ The study suggested that high-television exposure subjects were found to be significantly less aroused physically and cautiously concluded that a limited but measurable desensitization to filmed violence was apparent.

This study measured single readings of HR and GSR before and after the viewing sessions, so no data was actually collected while watching. However, the use of physiological monitoring equipment showed clear differences in the physiological state of the viewers, and encouraged further refinement of the technique.

Van Egeren (1979) measured the heart rate of male and female players and found the female heart rates accelerated when they lost, while male heart rates accelerated when they won. The study suggests that the nature of rewards the game offers (i.e. points for objects destroyed in the game) appeals to aggressiveness in the player.¹²⁰

In examining this study, one must be careful as to the role of the carotid sinus reflex as mentioned earlier. If one looks at the work of Graham and Clifton (1966) another possible conclusion may be drawn. In their study, Heart-Rate Change as A Component of the Orienting Response, Graham and Clifton concluded that HR deceleration was in response to habituation to the


stimulus and that IIR acceleration reflected a “defense” or “startle” response.121

If one considers this possibility, the reason female heart rates accelerated may have been from their unfamiliarity with the games and the outcomes, whereas the males may have accelerated as they knew the challenges of the games and expected losses and failure as a means of attaining the win in the video game. Therefore males could be more surprised to win at the game.

Winkel, Novak and Hopson (1987) examined the relation between personality characteristics of players and aggressiveness in relation to video game play. They measured heart rates while playing and gave an opportunity for anonymous aggressive behavior during the study. This study attempts to link the physiological arousal with imitative actions shortly after viewing. It is a good example of how difficult it is to create a viable study which attempts to examine the effect of video game play on real lived experience.122

While it was found that content of the video game did not affect the heart rate or postgame aggression, it is important to note two significant areas of concern about the methodology. One is that the contrived research design was so artificial that it would be impossible to conclude much from the results. The other limitation which the researchers point out is that the violence involved was extremely unrealistic and the games were not


commercially popular games but ones created by the researchers on an Apple IIe computer. Designing their own games gave them control, but they likely did not design for the motivations players were bringing to the game. The question of the effect of realism is mentioned as a major unsolved issue in video game play.

Ulrich (1986) examined the stress and relaxation responses of players and watchers of video games using physiological monitoring equipment. It was found that players exhibited physiological signs of stress and self-reported feeling stress while playing. People watching others play showed physiological signs of stress while not reporting feeling stress during the session. This study demonstrates the ability of physiological monitoring to detect differences between the self-reports of the subject watching the video game. It suggests that even though the player does not believe themselves to be involved they are engaging in some form of interaction even though they are not playing.

One of the more exotic monitoring experiments of video game players was conducted by Haier, Siegel, Tang, Abel and Buchsbaum. They employed a PET scanner to measure levels of the Glucose Metabolic Rate (GMR) when first playing Tetris, and then measuring those same levels after several weeks of practice. They found massive consumption of glucose all over the brain when first playing the game, but practice resulted in the reduced, highly efficient consumption of glucose. The study suggested that the learning is a matter of defining efficient pathways in the brain.123

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123 Haier, R., Siegel, B., MacLachlan, A., Soderling, E., Lottenberg, S., Buchsbaum, M. “Regional glucose metabolic changes after learning a complex
Two motivational theories arise from an examination of the Haier et. al. study. One possibility is that the motivation to play involves the initial activity of learning a game, where there is intense glucose consumption all over the brain. Subsequent play can be seen as an attempt to reactivate that wide-spread neural activity. Therefore once a game is mastered, only a new game will provide that same all-over neural activation. The other motivational possibility is that the subsequent efficiency of the brain in managing a complex intellectual task is the motivating factor. Continuation of play is therefore a result of mastery and efficiency.

When related to physiological effects of HR deceleration, video game play may be motivated by the process which begins with massive stimulation of neural activity, heart rate, muscle tension, and skin conductance which is suppressed and controlled as a result of mastering the play complexities. The violent content may then be seen as a factor which stimulates the initial reaction to the material to a high level.

Graybill, Strawniak, Hunter and O'Leary (1987) examined the subsequent effects of playing and observing violent and non-violent games on self-reporting and behavioral measures. In the behavioral measure, the child could help or hurt a child at a remote location by pushing buttons. No differences were found in the aggressiveness of those who played or watched the violent or non-violent games. They concluded that there were no powerful

short-term effects of playing violent video games. One of the factors noted in the study was,

The findings of this study suggest that there may be differences between the effects of television viewing and video game playing. One obvious difference is that while the content of a particular video game may be violent, the graphics are not nearly as realistic as is television violence.\textsuperscript{124}

Again realism of content is mentioned as a factor in the potential effect of video games as a medium.

This review of the relevant studies incorporating physiological measurements into examinations of video game play suggests possible ways to use and interpret physiological data, and also suggests that violence and realism have come to be significant important factors in video game design. However, they also show that one must be very cautious about the conclusions that are drawn from physiological data.

7.6 Sample Size

The sample for this study was a group of 25 subjects consisting of 4 females and 21 males. All subjects contacted me in response to a call for subjects on three local open-line radio talk shows. I was on the radio to discuss video games in general and asked for study participants to contact me by phone. The three talk shows were the Bill Good Show on CKNW on Jan.12,


From the resulting phone calls, I scheduled as many participants as could arrange to come to the Advanced Media Analysis Lab at the School of Communication at Simon Fraser University. Twenty-five subjects were run through the ICARUS session from February - March 1994. Other details of the sample may be found in Appendix III.

7.7 Research Design and Observational Protocols

The decision was made to approximate a standard home playing configuration of two players taking turns. This design allowed the natural creation of viewing and playing situations as the players take turns playing the one-player games and suited the natural design of the video games themselves.

The players were first asked to fill out a pre-test questionnaire, a copy of which may be found in Appendix I. The subjects were then hooked up to the ICARUS system. Once the equipment was functioning and baseline readings had been taken, the video game play began.

I wanted the players to play approximately the same number of game turns between sessions (a minimum of 6 turns in Mortal Kombat and 2 turns in Bubsy of at least a minute). Sometimes the players were allowed to complete a greater number of games in order to achieve usable samples, (some players had game durations of three seconds or less). While the total length of
any given ICARUS monitoring session varied somewhat, the play sessions lasted approximately 10 minutes.

Deciding how long to let the players play was a delicate matter and shows the complexity an interactive game introduces into the research project. The stimulus material presented is dependent upon the subject. Their skills and knowledge of the game they are playing become critical factors in what material is presented on the screen. It was possible for the player to never advance in the game being played.

Once the players had finished playing and watching the video games, they were separated and interviewed according to the interview protocol given in Appendix II. The interviews were videotaped for later analysis and review. After the interview, the subjects were allowed to leave. The entire process took between 45 minutes and one hour for two subjects.

7.7.1 ICARUS Implementation

The technical set-up of ICARUS is as follows: Subjects are connected to the bio-amplifiers by a number of transducers attached to the skin. The outputs of the bio-amplifiers are fed to a A/D converter which feeds data to ICARUS. Real time records of the physiological output are saved to data files while a composite picture of the Subjects, the Physiological Output and the Video Game Screen are displayed and recorded simultaneously on a monitor hooked up to a VCR.
Figure 28: A Block Diagram of the ICARUS System.

Note: The Video Output Screen is the same as the screen-shot presented in Figure 27

One of the problems that had to be solved before the study could be undertaken involved the electrodes used. The electrodes which connect the subject to the monitoring equipment proved to be time-consuming to apply to the subject. After each application, the electrodes must be sterilized before application to another subject. Since there is also a limited amount of time that the electrodes may give accurate readings on the subjects, lengthy hook-ups procedures introduce potential monitoring errors. Also the re-application of an electrode if necessary is too long a process. The final concern was the
attention span of the subjects to patiently wait through a long hook-up process.

I therefore undertook a review of other potential transducers for subject hook-up. I found a disposable electrode which would greatly decrease hook-up time and ensure sterile conditions for the subjects as no electrodes would be shared. Other more sturdy heart rate monitors were not implemented as they would require the children to place the transducer across the chest and it was deemed too intrusive for parental approval. The issue of sharing the transducer was also a factor in staying with the current ICARUS heart rate monitor.

7.8 Stimulus Material

The two games selected for the study were BUBSY: in claws encounters of the furred kind and Mortal Kombat. The games are both considered to be in the action category of gaming, one of the more popular categories. For this study I wanted games which were clearly on opposite ends on the violence scale while maintaining a level of graphic quality, sound design and gameplay. Game choice is critical as you do not want to be measuring that a game simply has no appeal for the subject. Both games should share aspects of quality which make them both desirable to play while differing in content.

The reasons for picking these two games were as follows:
1) Both games fall under the same category-classification.
2) One game is primarily concerned with violence, while the other is more playful.
3) Both have achieved a level of commercial success on several platforms.

It is important to keep both test games in the same category as players tend to play games within a single category. As such, if a player does not like action games, they will likely not respond well to either. If I used a cross category design, for example a puzzle game vs. an action game, I would likely be testing response between categories and the violent/non-violent condition could become violent/puzzle condition. Any conclusions about the response to the violent content could potentially be a cross-category difference were there is no connection to violent content.

The most difficult problem was finding a game completely cleansed of all violence. A strict definition of violent acts could include Bubsy's "pounce" move as violent, but there was a clear distinction of violent content between the two games. Informal discussion with parents during the contact phase of the study confirmed that the parents had little concern about violent content in Bubsy. Therefore I felt that Bubsy was as non-violent a selection as was available that still had quality play value.

I wanted both games to be commercially developed and successful in the market so I would be testing reactions to popular stimulus material that players are likely to encounter in natural play settings.
7.8.1 Bubsy: claws encounters of the furred kind.

Bubsy was designed as a marketable character. The focus of the game is to incorporate a more lively character into a standard gaming form which has proven very popular.

Accolade believes Bubsy is a real, living, breathing bobcat personality. In addition to the game, Charlotte Taylor Skeel, Director of Licensing, hopes to license other companies to produce merchandise based on Bubsy, including comics, lunch boxes, apparel, gum and a TV cartoon show! To make Bubsy more recognizable, Accolade created a Bubsy costume and hopes to send the cat to events around the country.\(^\text{125}\)

The game manual uses a comic book style, which emphasizes the personality of Bubsy, working it through the instructions (see Figure 29).

The backstory of the game is that an alien race called the "Woolies" are scouring the galaxy, pillaging other worlds in search of balls of yarn. While plundering Earth of its wool supply, they accidentally also vacuum up the hero of the game Bubsy, and subsequently eject him onto a strange planet. The player is therefore given the task of guiding Bubsy through the various landscapes, collecting balls of yarn and dispatching Woolies by pouncing on their heads.

The game uses several devices to move it beyond previous side scrolling games. The background has a vertical as well as horizontal component. (see figure below) This gives the player the option of quickly finishing the level or spending a great deal of time exploring it. There are many more options for choosing a path in any given level than earlier side scrolling games.

The range of character movements are given a great deal of attention in the design of *Bubsy*. In addition to necessary character animation (running and jumping), *Bubsy* is given a number of cartoon-like character animations. When *Bubsy* is at the edge of a platform, he will move as though he was about to fall off, he also exclaims "Whoa!". Other details are the Bugging out of his eyes as he falls off a large height, and a variety of "deaths" reminiscent of Bugs Bunny cartoons, *Bubsy* is flattened like a pancake, popped like a balloon, or puts on a Navy cap as he sinks into the water.

**Figure 31: Various Pictures of Bubsy in Action**

---


The resulting effect is a visual look more like a cartoon than a video game. The character reacts to his environment and the obstacles he encounters. The overall tone of the game is light and playful with an emphasis on humor and exploration. Most of the Woolies are stationary, sticking out their tongues and giving Bubsy the raspberry. Even the violent elements of the game are de-emphasized as Bubsy “pounces” (jumps on) the Woolies and they simply disappear. Bubsy has no weapons, nothing to shoot or throw which emphasizes movement of the character instead of firepower.

**Figure 32: Bubsy Navigating the Play Area**

---

7.8.2 Mortal Kombat.

*Mortal Kombat* is also a game in the action category. The first martial-arts style fighting games appeared on home computers in the mid-eighties. Variants have occurred on various platforms ever since. The first blockbuster sales of a fighting game on a video game cartridge came with the World Wide Federation (WWF's) successful television wrestling shows which made their way onto the first Nintendo system, the *NES* (Nintendo Entertainment System). The arcade game *Street Fighter II* (there was no *Street Fighter I*) was phenomenally successful in the early nineties both in the arcade and on both Sega and Nintendo home systems. Following the success of *Street Fighter II (SFII)*, *Mortal Kombat (MK)* was introduced into the arcade.

*Mortal Kombat* took the realism and violence of the *SFII* and other fighting games to a new level. Instead of creating computer graphics for the character animation, the creators of *MK* shot video tape of actors and actresses and digitized the footage into computer animations of the characters. This process of rotoscoping was popularized by Walt Disney in the creation of realistic animations at a lower cost. The resulting movements of the characters have a fluid feel that makes them look quite smooth and realistic.

The game play is straightforward. Two players face each other on a scrolling background. Each player is able to Jump, Duck, Block, Move Left or Right and can punch or kick at various intensities (i.e. Hard Punch, Light Kick.
etc.). The players fight for 90 seconds or until their energy has depleted. The person who wins 2 out of 3 fights moves up on the "Battle Plan".

The artists also introduced a bloody element to the hand to hand combat. In addition to the punches, kicks, blocks and other moves, the action is punctuated by bloody splatterings. The game element which caused the most controversy was the "Fatality". At a point in the contest, the player who is losing may drop down in their energy level far enough to lose the game, but not far enough to fall down. At this point in the game the words "FINISH HIM" (or "FINISH HER") appear along with a commanding voice instructing the player to "FINISH HIM" or ("FINISH HER"). If the player hits the correct sequence of moves, their player will "finish" off their opponent in a particularly gruesome fashion such as tearing limbs off, removing a spinal cord whole or burning the opponent to a skeleton. In the Nintendo version used in this study, Nintendo changed the term "Fatality" to "Finishing Move" and removed all the bloody endings.

Figure 34: The Battle Plan for *Mortal Kombat*\(^{131}\)

\[\text{BATTLE PLAN}\]

- Shang Tsung
- Goro
- Endurance 3
- Endurance 2
- Endurance 1
- Mirror Match
- Cage
- Kano
- Rayden
- Liu Kang
- Sub-Zero
- Sonya

---

Figure 35: Sonya Executing a Finishing Move in the SNES Version of *Mortal Kombat.*

Figure 36: Rayden executing a finishing move in the SNES version of *Mortal Kombat.*

This turned out to be an important factor when arranging for subjects to be tested, as parents were concerned about their children playing the more

---


violent version of the game. Some parents were only willing to let their children participate when told that their kids would be playing the "sanitized" game.

### 7.9 Data Structure

The most difficult element of the research was how to code and describe what was happening in the data. For each subject there are three continuous data streams for each of the EMG, GSR and HR. For each pair, there is a unique flow of game events. These two must be combined in order to map what activations are happening at what time.

Since all the subjects readings are of a different magnitude and duration, direct on-screen comparisons are difficult to execute from within the ICARUS program. I therefore printed out all the charts of all the subjects and employed a color coding scheme to identify playing and watching as well as the beginning and end of each turn. As such, I could see all the data at once, and sort by subject, game or type of response recording (EMG, GSR, HR). It then became possible to look for patterns and design a sampling strategy to codify the raw data into a manageable form.

For each player I had three game turns for each of the violent and non-violent game in the playing and watching condition. For each turn, I was able to measure the three responses. All the potential data points are described in the following figure:
The data for the EMG readings were not coded as measurements between subjects showed little change or pattern. Another problem was that there was evidence of potential monitoring errors on a number of subjects. It was hoped that the EMG would have given a measurement of muscle tension on the forehead which would may correlate with concentration. However, this measurement proved difficult to codify. This result mirrors earlier tests of the
EMG response to television material, and that measure will likely not be used in future ICARUS implementations.

To create a more manageable data set I created the following coding methodology using eight variables for each subject. The values of the raw data were entered for each condition. It became apparent from the data that the coding scheme should include the following elements, for each type of response (GSR, HR) there are four possible conditions: subject playing violent game, subject watching violent game, subject playing non-violent game and subject watching non-violent game. The primary unit of analysis becomes the game segment (start, play, end). As such, the final coding may be represented as follows:

GSR= Galvanic Skin Response
HR= Heart Rate
V=Violent Playing
VW=Violent Watching
N=Non-Violent Playing
NW=Non-Violent Watching

<table>
<thead>
<tr>
<th>Variable:</th>
<th>Value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSRV</td>
<td># of GSR &quot;spikes&quot;</td>
</tr>
<tr>
<td>GSRVW</td>
<td># of GSR &quot;spikes&quot;</td>
</tr>
<tr>
<td>GSRN</td>
<td># of GSR &quot;spikes&quot;</td>
</tr>
<tr>
<td>GSRNW</td>
<td># of GSR &quot;spikes&quot;</td>
</tr>
<tr>
<td>HRV</td>
<td>% change in heart rate</td>
</tr>
<tr>
<td>HRVW</td>
<td>% change in heart rate</td>
</tr>
</tbody>
</table>
For each subject these eight variables would be replicated three times, once for each of the violent/non-violent conditions for the three game turns. The resulting physiological data had twenty-four data measurements as well as the resting heart rate.
Chapter VIII: Analysis

8.1 Pre-Game Questionnaire & Post-Test Interview Results.

The sample of subjects participating in this study was comprised of a group of 25 children (21 males and 4 females) ranging in ages from 9-17 years old with a mean age of 12.4 years. The mean age for female subjects was 10.3 years old, while the mean age for male subjects was 12.8 years old.

Throughout the results, the primary difference between the subjects' oral and physiological responses was gender. Time and time again, it was the primary significant predictive factor. For example, gender was significantly correlated with character selection in *Mortal Kombat*. One of the interview questions was “How do you choose characters in *Mortal Kombat*?” The female subjects responded as follows:

**Figure 38: Character Selection in *Mortal Kombat*.**

<table>
<thead>
<tr>
<th>Female Subjects</th>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Look</td>
<td>1</td>
<td>3</td>
<td>75.0</td>
<td>75.0</td>
<td>75.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Know secret moves</td>
<td>2</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valid cases</td>
<td>4</td>
<td>Missing cases</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Male Subjects</th>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Look</td>
<td>1</td>
<td>2</td>
<td>9.5</td>
<td>11.1</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Know secret moves</td>
<td>2</td>
<td>9</td>
<td>42.9</td>
<td>50.0</td>
<td>61.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Who you can win with</td>
<td>3</td>
<td>5</td>
<td>23.8</td>
<td>27.8</td>
<td>88.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Know gross moves</td>
<td>4</td>
<td>1</td>
<td>4.8</td>
<td>5.6</td>
<td>94.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They’re all the same</td>
<td>5</td>
<td>1</td>
<td>4.8</td>
<td>5.6</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>99</td>
<td>3</td>
<td>14.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valid cases</td>
<td>18</td>
<td>Missing cases</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For female players, the look of the character was the predominant factor in choosing a player. The male players mention the look of the character much less. This difference could be due to the differing levels of experience between male and female subjects, as the more advanced players may be more familiar with the game play dynamic. However the two experienced female players both chose “Look” and the two male subjects who chose “Look” were also adept players, so even experience may not be a factor.

There were other interesting features of the sample group when their answers to the interview and questionnaire questions were correlated. (For correlation data please see Appendix I). The game reported as the subject’s favorite correlated significantly with the subject’s gender, skill at Mortal Kombat and their attitude about video game ratings. It would appear that subjects whose favorite games are of the fighting-game genre are also male, MK experts and think video game ratings will do little about the content of violent games. In contrast the players whose favorite games are puzzle or adventure games tend to be female, occasional MK players and think video game ratings are a good idea to control violent content in video games.

Another interesting correlation was the response to “Does violence make video games better?”. The answer correlated to a preference for Mortal Kombat over Bubsy, and to a higher frequency of overall video game play. Only male subjects answered “yes” to this question and they tended to prefer Mortal Kombat and play video games more often.

The subject preferences for games by gender and general attitudes to video games fit within norms reported in the video game industry and
support the accepted (if stereotypical) views of male and female attitudes and preferences in video game play.

8.2 ICARUS Physiological Results.

In the physiological responses to video game play the differences between playing and watching video games were found to be significant. Again, there were differences between gender in the physiological response to video game playing and watching. It is important to note that there were no significant differences between male and female subjects at rest, as the average rate for both was approximately 77bpm. As we will see in the data, the rates between gender will vary.

**Figure 39: Comparison of Resting Heart Rate Means.**

<table>
<thead>
<tr>
<th>Value</th>
<th>Label</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Sum of Sq</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>77.1429</td>
<td>8.8673</td>
<td>1572.5714</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>77.5000</td>
<td>12.1244</td>
<td>441.0000</td>
<td>4</td>
</tr>
</tbody>
</table>

Within Groups Total
77.2000 9.3566 2013.5714 25

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>.4286</td>
<td>1</td>
<td>.4286</td>
<td>.0049</td>
<td>.9448</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2013.5714</td>
<td>23</td>
<td>87.5466</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note there is no resting GSR rate. The GSR in this case is a measurement of surprise or excitation response to some stimulus, therefore if one is not being surprised there would be no GSR reading. The EMG readings are not included as they were not coded (See 7.9 Data Structure for explanation).
8.2.1 Heart Rate Playing vs. Watching Violent Game.

Figure 40:

Heartrate
While Playing vs. Watching
Mortal Kombat

Figure 41:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of pairs</th>
<th>Corr</th>
<th>2-tail Sig</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHRAVP Average HR playing MK</td>
<td>24</td>
<td>.390</td>
<td>.060</td>
<td>126.1250</td>
<td>22.051</td>
<td>4.501</td>
</tr>
<tr>
<td>VHRAVW Average HR watch MK</td>
<td></td>
<td></td>
<td></td>
<td>93.4861</td>
<td>20.637</td>
<td>4.212</td>
</tr>
</tbody>
</table>

Paired Differences

Mean       SD       SE of Mean  t-value  df  2-tail Sig
32.6389     23.608   4.819       6.77      23  .000
95% CI (22.668, 42.610)

When examining physiological response, this first measure suggests that watching the violent game, and the intensity of experience is greater for female subjects.
As the t-test demonstrates, there is a significant difference between the mean heart rates between playing and watching for all subjects. When the cases are broken down between male and female subjects we see that there are also significant relationships. The female mean heart rate watching *MK* is 135bpm while the male mean heart rate watching *MK* is 87bpm.

**Figure 42:**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Value Label</th>
<th>Gender</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Sum of Sq</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHRAVP</td>
<td>1</td>
<td>Male</td>
<td>121.1746</td>
<td>17.6470</td>
<td>6228.3598</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Female</td>
<td>157.5833</td>
<td>17.8955</td>
<td>960.7500</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td></td>
<td>127.0000</td>
<td>17.6796</td>
<td>7189.1098</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4454.0013</td>
<td>1</td>
<td>4454.0013</td>
<td>14.2496</td>
<td>.0010</td>
</tr>
<tr>
<td>Within Groups</td>
<td>7189.1098</td>
<td>23</td>
<td>312.5700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Value Label</th>
<th>Gender</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Sum of Sq</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHRAVW</td>
<td>1</td>
<td>Male</td>
<td>87.5397</td>
<td>8.2902</td>
<td>1374.5503</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Female</td>
<td>135.1111</td>
<td>35.2142</td>
<td>2480.0741</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td></td>
<td>93.4861</td>
<td>13.2367</td>
<td>3854.6243</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>5940.4821</td>
<td>1</td>
<td>5940.4821</td>
<td>33.9049</td>
<td>.0000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>3854.6243</td>
<td>22</td>
<td>175.2102</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When examining all the other factors such as game skill, number of platforms owned, and favorite game preferences, the differences are not statistically significant in relation to physiological response. This first measure suggests there is quite a difference between playing and watching the violent game, and the intensity of experience is greater for female subjects.
8.2.2 Heart Rate Playing vs. Watching Non-Violent Game.

Figure 43:

Heartrate
While Playing vs. Watching Bubsy

Figure 44:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of pairs</th>
<th>2-tail</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average HR playing Bubsy</td>
<td>24</td>
<td></td>
<td>105.6389</td>
<td>22.863</td>
<td>4.667</td>
</tr>
<tr>
<td>Average HR watching Bubsy</td>
<td></td>
<td></td>
<td>94.7083</td>
<td>21.966</td>
<td>4.484</td>
</tr>
</tbody>
</table>

Paired Differences

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
<th>t-value</th>
<th>df</th>
<th>2-tail Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.9306</td>
<td>22.846</td>
<td>4.663</td>
<td>2.34</td>
<td>23</td>
<td>.028</td>
</tr>
</tbody>
</table>

95% CI (1.281, 20.580)
As this chart demonstrates, for the heart rate response there is again a significant difference between playing and watching the non-violent video game. There is a physiological response to simply watching another person play the video game, the average resting heart rate for both gender groups was approximately 77 bpm while watching another person play the mean heart rate increased to 94 for Bubsy and 93bpm for Mortal Kombat. Again there were differences between gender in the intensity of these responses, however this time the difference between males and females is only found in the watching condition.

**Figure 45:**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Average HR watching Bubsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>By levels of</td>
<td></td>
</tr>
<tr>
<td>NVHRAW</td>
<td>GENDER</td>
</tr>
<tr>
<td>Value Label</td>
<td>Mean</td>
</tr>
<tr>
<td>1 Male</td>
<td>90.000</td>
</tr>
<tr>
<td>2 Female</td>
<td>118.2500</td>
</tr>
<tr>
<td><strong>Within Groups Total</strong></td>
<td>94.7083</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2660.2083</td>
<td>1</td>
<td>2660.2083</td>
<td>6.9367</td>
<td>.0152</td>
</tr>
<tr>
<td>Within Groups</td>
<td>8436.9722</td>
<td>22</td>
<td>383.4987</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Average HR playing Bubsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>By levels of</td>
<td></td>
</tr>
<tr>
<td>NVAVHRP</td>
<td>GENDER</td>
</tr>
<tr>
<td>Value Label</td>
<td>Mean</td>
</tr>
<tr>
<td>1 Male</td>
<td>102.3333</td>
</tr>
<tr>
<td>2 Female</td>
<td>120.5833</td>
</tr>
<tr>
<td><strong>Within Groups Total</strong></td>
<td>105.2533</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1119.0900</td>
<td>1</td>
<td>1119.0900</td>
<td>2.3415</td>
<td>.1396</td>
</tr>
<tr>
<td>Within Groups</td>
<td>10992.5278</td>
<td>23</td>
<td>477.9360</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the heart rate response for playing Bubsy, the means for female subjects is higher, but it is not a significant difference. This similarity of heart
rate response when playing *Bubsy* may be a result of the content and design of *Bubsy*. Since the game was less male and violence oriented than the *Mortal Kombat*, it is possible that both groups found it accessible.

### 8.2.3 Heart Rate Playing Violent vs. Non-Violent Game.

**Figure 46:**

Heart rate comparison between playing *Bubsy* and *Mortal Kombat*.

- **Bubsy:** 105 bpm
- **Mortal Kombat:** 127 bpm
When comparing player response between violent and non-violent games, the heart rate measurements indicate a significantly higher level of response to the violent game. One possible explanation is the violent content of the game. Another possibility relates to the design of Mortal Kombat. When a player plays MK, the computer controls the pace of the game. There is no opportunity to pause the game between bouts of fighting. In Bubsy, the player is able to pause or even simply stop moving without danger of the game ending. The player who hesitates in Mortal Kombat, finds their game over within seconds. This difference in pacing where Mortal Kombat compels the player to maintain the frenetic pace could be translating into this different response.

Since there is such a big difference between playing and watching response, it is likely that the design of the interaction where Mortal Kombat insists you play and attend to the game every second is playing a larger role in response than the violent content. The watcher is viewing and experiencing the same visual and audio stimulus, but they are not responding as dramatically. Therefore it is likely that the design of interactivity is playing a primary role in response.
8.2.4 Heart Rate Watching Violent vs. Non-Violent Game.

**Figure 48:**

Heart Rate Watching
Bubsy vs. Watching
Mortal Kombat

**Figure 49:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Pairs</th>
<th>Corr</th>
<th>2-tail Sig</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVHRAW</td>
<td>Average HR watching Bubsy</td>
<td>23</td>
<td>.860</td>
<td>94.6812</td>
<td>22.459</td>
<td>.000</td>
</tr>
<tr>
<td>VHRAVW</td>
<td>Average HR watch MK</td>
<td></td>
<td></td>
<td>93.1449</td>
<td>21.031</td>
<td>4.385</td>
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</table>

Paired Differences

<table>
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<tr>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
<th>t-value</th>
<th>df</th>
<th>2-tail Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5362</td>
<td>11.607</td>
<td>2.420</td>
<td>.63</td>
<td>22</td>
<td>.532</td>
</tr>
</tbody>
</table>

95% CI (-3.484, 6.557)
The level of heart rate activity for watching a video game is very nearly equal, 93 bpm for watching *MK* and 94 bpm for watching *Bubsy*. In the watching dimension the female responses are significantly higher (refer to Figures 5 & 8). The equality of the response suggests that the experience of watching a game is similar for many types of games regardless of content. The interactive dimension seems to be the area in which different levels of response are measured.
8.2.5 Galvanic Skin Response Playing vs. Watching Violent Game.

Figure 50:

GSR Playing Mortal Kombat vs. Watching Mortal Kombat

Figure 51:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of pairs</th>
<th>Corr</th>
<th>2-tail Sig</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAVMKP Average GSR playing MK</td>
<td>23</td>
<td>.448</td>
<td>.032</td>
<td>.2995</td>
<td>.128</td>
<td>.027</td>
</tr>
<tr>
<td>GAVMKW Average GSR watching MK</td>
<td></td>
<td></td>
<td></td>
<td>.0475</td>
<td>.058</td>
<td>.012</td>
</tr>
</tbody>
</table>

Paired Differences

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
<th>t-value</th>
<th>df</th>
<th>2-tail Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>.2521</td>
<td>.115</td>
<td>.024</td>
<td>10.53</td>
<td>22</td>
<td>.000</td>
</tr>
</tbody>
</table>

95% CI (.202, .302)
The GSR readings reflect the heart rate readings in terms of direction and intensity of reaction to play. Playing Mortal Kombat provides an extreme response on the GSR readings while watching another play produces a nominal effect. In terms of differences in readings between gender, the GSR readings are not significantly different except for the watching Mortal Kombat condition, where female readings are again of a greater intensity.

**Figure 52:**

<table>
<thead>
<tr>
<th>Value</th>
<th>Label</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Sum of Sq</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>.0354</td>
<td>.0494</td>
<td>.0439</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>.1047</td>
<td>.0699</td>
<td>.0147</td>
<td>4</td>
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</table>

<table>
<thead>
<tr>
<th>Source</th>
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<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>.0158</td>
<td>1</td>
<td>.0158</td>
<td>5.6834</td>
<td>.0266</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.0585</td>
<td>21</td>
<td>.0028</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Dependent Variable: GAVMKW
By levels of: GENDER

Average GSR watching MK
Gender

Within Groups Total

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std Dev</th>
<th>Sum of Sq</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.0475</td>
<td>.0528</td>
<td>.0585</td>
<td>23</td>
</tr>
</tbody>
</table>
8.2.6 Galvanic Skin Response Playing vs. Watching Non-Violent Game.

Figure 53:

![Graph showing GSR Playing Bubsy vs. Watching Bubsy](image)

Figure 54:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of pairs</th>
<th>2-tail Corr</th>
<th>Sig</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAVBP Average GSR playing Bubsy</td>
<td>22</td>
<td>.134</td>
<td>.552</td>
<td>.1817</td>
<td>.121</td>
<td>.026</td>
</tr>
<tr>
<td>GAVBW Average GSR watching Bubsy</td>
<td></td>
<td></td>
<td></td>
<td>.0562</td>
<td>.054</td>
<td>.012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
<th>t-value</th>
<th>df</th>
<th>2-tail Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.1255</td>
<td>.126</td>
<td>.027</td>
<td>4.67</td>
<td>21</td>
<td>.000</td>
</tr>
<tr>
<td>95% CI (.070, .181)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

183
The GSR reflects the heart rate response of the subjects to playing and watching Bubsy. There is a significant difference in arousal brought about by interacting with the game.

8.2.7 Galvanic Skin Response Playing Violent vs. Non-Violent Game.

Figure 55:
The GSR readings for the difference between the violent and non-violent conditions are heavily weighted in favor of Mortal Kombat. MK provides an intensity of experience that reflects in both heart rate and GSR in an extremely dramatic way. It is clear that the game is highly physiologically involving and arousing, and that arousal is not simply a matter of the visual images and audio sounds which are presented on the screen (or else watching and playing measures would not be so widely apart). The game design and interactivity are clearly the primary factor. However it is not clear whether it is the interaction with violence that explains the higher readings than playing Bubsy, or some other factor such as the pace and speed of the game. In future research this question will have to be addressed.
8.2.8 Galvanic Skin Response Watching Violent vs. Non-Violent Game.

Figure 57:

GSR Watching Bubsy vs. Watching Mortal Kombat

Figure 58:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of pairs</th>
<th>Corr</th>
<th>Sig</th>
<th>2-tail Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAVEW Average GSR watching Bubsy</td>
<td>22</td>
<td>.317</td>
<td>.150</td>
<td>.054</td>
<td>.012</td>
<td></td>
</tr>
<tr>
<td>GAVMKW Average GSR watching MK</td>
<td>22</td>
<td>.156</td>
<td>.12</td>
<td>.059</td>
<td>.013</td>
<td></td>
</tr>
</tbody>
</table>

Paired Differences

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
<th>t-value</th>
<th>df</th>
<th>2-tail Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>.0075</td>
<td>.067</td>
<td>.014</td>
<td>.53</td>
<td>21</td>
<td>.603</td>
</tr>
</tbody>
</table>

95% CI (-.022, .037)
Again, the GSR readings reflect a generally low response to the activity of simply watching the video game. There is a response to the stimulus of watching a game but it is not different between games or in level of response.

8.3 Conclusions.

8.3.1 Differences Between Gender

While one must be extremely cautious about generalizing with such a low sample number, this study demonstrates potentially different physiological response to video games between male and female subjects. Throughout the data collected, the differences between males and females consistently appeared. In the physiological data, the heart rate readings were consistently and significantly higher than those of their male counterparts. The GSR readings only reflected a gender difference when watching Mortal Kombat.

The questionnaire and interview process also found differences in tastes between male and female players, but these differences were not related to physiological response. The types of questions asked would have to be refined to provide clearer distinctions between players. It may simply be the case that physiological response to video games is similar regardless of the taste, preference and skill of the video game player.

The role of the differences between male and female players will remain an active area of study. Males and female players consistently express different preferences in video game play, yet reaching that female video game player has been an elusive goal.
8.3.2 Differences Between Playing and Watching

This study clearly shows that video game players are experiencing significantly different levels of excitement and arousal between playing and watching conditions. The equity of the response in both GSR and heart rate for the violent and non-violent video game demonstrate that the watching video game player is not as involved or aroused by the video game imagery and sound as is the player. This would suggest that the content of the video game is secondary to the interactive design of the game.

This finding also suggests why multi-player games are regaining popularity. Many of the games of the late eighties followed an alternating player strategy, where each player takes turns at the same material. Clearly the watchers are having less intense experiences. The other potential reason the one-player game design is less arousing is that the only means of comparison becomes score attained, a goal subjects reported being disinterested in.

In my interviews, subjects expressed their complete disinterest in score as a means of measuring achievement. Score was not a motivating factor to play. Players expressed advancing in levels, solving problems and life left as the primary forms of gauging their progress through a game (See Appendix I). These factors, not score provided motivation and desire to continue playing. Once a player passes all the levels of a game, their interest and motivation to play disappears or is sharply reduced.

The use of scoring mechanisms in video game play is declining. It obviously remains a part of sports simulation, but many of the current
blockbuster video games do not even keep score. The *SNES* game *Donkey Kong Country* does not keep score, but it does tell the player what percentage of the levels they have completed. In the same way *Earthworm Jim* for both the *Sega Genesis* and *SNES* also has no scorekeeping. The player advances through levels until the game is over.

In addition, when asked whether they play video games with friends, 48% responded “sometimes” and 52% responded “usually” (Appendix I). The subjects expressed a general excitement and desire to play with friends whenever possible. The next research step would be to compare the physiological reaction of solitary play to multi-player play. The significant differences in physiological response, in addition to the changing attitudes towards single player gaming point towards a future for multi-player game design where there are no watchers.

**8.3.3 Differences Between Violent and Non-Violent.**

The physiological data points to large differences in the intensity of physiological response to violent games over non-violent games. However, interpreting this finding is a difficult and sensitive undertaking. One potential inference that may be drawn is that the violent content is more demanding of the player and therein lies the increased physiological response.

The violent playfield is one where the player must always remain on guard, any lack of attention will result in the end of a turn. This dynamic of the violent playfield guarantees that violent games will have tighter feedback and interaction with the player. The non-violent game allows for reflection
and thought. The need for a defensive posture at all times is not emphasized as it is in the violent game.

If it is this design which requires constant vigilance by the player, then it would be possible to design non-violent video games which would provoke a similar physiological response. However, if it is the case that the player is internalizing the violent threats, reacting viscerally and physiologically to the direction of a violent theme at them, then only violent games will provide this intense physiological reaction.

I was expecting to find a clear distinction or desensitization to the violent content by the expert players, but was unable to find any simple indication of such an effect. Since players report tiring of video games once they master them, the violence alone is not the factor that maintains a motivation to play. Perhaps the key to desensitization is finding the profile of the heavy video game player and the other elements of play such as challenge. New games (and new opponents) provide new challenges and increase motivations to play.

The violence has proven to be a factor in selling video games to male players (as Sega and Nintendo sales figures for "censored" and "uncensored" video games demonstrated), who are physiologically aroused by playing them. However, female players in this study showed higher levels of physiological arousal, yet the games are less popular with them. Perhaps the answer lies in the relative desire between males and females to achieve those physiological levels of excitation.
Chapter IX:
Summary and Conclusions

The video game has become a prominent part of the daily experience of children in North America and in many other countries. The video game has become a new pattern of play. The growth in popularity of the video game has been intertwined with a growth in the industry as well as an increasing sophistication in game design and game marketing. The history of the video game is a history of deaths and births of generations of video game technology, reborn every few years as faster game machines are produced and marketed. However, in tandem with this technological cycle of obsolescence and new technology there remains a continuous stream of development. The primary male audience and the violent games they enjoy are continually developed, moving from one video game platform to another.

Every time the video game undergoes another technological facelift, video game critiques are also reborn. Arguments and critiques are re-articulated in the light of newer, faster and sometimes more violent gaming experiences. In targeting children and youth through the infiltration of the video game from the arcade into the home, the family becomes the site of struggle for video games. The concerns of other home technologies such as television set the standards for parental concern and involvement with their children's use of these home technologies. As I pointed out in this thesis, the primary concerns parents have about video games will remain: Escape and Fantasy, Social Isolation and Alienation, Addiction and Displacement, Benefits and Learning, and, of course, Violence.
The violent component of video games is unlikely to fall by the way in the near future. As I illustrate in the Chapter IV, the violent characteristic of video games is likely to remain due to structural industry constraints. New game platforms are in development to create even more realistic three-dimensional fighting games patterned on the concept of the *Mortal Kombat* type game. The industry has found a solid money-generating machine in the fighting game. As my study demonstrated, these violent games provide a dramatic focus of excitement for the player.

The questions of whether or not these games socialize kids to accept violence as part of their lived experience will remain hotly contested. However, I believe the issue of what video games teach should remain in a wider context. What the video game primarily socializes kids into is a consumption based model of entertainment. Entertainment becomes a highly-produced experience crafted by technicians and experts to be consumed and discarded. Gone are notions of creating one's own entertainment. Entertainment becomes one more element in a high intensity marketing situation, an exercise in shopping as opposed to an exercise in creativity. Imagination is optional as the world of the video game is one to explore and consume. The development of new and novel forms of video game play becomes subservient to the needs of marketing.

In terms of socializing kids attitudes about violence and sex, it is interesting to consider that the video game is always held up as a shining example of how to reach kids, get their attention and get them learning. Throughout its history it has been linked with an interest in and a gateway to computers. Today, interactive technologies are rushing to get into the
educational context. However when we ask if they teach sexist attitudes or create an atmosphere of violence, the ability of the video game to communicate those values through play becomes contested and debated.

The study demonstrated clear differences between playing the violent game over the non-violent game, and leads one to conclude that there is definitely something in the design of the violent video game that the players find exciting and activating. The study undertaken for this thesis also demonstrated strong differences between playing and watching video games. I believe that future interactive games will emphasize involvement by multiple players as the watching of the game does not provide the intense visceral experience of video game play. The study shows that interactivity clearly changes response to the play material.

Since, players’ reactions to the two different games were almost identical when watching, yet quite different when playing, one is forced to re-examine the role of content in interactive media. This would lead me to believe a re-examination of the role in licensing is coming. If the interactive design is the fundamental force which captures and engages children’s play, the ability to recycle old game designs with new graphics and sound may be a technique of production with a limited life-span. The marketing gets the game into children’s homes, but the interactive design either continues to motivate play or turns kids off altogether.

The puzzle of female non-involvement in video game play will also continue to be an issue. The study suggested that there may be clear differences in the physiological responses of males compared to females.
Previous studies have also shown clear differences between male and female physiological reactions to video game play. It would seem reasonable that males and females interpret their emotional response to physiological reaction differently. As such, much more sensitivity to the goals and motivations for play needs to be employed when designing games for emerging markets.

Further study may help provide clues to what elements of the games are attractive or boring to female players. As the market of young (and some not-so-young) male players becomes saturated and players lose interest, how will companies attract new players and continue to grow? The video game companies will be attempting to address these new potential markets. As the research that I and others demonstrates, the female expectations of video game play are quite distinct from the established male model. How many other aspects of play remain unexplored for a wider variety of both male and female players? The industry is still waiting for the first blockbuster since Tetris to attract a wide female following. Perhaps that will not happen until a non-gendered platform is put on the market, as the social structures around video game play have already been clearly defined as a male dominated arena of play. Currently the PC is the only such “non-gendered” platform and the price difference between a PC and a Sega Genesis or SNES is still considerable.

In conclusion, I feel the answer to concerns about video game play lies in the careful selection and use of all children’s media. Children should not only be presented with choices about media activities, but they must have tools to critically evaluate media. Those tools should not come in the form of Nintendo based rating schemes, but the children should create their own
criteria for evaluation based on an understanding of the entire video game process. Children should know how the games are produced, why certain games are selected, what techniques marketers attempt to use and how players respond to them. With the critical tools of understanding what the video game is, the potential negative impacts are lessened and the opportunity for the diverse varied game play experiences will expand in response to a more video game literate market.

The trajectory of the video game industry seems solidly fixed on a path which articulates notions of play around violent themes and the expert male player. These games and these players are the current engine of the industry as they are the primary revenue base. However, the time has come for the video game industry to broaden its base of consumers. The primary challenge for the industry is the integration of new players into the video game culture as older players move on to other pursuits and entertainments. The successful video game companies of the future will be able to rethink the multiple motivations for video game play and bring the multiple potential markets of new players into the fold.
Appendix I

Participant Questionnaire
Video Game Study

What is your name? ____________________________

How old are you? _____ years

Are you male or female? (please circle one) Male Female

Which video game systems do you own? (Please circle all that apply)

None       Super Nintendo       Sega Genesis        TurboGraphix
IBMcomputer Macintosh            Sega CD              Other

What are your favorite games?

___________________________________________

Rank your favorite type of games from 1 (the best) to 7 (least interesting):

Action____ Adventure / Role Playing____ Puzzle____
Simulation____ Sports____ Racing____ Fighting____

Have you ever played Mortal Kombat before? (please circle all that apply)

Yes on Sega       Yes on SNES       Yes in Arcade       No never played

How good are you at Mortal Kombat? (please circle one)

Expert 1 Play Occasionally 3 Novice 5

Have you ever played Bubsy Before? (please circle one)

YES NO

How good are you at Bubsy? (please circle one)

Expert 1 Play Occasionally 3 Novice 5

How often do you play video games? _______ hours/week
Appendix II

Post-Test Interview Protocol

Of the games you just played which do you like better? Why?
   What was the most exciting point of the game you just played?
How do you choose characters in Mortal Kombat?
What makes a good character?
Are all the fighting games the same?

Why do you like/dislike playing video games?
   What makes a good game?
   (Challenges, identification with on-screen character, speed, graphic detail)
   What makes a bad game?
   Repetition, boring, slow

When does a game get boring/frustrating?
   What makes you stop playing?
   (Mastery, frustration, boredom)

What do you think about violence in video games?
   What do you think of censoring violence?
   Do violent themes make a game better/worse? (How?)

How do you develop strategy?
   Do you watch other players?
   Talk to friends?
   Buy magazines?
   Call play lines?
How do you judge how well you are doing in a game?
Are their little victories?
(ie when you lose do you learn things about your mistakes?)
How do you feel when you lose?
How do you feel when you win?
When do you get the most excited during a game?

What do you think of the game selection available today?
Are their enough games?

Describe an Ad for a video game you saw recently.
What strikes you about the ads for video games?
Do they excite you?
Make you want to try/purchase a video game?
Appendix III
Statistics of the Sample Group

1) Sample Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Mean Age</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>12.4 years</td>
<td>9 - 17 years old.</td>
</tr>
<tr>
<td>(female)</td>
<td>10.3 years</td>
<td>10 - 11 years old (four subjects).</td>
</tr>
<tr>
<td>(male)</td>
<td>12.8 years</td>
<td>9-17 years old (twenty-one subjects).</td>
</tr>
</tbody>
</table>

Valid cases: 25  Missing cases: 0

2) Sample Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Code</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1</td>
<td>21</td>
<td>84.0</td>
<td>84.0</td>
<td>84.0</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>4</td>
<td>16.0</td>
<td>16.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 25  Valid cases: 25  Missing cases: 0

3) Responses to "Have you played Bubsy Before?"

<table>
<thead>
<tr>
<th>Response</th>
<th>Code</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>5</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>20</td>
<td>80.0</td>
<td>80.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 25  Valid cases: 25  Missing cases: 0

Female Subjects:

<table>
<thead>
<tr>
<th>Response</th>
<th>Code</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>2</td>
<td>4</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 4  Valid cases: 4  Missing cases: 0

Male Subjects:

<table>
<thead>
<tr>
<th>Response</th>
<th>Code</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>5</td>
<td>23.8</td>
<td>23.8</td>
<td>23.8</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>16</td>
<td>76.2</td>
<td>76.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 21  Valid cases: 21  Missing cases: 0

199
4) Responses to “Have you played Mortal Kombat Before?”
(Subjects could indicate more than one answer)

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Code</th>
<th>Frequency</th>
<th>Pct. of Responses</th>
<th>Pct. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes on Sega</td>
<td>1</td>
<td>7</td>
<td>16.7</td>
<td>28.0</td>
</tr>
<tr>
<td>Yes on SNES</td>
<td>2</td>
<td>18</td>
<td>42.9</td>
<td>72.0</td>
</tr>
<tr>
<td>Yes in Arcade</td>
<td>3</td>
<td>11</td>
<td>26.2</td>
<td>44.4</td>
</tr>
<tr>
<td>No Never Played</td>
<td>4</td>
<td>5</td>
<td>11.9</td>
<td>20.0</td>
</tr>
<tr>
<td>Yes on Computer</td>
<td>5</td>
<td>1</td>
<td>2.4</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>42</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Valid cases 25  Missing cases 0

**Female Subjects:**

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes in Arcade</td>
<td>3</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>No Never Played</td>
<td>4</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Yes on Computer</td>
<td>5</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
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<td><strong>Total</strong></td>
<td></td>
<td>4</td>
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<td>100.0</td>
<td>100.0</td>
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Valid cases 4  Missing cases 0

**Male Subjects:**

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes on Sega</td>
<td>1</td>
<td>7</td>
<td>33.3</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Yes on SNES</td>
<td>2</td>
<td>11</td>
<td>52.4</td>
<td>52.4</td>
<td>85.7</td>
</tr>
<tr>
<td>No Never Played</td>
<td>4</td>
<td>3</td>
<td>14.3</td>
<td>14.3</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>21</td>
<td></td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Valid cases 21  Missing cases 0
5) Subjects were asked to rate their skill at Bubsy.

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play Occasionally</td>
<td>3</td>
<td>5</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Limited Play</td>
<td>4</td>
<td>1</td>
<td>4.0</td>
<td>4.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Novice</td>
<td>5</td>
<td>19</td>
<td>76.0</td>
<td>76.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>100.0</td>
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</tbody>
</table>

Valid cases 25 Missing cases 0

**Female Subjects:**

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>5</td>
<td>4</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Valid cases 4 Missing cases 0

**Male Subjects:**

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play Occasionally</td>
<td>3</td>
<td>5</td>
<td>23.8</td>
<td>23.8</td>
<td>23.8</td>
</tr>
<tr>
<td>Limited Play</td>
<td>4</td>
<td>1</td>
<td>4.8</td>
<td>4.8</td>
<td>28.6</td>
</tr>
<tr>
<td>Novice</td>
<td>5</td>
<td>15</td>
<td>71.4</td>
<td>71.4</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td></td>
<td></td>
<td>21</td>
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</tr>
</tbody>
</table>

Valid cases 21 Missing cases 0

6) Subjects were asked to rate their skill at Mortal Kombat.

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert</td>
<td>1</td>
<td>3</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
<td>3</td>
<td>12.0</td>
<td>12.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Play Occasionally</td>
<td>3</td>
<td>7</td>
<td>28.0</td>
<td>28.0</td>
<td>52.0</td>
</tr>
<tr>
<td>Limited Play</td>
<td>4</td>
<td>4</td>
<td>16.0</td>
<td>16.0</td>
<td>68.0</td>
</tr>
<tr>
<td>Novice</td>
<td>5</td>
<td>8</td>
<td>32.0</td>
<td>32.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
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<td>100.0</td>
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Valid cases 25 Missing cases 0
Female Subjects:

<table>
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<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play Occasionally</td>
<td>3</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Limited Play</td>
<td>4</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Novice</td>
<td>5</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std err</td>
<td>0.917</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>2.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>3.000</td>
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Valid cases: 4  Missing cases: 0

Male Subjects:

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert</td>
<td>1</td>
<td>3</td>
<td>14.3</td>
<td>14.3</td>
<td>14.3</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
<td>3</td>
<td>14.3</td>
<td>14.3</td>
<td>28.6</td>
</tr>
<tr>
<td>Play Occasionally</td>
<td>3</td>
<td>6</td>
<td>28.6</td>
<td>28.6</td>
<td>57.1</td>
</tr>
<tr>
<td>Limited Play</td>
<td>4</td>
<td>3</td>
<td>14.3</td>
<td>14.3</td>
<td>71.4</td>
</tr>
<tr>
<td>Novice</td>
<td>5</td>
<td>6</td>
<td>28.6</td>
<td>28.6</td>
<td>100.0</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std err</td>
<td>0.917</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>4.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Valid cases: 21  Missing cases: 0

7) Response to “Which game did you prefer playing, Bubsy or Mortal Kombat?”

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortal Kombat</td>
<td>1</td>
<td>14</td>
<td>56.0</td>
<td>56.0</td>
<td>56.0</td>
</tr>
<tr>
<td>Bubsy</td>
<td>2</td>
<td>6</td>
<td>24.0</td>
<td>24.0</td>
<td>80.0</td>
</tr>
<tr>
<td>Neither/Same</td>
<td>3</td>
<td>5</td>
<td>20.0</td>
<td>20.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std err</td>
<td>0.917</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>2.000</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>3.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Valid cases: 25  Missing cases: 0
### Female Subjects:

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortal Kombat</td>
<td>1</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Bubsy</td>
<td>2</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Neither/Same</td>
<td>3</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 4

### Male Subjects:

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortal Kombat</td>
<td>1</td>
<td>13</td>
<td>61.9</td>
<td>61.9</td>
<td>61.9</td>
</tr>
<tr>
<td>Bubsy</td>
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<td>5</td>
<td>23.8</td>
<td>23.8</td>
<td>85.7</td>
</tr>
<tr>
<td>Neither/Same</td>
<td>3</td>
<td>3</td>
<td>14.3</td>
<td>14.3</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 21

### 8) Response to “Why did you prefer one game over the other?”

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>More Challenging</td>
<td>1</td>
<td>6</td>
<td>24.0</td>
<td>26.1</td>
<td>26.1</td>
</tr>
<tr>
<td>Less Violent</td>
<td>2</td>
<td>1</td>
<td>4.0</td>
<td>4.3</td>
<td>30.4</td>
</tr>
<tr>
<td>Easier to Control</td>
<td>3</td>
<td>3</td>
<td>12.0</td>
<td>13.0</td>
<td>43.5</td>
</tr>
<tr>
<td>Humor/Fun</td>
<td>4</td>
<td>4</td>
<td>16.0</td>
<td>17.4</td>
<td>60.9</td>
</tr>
<tr>
<td>More Action</td>
<td>5</td>
<td>9</td>
<td>36.0</td>
<td>39.1</td>
<td>100.0</td>
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<td></td>
<td>99</td>
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<td>8.0</td>
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<td></td>
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Total: 25

### Female Subjects:

<table>
<thead>
<tr>
<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier to Control</td>
<td>3</td>
<td>2</td>
<td>50.0</td>
<td>66.7</td>
<td>66.7</td>
</tr>
<tr>
<td>Humor/Fun</td>
<td>4</td>
<td>1</td>
<td>25.0</td>
<td>33.3</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>99</td>
<td>1</td>
<td>25.0</td>
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</tbody>
</table>

Total: 4

Valid cases: 23

Missing cases: 2
### Male Subjects:

<table>
<thead>
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<th>Value Label</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>More Challenging</td>
<td>1</td>
<td>6</td>
<td>28.6</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Less Violent</td>
<td>2</td>
<td>1</td>
<td>4.8</td>
<td>5.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Easier to Control</td>
<td>3</td>
<td>1</td>
<td>4.8</td>
<td>5.0</td>
<td>40.0</td>
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<tr>
<td>Humor/Fun</td>
<td>4</td>
<td>3</td>
<td>14.3</td>
<td>15.0</td>
<td>55.0</td>
</tr>
<tr>
<td>More Action</td>
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Valid cases 20  Missing cases 1

### 9) Response to “What makes a good game?”

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<td>95.8</td>
</tr>
<tr>
<td>Cartoony/Unrealistic</td>
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<td>100.0</td>
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Valid cases 24  Missing cases 1

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<td>100.0</td>
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Valid cases 3  Missing cases 1
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</tr>
<tr>
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<td>4.8</td>
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<td>14.3</td>
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<td>9.5</td>
<td>95.2</td>
</tr>
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Total cases 21  Missing cases 0

### 10) Response to “What makes a bad game?”

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<td>16.0</td>
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<td>76.0</td>
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<tr>
<td>Too Easy</td>
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<td>5</td>
<td>20.0</td>
<td>20.0</td>
<td>96.0</td>
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Total cases 25  Missing cases 0

### Female Subjects:

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<th>Frequency</th>
<th>Percent</th>
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<th>Cum</th>
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<td>1</td>
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<td>25.0</td>
<td>25.0</td>
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Total cases 4  Missing cases 0

### Male Subjects:

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<tr>
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<td>4</td>
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<td>19.0</td>
<td>71.4</td>
</tr>
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<td>Too Easy</td>
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Total cases 21  Missing cases 0
11) Response to “Do you continue to play a game after you beat it or master it?”

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<th>Cum Percent</th>
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<td>40.0</td>
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<tr>
<td>The same</td>
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<td>20.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Never</td>
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Valid cases 25  Missing cases 0

Female Subjects:

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<th>Cum Percent</th>
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<td>25.0</td>
<td>25.0</td>
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<tr>
<td>The same</td>
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<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>50.0</td>
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<tr>
<td>Never</td>
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Valid cases 4  Missing cases 0

Male Subjects:

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<td>42.9</td>
<td>42.9</td>
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<td>The same</td>
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<td>4</td>
<td>19.0</td>
<td>19.0</td>
<td>61.9</td>
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<tr>
<td>Never</td>
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Valid cases 21  Missing cases 0

12) Response to “How do you choose your character in Mortal Kombat?”

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<th>Cum Percent</th>
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<tr>
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<td>5</td>
<td>20.0</td>
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<td>22.7</td>
</tr>
<tr>
<td>Know secret moves</td>
<td>2</td>
<td>10</td>
<td>40.0</td>
<td>45.5</td>
<td>68.2</td>
</tr>
<tr>
<td>Who you can win with</td>
<td>3</td>
<td>5</td>
<td>20.0</td>
<td>22.7</td>
<td>90.9</td>
</tr>
<tr>
<td>Know gross moves</td>
<td>4</td>
<td>1</td>
<td>4.0</td>
<td>4.5</td>
<td>95.5</td>
</tr>
<tr>
<td>They're all the same</td>
<td>5</td>
<td>1</td>
<td>4.0</td>
<td>4.5</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>99</td>
<td>3</td>
<td>12.0</td>
<td>Missing</td>
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</tr>
<tr>
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Valid cases 22  Missing cases 3
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<th>Cum Percent</th>
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Valid cases 4
Missing cases 0

### Male Subjects:

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<td>50.0</td>
<td>61.1</td>
</tr>
<tr>
<td>Who you can win with</td>
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<td>27.8</td>
<td>88.9</td>
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<tr>
<td>They're all the same</td>
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<td>5.6</td>
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Valid cases 18
Missing cases 3

13) **Listing of all the games indicated by the subjects as "Favorite Games"** (Subjects were asked to list all of their favorite games).

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<th>Pct. of Cases</th>
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<td>NBA Jam</td>
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<td>3</td>
<td>5.2</td>
<td>12.5</td>
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<td>Doom</td>
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<td>1</td>
<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Castle Wolfenstein</td>
<td>4</td>
<td>1</td>
<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Mortal Kombat</td>
<td>5</td>
<td>8</td>
<td>13.8</td>
<td>33.3</td>
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<td>Final Fantasy</td>
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<td>2</td>
<td>3.4</td>
<td>8.3</td>
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<tr>
<td>Carmen Sandiego</td>
<td>7</td>
<td>1</td>
<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Mario Kart</td>
<td>8</td>
<td>1</td>
<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
<td>NHL Hockey 94</td>
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<td>3</td>
<td>5.2</td>
<td>12.5</td>
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<td>World Heros</td>
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<td>1</td>
<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Star Fox</td>
<td>11</td>
<td>2</td>
<td>3.4</td>
<td>8.3</td>
</tr>
<tr>
<td>Blades of Steel</td>
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<td>1</td>
<td>1.7</td>
<td>4.2</td>
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<td>4</td>
<td>6.9</td>
<td>16.7</td>
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<td>Super Contra</td>
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<td>1.7</td>
<td>4.2</td>
</tr>
<tr>
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<td>3</td>
<td>5.2</td>
<td>12.5</td>
</tr>
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<td>Battletoads</td>
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<td>1</td>
<td>1.7</td>
<td>4.2</td>
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<td>1.7</td>
<td>4.2</td>
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<td>1.7</td>
<td>4.2</td>
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<td>Other</td>
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<td>22.4</td>
<td>54.2</td>
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<td>Tetris</td>
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<td>3</td>
<td>5.2</td>
<td>12.5</td>
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Valid cases 24
Missing cases 1
**14) Listing of all platforms owned by the subjects. (multiple response)**

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<th>Pct. of Cases</th>
</tr>
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<tbody>
<tr>
<td>Super Nintendo</td>
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<td>13</td>
<td>33.0</td>
<td>54.2</td>
</tr>
<tr>
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<td>5</td>
<td>12.8</td>
<td>20.8</td>
</tr>
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<td>TurboGraphix</td>
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<td>2.6</td>
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<td>Nintendo 8-bit</td>
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<td>1</td>
<td>2.6</td>
<td>4.2</td>
</tr>
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<td>Gameboy</td>
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<td>2</td>
<td>5.1</td>
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<td>other</td>
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</tbody>
</table>

Valid cases 24  Missing cases 1

**15) How often subjects play video games (hrs/week).**

<table>
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<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
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Mean 4.340  Std dev 4.074  Variance 16.598
Range 19.000  Minimum 1.000  Maximum 20.000

Valid cases 25  Missing cases 0

**Female Subjects:**

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Mean 2.125  Std err .657  Std dev 1.315
Variance 1.729  Range 3.000  Minimum 1.000
Maximum 4.000

Valid cases 4  Missing cases 0
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Validity Statistics:
- Mean: 4.762
- Variance: 18.490
- Maximum: 20.000
- Minimum: 1.000
- Std dev: 4.300
- Std err: 0.938

Valid cases: 21
Missing cases: 0

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#### 16) First place ranking for favorite category of game.

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Valid cases: 23
Missing cases: 2

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#### 17) Second place ranking for favorite category of game.

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<td>Sports</td>
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Valid cases: 23
Missing cases: 2
18) Third place ranking for favorite category of game.

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Valid cases: 23 Missing cases: 2

19) Response to “Do you agree or disagree that video games should be rated?”

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Valid cases: 21 Missing cases: 4

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Valid cases: 4 Missing cases: 0

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Valid cases: 17 Missing cases: 4
20) Response to “How do you know how well you are doing in a game, how do you rate your performance during play?”

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Valid cases 20  
Missing cases 5

**Female Subjects:**

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Valid cases 2  
Missing cases 2

**Male Subjects:**

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Valid cases 18  
Missing cases 3

21) Response to “Do you play video games with friends?”

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Valid cases 25  
Missing cases 0
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Valid cases 4  Missing cases 0

### Male Subjects:

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Valid cases 21  Missing cases 0

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22) **Response to "How do you develop strategy when you play video games?"**

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Valid cases 25  Missing cases 0

### Female Subjects:

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<th>Cum Percent</th>
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Valid cases 4  Missing cases 21

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212
### Male Subjects:

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Total: 21 100.0 100.0

Valid cases 21 Missing cases 0

### 23) Response to "Does Violence Make Video Games Better?"

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Total: 25 100.0 100.0

Valid cases 23 Missing cases 2

### Female Subjects:

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Total: 4 100.0 100.0

Valid cases 4 Missing cases 0

### Male Subjects:

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Total: 21 100.0 100.0

Valid cases 19 Missing cases 2

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References


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