All of Your Base Are Belong to Us?
Shmups as a Source for Better Game Design

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Abstract

This study sought to examine the development of video games between 1987 and 2005 to ascertain, on an emotive level, whether video games have changed in that time. It is the contention of this study to demonstrate that video games have remained largely unchanged, bar graphical and other “aesthetic” updates. Based on this, it is apparent that the emotive traits defining effective video games of the past are still valid in the contemporary market.

Another aspect of the study is to demonstrate that nostalgia is one of the most significant reasons why gamers are drawn to certain types of game purchases. The study contends that gamers are getting older and carrying significant gaming experience, and that nostalgia impacted on their purchasing selections, hence informing game design. To support this aspect of the study, two small survey studies have been created. Disseminated and used in 2004 and 2008 these studies are used to support the main contention of the study and also prove the importance of modes of representation when it comes to the consumption habits of consumers. The findings of this aspect of the study demonstrate a pattern between year of birth, and specific nostalgic preferences of gamers.

The study compares the development of mainstream games to that of the Shmup genre, the longest and most prolific genre of gaming. Shmups, a contraction of the term “Shoot-em-up”, are epitomized by games such as Raiden and Ikaruga, which are top down, third person shooting games with fixed scrolling systems. Shmup games are the most appropriate game genre for this study as they are the only commercial game genre to have changed little on both an aesthetic and mechanical level since their inception.

The study undertakes an extensive literature review in order to determine the emotions most commonly associated with effective game design, and how these types of emotions could be produced within game creation using specific heuristics. These heuristics form the basis of a theoretical framework which is then used to compare the development of Shmups against other forms of commercial gaming from 1987 until 2005.

A series of structuralist, post-structuralist and constructivist theories are utilized throughout the study in combination to support new and emerging models of game analysis. This study aims to create a solid methodological framework that could be...
applied to the analysis of any type of computer and/ or arcade game, regardless of genre.

Findings demonstrate how each of the heuristics needed to be adapted given certain technological and social norms present during a game’s development and subsequent consumption, and that the heuristic sets could not be used in isolation. One of the core variables in this study is identified as being the process of representation. The same emotional responses were at the heart of all effective games, and that these emotional responses could be both implemented and evaluated using a set of specific heuristics. Research findings also demonstrate that specific means of representation provided powerful emotional cues that exploited an end-users sense of familiarity, specifically nostalgia, and that there is a predictable link between birth year and nostalgic peak.
Statement of Authenticity

The original work contained herein is that of Luke McMillan and has not previously been submitted for an award at any other higher education institution. To the best of my knowledge and belief, no material previously published or written by another person has been included except where due referencing is made in the dissertation.

Luke McMillan
Acknowledgements

Without the encouragement from a great many people, this thesis would never have eventuated. In this regard I would like to make special mention of my loving wife, Jessica who has played such a significant role in helping me to see this substantial project through to completion.

I would also like to make special mention of those who showed faith in my decision to conduct research in such a new field: Peter Roennfeldt and Garry Tamlyn. Thanks especially to Garry Tamlyn for your guidance and perspective during the early stages of this document; your contributions allowed me to gain an objective view of the problem.

Dr Donna Weston, without you, this thesis would have never made it across the line. You are one of the hardest working people that I know and without your considerable effort (and patience) this thesis would have been abandoned a long time ago.

I would also like to thank Dawn Riley and Keiran Bartlett, thank you for allowing me so many opportunities to improve my thesis and allowing me the time to grow as an academic.

Professor Patricia Wise deserves special mention as I am sure that had we not crossed paths, I would have never produced anything like this; my sincerest thanks for opening my eyes to a completely new perspective. You have been such an inspiration and my personal benchmark for academic excellence.
Foreword

The title for this study is not a typographical error, but rather one of the most recognized ‘memes’ in gaming. Taken from the English port of Zero Wing for the Sega Megadrive in 1991, “All of your base…” has become synonymous with gaming culture and how the Japanese dominated the console market during the 1980s and 1990s. The phrase is also pertinent to this study. Not only is the phrase derived from the genre of gaming which is the focus of this study, but the era in which it came about also represents the focus on nostalgia contained within. The phrase embodies the time, culture and genre which this study focuses on and as such, is the most apt way of titling it. Further to this, the title of the study is a sign of “thanks” to the many people who are not associated with academia or the commercial side of Shmup development; you have all been an invaluable source of information for the case studies contained within. As such, when it comes to information about Shmups, “all of your base are belong to us.”
Chapter 1: Introduction

Rationale
In the relatively short history of video and computer games, technological change has been a dominating factor. Not only has technology created larger, more aesthetically rich virtual environments, but the continual development of newer and more powerful hardware platforms has also meant that with each and every generation of gaming, the consumer comes to expect more and more of the gaming products that they buy. This juxtaposition of human expectation and technological advancement is cause for research, because although technology may create ways in which human desire can be fulfilled, human desire itself remains an unchanged constant in the equation. One of the areas of human desire yet to be explored in relation to gaming is the concept of nostalgia. As of 2010, there is only a limited body of academic work which deals with how gamers’ past experiences can influence their future purchases with the most notable being from Suominen (2007) and Newman (2004, pp. 165-167). Of these studies, none are yet to deal with the most prolific and long running gaming genre, the Shmup and the potential that it has to create a familiar and nostalgic experience for gamers today. In a commercial landscape that accounts for $19.66 billion U.S. it is more essential than ever to understand the potential that nostalgia might play in driving human desire.

Problem
It is the contention of this study that on a core, emotive level, video and computer games have remained unchanged since their commercial genesis and it is merely the means of representing these core, emotive traits which have changed. This hypothesis stems from two main concerns: firstly, data available for the U.S. market suggests that the average age of gamers is steadily increasing. Secondly, if the average age of gamers is increasing, then this means that gamers who grew up with games are adopting them into their adult lives. As such, there exists the potential for specific targeting of nostalgic emotion which has not yet been researched in industry or academia.

Research Questions
There are two main research questions which drive this research: have computer and video games actually changed at all, other than their representational elements and, what are the potential similarities that all effective games have in common? To investigate
this hypothesis, this study compares the development of video games to the
development of the longest and most unchanged form of gaming: the Shmup, a
contraction of the term “Shoot-em-up”. The Shmup acts as an important, rare constant
in video and computer games. Shmups were at one time the most prolific type of game
being made and consumed, and have changed little from the height of their consumption
aside from minor graphical improvements. While commercial Shmups are still being
made, they do not hold the same notoriety that they once did with the bulk of
mainstream gamers. The most significant reason why Shmups make the ideal basis for a
comparative analysis is that they embody the research question. That is, while they are
still being commercially made in the same style that made them popular, they have lost
the notoriety that originally made them so appealing. While Shmups still embody the
same core emotive traits and are aesthetically quite similar to their early counterparts,
gamers have moved on to other forms of computer gaming entertainment, suggesting
that although human desires may be a constant, we as a species always seek relatable,
albeit contemporary ways to meet these desires. It is for this reason that Shmups provide
the perfect ‘doomsday’ analogy for the games industry: it is a genre which has rehashed
the same concepts and aesthetics that made it popular, thereby causing its own creative
stagnation. The unique context of Shmups therefore provides evidence to support the
research hypothesis. This study will employ Shmups to compare how developments in
gaming technology have changed the desires of gamers. Through an analysis of four
periods of Shmups development, this study will identify the powerful, core emotive
traits that attract consumers to new game purchases.

Objectives
The goals of this study are to prove that despite the significant technological advances
in games, humans still desire the same, core emotive traits. By doing so, these core
emotive traits can be extrapolated and the means of their representation can be
discerned. To achieve this objective, an analysis of over 3,500 arcade and console
games has been undertaken, with specific emphasis placed on around 600 individual
titles. Despite the prevalence and potential importance of the Shmup genre, no study has
explored the genre at any great length.

Specific Objectives
1. Trace the history of Shmups back to their origins in order to develop a logical
timeline for developments in the genre which may have influenced the creation
of other, non-Shmups. This aspect of the study involves the examination of over 3,500 arcade titles. A specific explanation and history of Shmups will be provided in Chapter Two.

2. Explore the process of representation and how this impacts on emotive response and nostalgia.

3. To review all appropriate literature to date that can help explain the specific design heuristics that lead to the creation of effective games and use this as the basis for comparative analysis.

4. Formulate an interdisciplinary approach using these heuristics, which can then be used as the methodological tool-set for the analysis chapter.

5. To compare the development of the Shmup timeline against other forms of popular gaming between the years of 1987 and 2005 and apply the design heuristics to ascertain how core emotive elements have been represented.

6. Identify any elements of representation that may be useful when creating games for an aging demographic of “average” users. To do this, two surveys were devised and disseminated in 2004 and 2008. The findings of these studies will be used in support of the hypothesis.

7. Provide a specific methodology for the analysis of games that is applicable, no matter what game is being analysed.

8. Reflect on the possible future of the Shmup genre.

**Chapter Overview**

Each objective outlined above forms the basis of the chapter structure that this thesis follows. Chapter Two provides the necessary historical context by outlining essential background information about the Shmup genre and specifically looks at the genre’s evolution. The content of this chapter derived from a study of game aesthetics, combined with observations of the games’ mechanical attributes. Adhering to Theodore Adorno’s process of pseudo-individualisation, incremental changes in the genre were traced backwards from Shmups that form the contemporary definition. Some 3,500 arcade games were examined using the Multiple Arcade Machine Emulator (MAME). Specific mechanical and aesthetic markers were noted in a database, which was later used to trace the first instances of specific standardisations. The information entered into this database has also been used throughout the study to graph specific instances of genre standardisations over time. In this regard, Chapter Two forms a significant contribution to the field of game studies and also addresses the first objective of the study.

Chapter Three consists of an overview of the methodology used by this study to help address the thesis point. This chapter looks at existing models of academic game
analysis and presents a methodological framework for the interdisciplinary study of video games, based on holistic overviews of existing methods. Due to the breadth of content covered by this study, Chapter Three aims to present a logical analytical method by providing a set of constants and variables to guide the reader and define the content of the study. In essence, Chapter Three provides a model of how structuralist and post-structuralist methodology can be combined to form a coherent and effective mode of analysis. Further to this, Chapter Three also provides an overview of the empirical component of this study as outlined as part of objective six. The chapter concludes with a literature review concerning the process of representation, placing the concept within the context of gaming. As representation is concerned with the coding of emotion, recurrent themes in desirable emotive response are also discussed. This section of the chapter aims in part to address objective two, however more specific detail is provided as part of the empirical study in Chapter Six. Once representation has been defined and recurrent themes in desirable emotive traits outlined, the means of implementing representation effectively is discussed in Chapter Four.

The Fourth chapter comprises a literature review which contextualises the methodology. Whereas Chapter Three provides an overall framework, Chapter Four introduces the various methodological tool sets that drive this framework. A set of heuristics are introduced in this chapter, which will form the methodological tool set for defining what constitutes an effective game (objectives three & four). These heuristics are derived from a review of a wide body of gaming and non-gaming literature. Each heuristic is firstly discussed individually, and then in relation to how each supports the other, culminating in the interdisciplinary structure as outlined in Chapter Three. Objective Seven is a guiding component of this chapter.

Chapter Five is the main body of this study in which Shmups are compared to their non-Shmup counter-parts. It is by necessity a large chapter due to the volume of material analysed. This chapter is broken down into four smaller sections as outlined in Chapter Three. Each of the four smaller sections is referred to as a “period” and a number of singular games are presented in chronological order and analysed in accordance with the heuristics. Each period is then summarized in relation to each of these heuristics before moving on. The methodological tool sets as presented as part of Chapter Four are utilized throughout this Chapter. This extensive analysis satisfies the fifth objective of this study.
The results of the 2004 and 2008 empirical study into nostalgia and age are presented as part of Chapter Six. Elements of representation which may be useful to promote a sense of nostalgia are discussed in some detail here. This chapter is designed to address the sixth objective of the study, whilst also providing further specific detail for objective two.

Finally, Chapter Seven address how each heuristic has been changed over time to address continuing changes in consumers’ desires for representation and thus addresses the hypothesis of the study. Objective Eight is also discussed in the final pages of this chapter. This chapter utilizes the same methods as outlined in Chapter Three and compares the deviation of Shmups to other contemporary games. A set of findings based on the extensive analysis is presented in this chapter, which provide food for thought for future game analysis.

**Significance of the Study**

There are two main points of concern in the contemporary games market that make this research important: education and an aging demographic of gamers. In addressing the professional relevance of this study, let us first begin with the latter. At the 2009 Game Connect Asia Pacific conference held in Melbourne, GDAA president Mike McNabb stated that “the young farts are getting older” when discussing the evolving landscape of gaming today. What McNabb was getting at is that gamers are bringing with them a wealth of existing knowledge when playing ‘new’ games. One aspect of this existing knowledge is the nostalgic memories that gamers have acquired over the years. “Nostalgia is a powerful force” (Bignell, 2004, p. 165) especially when considering that consumers are more attracted to products which already hold significant positive emotional values. As such, being aware of what might constitute these positive emotional values which form the basis for nostalgia should be a primary consideration for all game developers, targeting the ever aging, ‘average demographic’ of gamers.

According to empirical data ascertained from a decade of Entertainment Software Association reports surveys (The Entertainment Software Association, 2004-2009), the average age of gamers is increasing by six months every two years [Figure 1]. According to the Entertainment Software Association (ESA), which is a North American, games industry organization, the average gamer is the demographic most abundant in comparison to others. The data from 2009 suggests that the average gamer
is 35, male and has been playing games on average for the last twelve years. Gamers, who grew up with computer games, are now adopting them into their adult lives. These “young farts” as McNabb would put it, grew up in a time when Shmups were at the height of their popularity. As Shmups were so prolific during the time when these thirty-five year old “young farts” were growing up, it stands to reason that a study of this genre will expose potentially powerful, nostalgic design traits that can be brought back to sell to these average gamers.

The second area of relevance for this study is the potential that a heuristic based approach to game analysis offers a new generation of game developers, particularly designers currently studying at universities and colleges around the world. Although design can be highly intuitive, the actual results of intuitive designers can be hit and miss. A schism between the methods used by academics and those in industry is also apparent in some instances. One of the most iconic examples of this schism in ‘method’ came from Varney (2007) in his article for the escapist, “Immersion Unexplained: Why Do We Lose Ourselves in Video Games? Don’t Ask A Humanities Professor”. Varney makes some scathing comments regarding the ability of academics to report anything useful about video game analysis. Varney’s analysis of academic work specifically explaining immersion comes to a head when Varney (2007) surmises that “[academics] are playing games of their own design” and that “it's hard to read all this airy palaver
[academic work], this baffleheaded pedantry, without shouting, ‘Get a job.’ Can these detached structuralist and post-structuralist critics help us understand immersion? Could they ever, ever admit becoming immersed themselves, in anything?” According to Varney’s literature review, the answer to this question is a clear “no”. Although Varney makes a strong argument, there is significant merit to academic discourse about video games, especially when it comes to informing new practices in production.

All intuitive designers are able to conceptualize an idea that they might have, but when asked to explain the process that they use to come up with the final product, many cannot provide any logical approach other than giving subjective replies such as “it felt right” etc. There is no denying that these intuitive designers can make some fantastically effective games, however how do you train a student to do these things? The answer lay in over analysing the often, taken-for-granted aspects of gaming such as making a game fun, immersive etc and actually coming up with a methodological toolset that students can follow to achieve these emotive traits in their own games.

This study is geared towards finding the best practices in both research and industry that when linked can take much of the guess work out of game development, especially when it comes to understanding the needs of the end user. The research is also intended for a wider audience including game developers and game design students. Relevance is of primary concern when addressing these three different demographics: industry, research and emerging game designers. Each perspective is crucial to the overall interdisciplinary nature of this industry.
Chapter 2: Defining the Shmup

While contentious, it is widely believed that the first published instance of the word ‘Shmup’ was in Commodore 64 magazine, *Zzap!* Issue 3, July 1985. The word was initially mentioned in the editorial section written by Chris Anderson (1985)

Some things which you may think are slurred comments, but are in fact quite deliberate are a few strange new words scattered round the mag, like ‘Shmup’, ‘aardvark’ and ‘wimp out’. You’ll find a full explanation for all these on the last page of the mag, so don’t panic. (p.5)

As promised, the back of the issue contained a definition of “Shmup”

A Zzap-coined term to replace the long-winded ‘shoot-em-up'. Any game involving stacks of blasting and zapping.

The term Shmup was also used in the review of *Drop Zone* (UK Gold/Arena Graphics, 1985) written by Julian Rignall in the same issue of *Zzap!* Despite *Zzap!* claiming credit for the invention of the term, it is believed contractions of ‘shoot-em-up’ first appeared in Western arcades around 1978, the same time that *Space Invaders* (Taito, 1978) was dominating the arcade market.

By 1985 the Shoot-em-up family tree had spawned many new branches and there was much variation within the genre. Within Western culture, there came a need to classify all of these sub-genres and to this day, Shmups has been the term of choice. Contrarily, in Japan the genre is still known as shooters; it would seem peculiar that a Western magazine specializing in computer games would ultimately dub a Japanese-created arcade game genre. It could be argued that the term ‘Shoot-em-up’ is highly representative of the ‘Country and Western’ mentality of Western gamers. The ‘shoot first, ask questions later’ culture of Western movies and related folklore reflects the machismo and bravado-driven behaviours commonly role-played in popular video games such as *Grand Theft Auto III* (Rockstar, 2002). Alternatively, the more subdued and detached term of ‘shooters’ or ‘STG’ used by the Japanese gaming population suggests a less ‘personal’ approach to playing these games, with less emphasis placed on the successful extermination of an imagined enemy, and with much less pleasure derived from the final act of execution. A parallel exists in karaoke in Japan, where it is

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1 As there is no standardized referencing system for video and computer games, this thesis will use publisher and year information to differentiate different versions of the software. These software references will not be found in the bibliography, other than those Shmups which form the case studies.
2 [http://www.zzap64.co.uk/zzap3/dropzone.html](http://www.zzap64.co.uk/zzap3/dropzone.html)
participation and effort that count, whereas Westerners see karaoke as a kind of talent contest, with a single, ultimate winner. In itself this suggestion poses as problematic when attempting to extract the subtleties and nuances that make for such different and distinct interpretations of the same material. The contrasting titles given to these identical games by these two cultures could be construed as highly suggestive of corresponding, yet diverse, underlying societal mentalities.

Although the term shooter is synonymous with a wide variety of games, Shmups constitute a distinct category within the larger shooter family. In many respects, Shmups are also the genre responsible for the development of contemporary shooting genres such as the ‘First Person Shooter’ (FPS). To distinguish Shmups from the larger body of shooters in general, there are a number of rules which one can use to distinguish a Shmup. The following section defines the Shmup genre based on discourse in contemporary user groups.

**Defining the Rules**

In recent years, Shmups and their genre classification has become a hotly contested topic within the Shmups.com community. As the name implies, Shoot-em-ups are focused on the player destroying overwhelming numbers of enemies, and what distinguishes Shmups from Shoot-em-ups is the way that the player must do this.

Shmups are defined by certain unique elements of game mechanics\(^3\) including aspects of player perspective, the game world, control, objectives and themes. Starting with control, the player takes control of their avatar from a third person perspective. Using the directional controls, the player is able to move freely along X and Y axis of the screen. The Players orientation is fixed to that of the primary scrolling axis [Figure 2].

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\(^3\) Throughout this study, game mechanics refers to the types of rules and systems that a particular game uses. This is used as an alternative to the term more commonly known term, “gameplay”.
The player has no control over the view perspective of the game. The game will scroll automatically along its primary axis of movement at a speed determined by the game, beyond the player’s control. The player observes their craft from a fixed third person perspective, either above or to the side of their ship depending on the type of Shmup.

In most cases, the player’s orientation is fixed so that their craft is facing the primary axis of movement. However the most notable exception to this can be seen in *Zero Gunner* and *Zero Gunner 2*, where the player has the ability to control their ships direction without impacting on scroll speed or direction.

Movement of the player’s craft in Shmups is fixed to X and Y movements primarily. Movement along the Z axis if present is nearly always controlled by the game’s predetermined scrolling. If, however, Z axis movement is controlled by the player it is usually implemented as a button, not as a function of the directional control pad. Aside from directional control, Shmups control schemes must also utilize at least one "shoot" button that controls the player’s primary mode of fire. In terms of multiplayer control, Shmups can only be played co-operatively with a second player. Enemy control is strictly generated by the Shmup program itself without the interaction of a second gamer.

**Objectives**

Shmups also incorporate certain gameplay elements related to the successful completion of the game. Specifically, Shmups are primarily score driven and rely on the player’s ability to exploit the given Shmups “play system” to their advantage. The main objective of a Shmup is to progress through the level in a linear fashion, destroying or
removing enemy craft from the screen by the use of directional control and a primary fire mode. Destruction of enemy craft results in increases to the players score. Clearing the level also results in the continuation of the game to another level, further allowing good players to increase their score at increasing difficulty levels.

**Game AI (Artificial Intelligence)**

A major distinguishing feature of Shmups is the inclusion of a game world that lacks real enemy artificial intelligence. For example, the game world often follows pre-determined patterns and dictates the movement of the game player, rather than reacting to the movements of the game player. Certain exceptions to this exist and can be seen mainly in aimed bullets patterns and certain boss attack strategies. More often than not, Shmups rely on pre-defined, static patterns of enemy movements. Therefore, the player’s ability to finish certain Shmups relies mostly on their own ability to remember the movement and placement of enemies throughout the various levels in a Shmup. The only non-static element in Shmups AI is the movement of bullet patterns. Although some bullet patterns remain unchanged, the majority of bullet movement in Shmups is programmed to home in on the player’s ships at various screen co-ordinates. However, this homing is mostly limited to only single co-ordinates and lacks the ability to constantly home in on the player’s craft.

**What about games that don’t meet all of these criteria?**

As with all types of genre classification there are certain borderline cases that need special consideration in the classification process. In cases such as these it is sometimes easier to look at what elements are totally foreign to Shmups to eliminate certain borderline cases.

- Players cannot have control over Z axis movement.
- The use of a jump button for movement
- The inability to move along the X and Y axis freely with the sole use of the directional pad
- Games where scrolling along the primary axis a) is controlled by the player’s movement, for example *In the Hunt* and b) scrolls freely along all axes.
- The player’s primary mode of fire must not move along the Z axis, for example, *Space Harrier.*
Vertical and Horizontal Shmups

Two commonly used sub categorizations: Vertical Shmups and Horizontal Shmups are further used to define the genre. Both of these sub-categorizations are based on which axis (X or Y) the Shmups background scrolls along. In the former of the two sub categories, Vertical Shmups, the background scrolls from top to bottom along the Y-axis of the screen. Vertical Shmups are played from an above third person perspective as seen below in the screenshot taken from *Ikaruga* (2001) [Figure 3].¹ The orientation of the player’s craft is also bound to the way in which the background scrolls. For instance, in vertical Shmups, the front of the player’s craft is pointed toward the top of the screen; hence to move forwards (along the Y-axis) the player must push up on the directional controller [Figure 4].

In the subcategory of Horizontal Shmups, the background scrolls along the X-Axis of the screen. Horizontal Shmups are played from a side-on third person perspective, similar to looking at a cross-section. In the majority of horizontal Shmups, the

background scrolls from right to left and the front of the players craft faces toward the right of the screen as seen in Figure 5 taken from *Border Down*. Therefore, for the player to move forwards in a horizontal Shmup (along the x-axis), the player must push right on the directional controller (Figure 6).

Depending on whether a Shmup is vertical or horizontal, the screen orientation must be adjusted accordingly. For instance, most Vertical Shmups use a screen orientation ratio known as 3:4 (three is to four). This means that either the screen must be orientated on its side (as a normal television is 4:3) or the game plays with large black borders on a regular 4:3 monitor. However, Horizontal Shmups take advantage of regular screen orientation (4:3) (Figure 7).

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As always, exceptions must be made: some Vertical Shmups use a regular 4:3 screen orientation, although a side effect of this is that player’s visibility along the primary scrolling axis is limited. This feature is mostly saved for home console only Vertical Shmups, as most people did not want to turn their televisions on their side just to play one game.

Despite the encompassing nature of the above two sub categories of Shmups, some games in the genre do not completely conform to the above definitions. For example, some early Shmups such as Viewpoint (1992) scrolled isometrically along the screen. More recently, however, a Shmup by the name of Zero Gunner (1996) gave players the ability to rotate their craft variably through a full 360 degrees. Zero Gunner also introduced a variable scroll axis, therefore combining a number of scrolling techniques – vertical, horizontal and diagonal. Zero Gunner is, however, still classified as a non-orthodox Vertical Shmup, as the player observes the game from an over-head third person perspective. Zero Gunner is however still classified a non-orthodox Vertical Shmup as the player observes the game from an over-head third person perspective.

Shmups such as Ikaruga (2001), Radiant Silvergun (1999), R-Type (1987) and Raiden DX (1994) are zeitgeists of the genre; games which are synonymous with the time and mediums for which they were created. These games are iconic representations of the genre and are testament to how widespread and successful the Shmups genre has been over a prolonged period of time. If Shmups are the constant by which one tests the variables, then the variables therefore need to be identified and tested.
The case study Shmups in the analysis chapter only represent the genre at its height, and subsequently do not cover information that provides a contextual reference for the genre as a whole. Therefore, before moving into the analysis of Period One, a concise overview of the genre’s development will be presented here. This discussion also provides evidence of the importance that familiarity played in the development of the genre. To understand this evolution of gaming, one has to track back through a gaming landscape of nearly 3,500 unique games to expose the genre’s roots. Even the most gaming illiterate reader can immediately make the connection between the above genre definition and one particular zeitgeist game *Space Invaders*, but can the genre be traced back even further, and can the genre be traced back to its para-gaming roots?

This brief overview of the genre provides essential context for the future analysis. The information presented below is not comparative analysis, but rather an overview of the evolution of the Shmups genre. This section of Shmup development will herein be referred to as ‘Proto-Shmups’, as these particular games, although bearing a resemblance to later Shmups, do not follow all of the prescribed Shmup standardizations as presented in the introduction.

**Pre-History of the Shmup Genre the Year of the Invasion**

In 1978 only a handful of arcade games had been publicly released. The consumption and development of arcade games remained outside of the public consciousness for the most part, but there was a growing presence in this market. The home console market was in a similar state, although things weren’t as optimistic on the home front. Even after the arcade success of *Pong* (Atari, 1972), Atari had by no fault of their own set in motion a course of events that would eventually lead to the financial collapse of many companies in 1977. It seemed that the success of *Pong* in the arcades had created a need in the home console market for the game; a need that too many companies were only too happy to fill. *Pong* clones flooded the home console market and by 1977 the market place could not sustain all of the companies keen to cash in on Atari’s success. The result was the financial demise of many of these companies.

Although the home video game market was still kept active by such consoles as the Magnavox Odyssey, the technology behind these machines had been superseded by consumers’ expectations - expectations that the more advanced arcade technologies were promoting. With the advent of the microprocessor first used in *Gun Fight* (1975),
game developers began to create more ambitious games. Graphics, sound and game play elements were all to benefit from new technologies. Combined with the consumer dissatisfaction with the home console market, these two elements led to the beginnings of the arcade’s popularity. However, the mainstream assimilation of video games was yet to come.

Throughout 1977, no less than thirty-six digital arcade games had been released in both Japan and North America, and by 1978 that number had grown again to forty-three games, most of which were released by Atari or Midway. By 1979 that number had doubled to no less than 96 games and by 1980, the number of arcade games had nearly doubled again to 167 releases.

From 1978 to 1981, Midway, Atari, Taito, Data East and Nintendo created some of their very first arcade games, and with the rapid growth of the arcade industry came public awareness. Games like Space Invaders (1978) caused currency shortages and legal battles. PacMan (1980) inspired popular music by Buckner and Garcia called “Pac-Man Fever” and Pac Man went on to become the most recognizable arcade game ever created (Lindsey, 2002). However, it was Space Invaders that planted the seed from which the family tree of Shmups grew.

**Space Invaders**

Although not a Shmup by today’s standards, one of the very first games to initially develop the genre of Shmups is Space Invaders (1978). Space Invaders was first released in 1978 by Taito in Japan, and then later licensed to Midway for release in the United States. The release of Space Invaders in Japan was such a success that it caused a Yen shortage around the country, an event only rectified when the Japanese government quadrupled the production of 100 Yen coins (Bousiges, 2004). Many small grocery stores and markets in Japan got rid of their produce and converted into “Space Invader Parlours” or “Space Invaders Houses” overnight (Bousiges, 2004). The “Thump, Thump, Thump” music of Space Invaders was heard all across Japan as loud speakers belted out the menacing, atonal noise of invading aliens.

Later that same year Space Invaders began its assault on the United States. The game was one of the first to break out of arcades and milk bars and into the consciousness of

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6 Statistics gathered from an empirical analysis of MAME v0.98
non-gamers. The effects of the *Space Invaders* phenomenon was felt so widely and deeply that concerned residents of Mesquite, Texas, took banning the machines to the Supreme Court in order to stop the “illicit machines” from “souring” the minds of their youngsters (Bousiges, 2004).

*Space Invaders* brought two main technical innovations to the world of video games. *Space Invaders* was the first game that could save players high scores, and secondly, it was the first game to have a soundtrack, albeit a menacing, atonal aural assault compromising of few notes and mostly noise. Along with *Space Invaders*’ technical innovation came innovation in the field of game play. *Space Invaders* lay in place the framework for all vertical Shmups to come by introducing three main-game play criteria:

- A fixed overhead third person camera perspective (Figure 8)
- A static player orientation (Figure 9)
- Directional input schemes that allowed movement along one axis

Another feature of *Space Invaders* is that it was the first truly addictive single player game experience. Jørgen Kirksæther (Kirksæther, 2004), in a radio interview with Halvard Jakobsen for the Norwegian radio station NRK had the following to say:

> It took the Japanese to figure out how to make a satisfying single-player game. The key is that you should never be able to win. The Americans could never have created that game, he says, because the idea of a game that can't be won is inconceivable within the American culture. The Samurai codex of the Japanese, on the other hand, allows for the idea of losing with honour, Jørgen says. After Space Invaders, which was a huge success, both the Americans and the Japanese made and are still making popular, unwinnable games.

Toshihiro Nishikado, creator of *Space Invaders* states in a BBC documentary “I Love 1978” that he himself can only get to level three of *Space Invaders* (I Love 1978, 2002).
Although these features had appeared in video and arcade games before, the combination of these elements was something new. *Space Invaders* also brought with it a new theme for video games, probably best surmised in the game’s title and most likely inspired by the large amount of sci-fi films being produced at the time. This theme has carried itself over into countless Shmups, even until this day.

However there is some controversy as to whether Space Invaders was truly an “original” game. Two reputable Internet sources, Zube (2004) and Williams (2004), point out that *Space Invaders* was heavily influenced by a previous Taito game called
Space Monster (1972) [Figure 10].7 Williams (2004) states that “Taitotronic’s Space Invaders was based on the mechanical game Space Monster, released by Taito Trading Co., in 1972”. Despite this, Space Invaders designer Nishikado refutes these claims. Zube (2004) later stated:

(On the other hand,) Toshihiro Nishikado, the designer of Space Invaders, gave an interview in the November 2001 Electronic Gaming Monthly (EGM) and he makes no mention of the game [Space Monster]. David S. J. Hodgson, who interviewed Mr. Nishikado, states that he was “IN NO WAY” (Hodgson’s words) influenced by the game. (para. 4)

Despite this, Nishikado makes two contradictory comments in later interviews. In a BBC documentary about popular culture in 1978 entitled I Love 1978, Nishikado states the following: “The original idea was to create a kind of shooting game with several targets on the screen for the player to shoot. I wanted to have human targets but we saw that might be a bit too violent so we decided to use aliens instead” (I Love 1978, 2002).

Although Nishikado’s reference to creating a “kind of shooting game” is mere speculation when comparing Space Invaders to Space Monsters, an interview in issue three of Retro Gamer Magazine is more concrete. In the interview about the origins of Space Invaders, Nishikado states that “I wanted to create a parlour shooting game…” and when asked about whether he was happy with the title of Space Invaders, he stated that he initially wanted to call the game Space Monster, but a Taito official advised him to change the title.

Space Invaders to this day is still making money via licensing agreements, which have seen it released on new generation mobile phones worldwide. The Museum of
Computing Magazine estimates that by 2003, *Space Invaders* had made a staggering 500 Million US dollars for Taito, making it one of the highest grossing games of all time (Waddel, 2003).

Although *Space Invaders* may have been condemned by a Texas right wing Christian group, the game received positive reviews from a 1980 issue of The Christian Science Monitor. The article from this issue, “Aliens in the pizza parlour!” by staff writer Peter Grier (1980), praised the game while at the same time shedding some light on consumption of the game in that year:

> It has since become the most successful coin-operated game ever sold in America. The average video game or pinball machine is manufactured for only 90 days before production switches to a new model, but Space Invaders is still being snapped up by amusement arcades and burger joints after 22 months on the assembly line. Even Midway can't quite figure out why it's so popular.

> Sometimes we scratch our heads, and go, ‘Why has this continued so long?’ sighs Stan Jarocki, Midway's marketing vice-president. But there's no end in sight. I think it's just a release from tension. No matter what your score is, you'll enjoy it, and want to play it again. (p. 45)

Grier (ibid) also goes on to state that *Space Invaders* machines in good locations brought in as much as $1000USD for their operators. *Space Invaders* was revolutionary and although there had been Shoot-em-Ups before it, none had managed to successfully combine the game play elements quite so successfully.

### Outside Influences on Space Invaders

Tracing the family tree of Shmup development begins to become difficult when moving further back than 1978. Part of the reason for this is that not many of the analogue gaming devices from this era survived, and unlike digital games, emulation has not been able to preserve them. However, Nishikado does give some insight into the influences behind the creation of Space Invaders.

In Retrogamer magazine (2004) and the BBC documentary series *I love 1978* (2002), Nishikado makes reference to a few of the pre-cursory concepts that he wanted for the game that was later to become *Space Invaders*. Originally, Nishikado wanted to either use Tanks or Humans as the target. As discussed earlier, Taito and Nishikado decided that shooting humans would prove to be too violent, whilst animating the tanks’ approach would require too much expensive hardware.
Ninety-eight digital arcade games pre-date the release of *Space Invaders*. Five of those games have gameplay elements similar to *Space Invaders*, and all of them have a military theme.

- **Sea Wolf** (Midway, 1976)
  Similar Layout to *Space Invaders*, but enemies did not attack the player; instead the player had to accumulate maximum points within a pre-defined period by shooting enemy ships.

- **Depth Charge** (Gremlin, 1977)
  The player attacks enemy subs from the top of the screen and although enemies do shoot back, they do not converge on the player’s position.

- **Destroyer** (Atari, 1977)
  Similar to *Depth Charge*, but the player has no control over their movement. The player controls the firing of depth charges and the depth at which they explode.

- **Guided Missile** (Midway, 1977)
  The player fires missile up the screen (Y) and then controls their descent into enemy craft, played against a time limit.

- **M79 Ambush** (RamTek, 1977)
  Player fires projectiles from base of screen at enemy craft moving along the X axis; the player must accumulate points against the clock.

The seed that was planted by the release of *Space Invaders* in 1978 grew at a frantic pace, inspiring numerous copies, modifications and hybrid variations on its gameplay. The combination of new technologies and variation to the already successful *Space Invaders* recipe developed the first fork in the branches of the Shmup family tree: Vertical and Horizontal Shmups had been born. *Space Invaders*; however, was not solely responsible for the gameplay developments that were to follow.

The Proto-Shmup period is a time of massive experimentation and growth within the Shoot-em-up genre. Many developers based their designs on the successful model of *Space Invaders* and then began to experiment with gameplay ideas. The period between 1978 and 1983 established the ground rules and principles for the Shmup genre.
The Family Tree

Although illustrated in a linear fashion, Figure 11 is the product of the back tracing of the Shmup genre to identify games that established key genre elements before others.

Figure 11 shows the perceived development of the Proto-Shmup genre by looking at elements of player interactivity within the game world. The freedom of movement along various spatial axes and other control interfaces is fundamental. The following examination of Proto-Shmups delves into this initial family tree to try to explain why certain games have expanded upon others and ultimately, why games like *Mission X* and *Battle of Atlantis* developed into a game play framework for Shmups.

**Sky Raider**

Following just after the 1978 release of *Space Invaders*, Atari released a little known game called *Sky Raider* (1978). *Sky Raider* was not just another clone of *Space Invaders* but a new style of Shoot-em-up game. Unlike *Space Invaders*, *Sky Raider* put the player at the helm of a bomber aircraft, in charge of the deployment of its bombs. Also unlike *Space Invaders*, the player was not represented by an on screen entity (such as the missile base used to represent the player in *Space Invaders*), instead, the player had control over a moving cross hair on screen. As the player was not represented by an on-screen avatar, the player was therefore unable to be damaged by the enemy. The game mechanics represented this fact accordingly, as the player was put up against a time limit in which to achieve their best score rather than subject to enemy attacks.
Even though *Sky Raider* does not appear to represent modern day Shmups, it did contribute two very important factors towards what we know today as Shmups. Firstly, *Sky Raider* was the first game to use a constantly scrolling background (Bousiges, 2004). The games’ arcade flyer expands on this fact more: “A unique new engineering concept presents the player with a birds-eye view of continuously moving video terrain passing below. The simulation of flight is realistic and irresistible!” (Sky Raider, 1978).

*Sky Raider* was intended to be a realistic flight simulator, although the player only had control over dropping bombs on enemy targets. To aid this sense of “realism”, Atari choose not to use the traditional directional pad and buttons configuration of other arcade games of the time. Instead, Atari used a traditional aircraft flight yoke for the input device. *Sky Raider* also provided another key game play feature to vertically scrolling Shmups created thereafter. The weapon system used in *Sky Raider* accounted for the targeting of ground objects through the use of a separate weapon aimed via the use of a cross hair. *Sky Raider*, like *Space Invaders*, only offered the player movement along a single axis; however, the velocity of the player (represented via background scroll speed), could be controlled by either pulling back or pushing forward on the flight yoke.  

*Phantom II, Midway and the 8080*

Ironically, one of the most important developments in Vertical Shmups is developed on the very same hardware as the initial innovator, *Space Invaders*. Based on the same 8080 processor design as *Space Invaders*, *Phantom II* took the military themes of the Pre-Proto Shmups and placed them into one of the very first instances of continuous scrolling, direct fire shooters.

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*Figure 12* Sky Raider flyer. Adapted from Sky Raider flyer. Copyright by Atari, 1978. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
HeliFire, Radar Scope and Nintendo

Six months before Williams released what was to be one of the most influential Shmups, Defender (1980), Nintendo released a game that is the stepping-stone between Space Invaders and Defender. HeliFire (1980) was a combination of Space Invaders’ styled game play, coupled with the first ever vertically scrolling game play elements. In HeliFire, the player was put in charge of a submerged submarine. Enemy planes would fly vertically above the player and attempt to drop bombs on them. At the same time, the player had to shoot projectiles from their submarine at the above enemy planes.

One of the most striking features of HeliFire is that the game scrolls from right to left, as opposed to the large majority of vertical Shmups that scroll in the opposite direction. HeliFire also incorporated the same fixed scroll speed as Sky Raider and Astro Fighter. Even though the game scrolled along a horizontal axis, the screen orientation was still set to vertical, demonstrating the influence that Space Invaders had on all Shmups of the era.  

HeliFire was the third last Shmup that Nintendo created for the arcade. Nintendo’s last ever arcade Shmup, Space Firebird (1980) was released just five months after HeliFire in November. Previous to HeliFire, Nintendo had created only three arcade games, two of which were Space Invaders clones: Space Launcher (1979) and Space Fever (1979). Nintendo’s change in direction can be squarely attributed to the release of Shigeru Miyamoto’s Donkey Kong (1981).
Before the release of Nintendo’s famous *Donkey Kong*, Nintendo manufactured another *Space Invader* styled Shmup by the name of *Radar Scope* (1980). *Radar Scope*, although based on the same style of play mechanic as *Space Invaders*, used a different visual perspective and game play features. The view that the player had of the game was still a third person overhead, however, the player viewed the game from an overhead third person, depth perspective (a technique that creates visual depth by use of size bias at the bottom and top of screen) Figure 15. The game’s own flier describes this technique as “3D Vectors”. This type of visualization was not seen again in a game until the release of *Silpheed* in 1993.

*Radar Scope* was the first Shmup to allow the player to fire off multiple projectiles at once. Before this, the player could only shoot one projectile at a time and was only allowed to shoot again, once the previous projectile had left the screen or made contact with a target. *Radar Scope* was also unique because instead of issuing the player with a number of lives, it used a damage system whereby the player was not affected by the one–hit, one–kill’ system that many similar games had used Figure 15. Despite the
game’s advancements on the already established Space Invaders formula, it sold poorly, even though Nintendo star Shigeru Miyamoto (Mario Bros., Donkey Kong) worked on the game. Of the three thousand Radar Scope machines produced, around two thousand of them were converted into Donkey Kong Machines (Bousiges, 2004).

**Defender**

In 1980, the introduction of Defender (1980) would literally turn the embryonic genre of Shmups on its side. Defender was the first ever Shmup to scroll horizontally and to also have its screen orientation set to horizontal (unlike HeliFire). The player was put in control of a ship called the “Defender” and assigned the task of protecting the earth citizens from alien abduction. When asked what ideas led to the birth of Defender in the September 1982 issue of Joystick Magazine (as cited in RecRoom Amusesements, n.d.), game creator Eugene Jarvis said:

> Steve Richie and myself were sitting in a room toying with concepts and game ideas. Steve said: 'Wouldn't it be neat if you were flying over a planet on a screen.' And we tried to figure out what do with it. You could be flying over the planet, you could go up and down in any direction you want…I eventually said: 'We can't do that yet, but what we can do is fly left and right and so on.' (para. 8)

The game is unique even by today’s standards as the player could both scroll from left to right as well as an obscure right to left. This innovation however came at the cost of playability. For the time Defender used a record of five buttons and a directional pad for its control. Bousiges, (2004) states that “Due to the intimidating controls, no one played the game and there were even rumours saying Pac Man and Defender would bomb and Rally-X would be the next hit [from Atari]”.

Defender brought with it much innovation, particularly in graphics and game play. Defender was the first game to utilize a ‘bomb escape’ technique, where the player has the ability to clear the screen of both enemies and enemy projectiles through the use of a single button. This game play feature gives the player an ‘escape’ when things get a bit tough.

Defender also utilized a primitive form of artificial intelligence that allowed game play events to occur outside the player’s field of view. These events, such as enemy
movements and placements, were depicted by the use of “radar”. At the centre of the radar screen was what the player could see at their current position. To the left and right of this centre position where events that were occurring outside of the player’s field of view; this technique was later attempted in Cosmic Adventure (1981).

Defender, along with Space Invaders created a spirit of competition within those hardcore elements of the gaming public. This spirit of competition also made news in Time Magazine in 1980. The article “Games that People Play” featured a gamer by the name of Steve Jurasek who played Defender non-stop for 16 hours on one credit.

After the release of Defender, Eugene Jarvis broke from Williams to form his own company, Vid kidz. In the wake of Jarvis’ absence, Williams became desperate for a new game and later took Vid kidz under his wing as official second party developers, commissioning the development of a follow-up to Defender. Even though Jarvis was opposed the idea of creating sequels, Larry DeMar (co-founder of Vid kidz) talked Jarvis into creating an enhanced “Defender” game. The result of this was a game called Star Gate (1981). Jarvis was determined to make the game that Defender could have been. In an interview from Halycon Days, (Hague, 2002) he stated the following:

> It couldn't be just a regular cosmetic con-job, but a really cool enhancement. We got real excited about tweaking the code and programming gobs of new and cool enemies and getting better real-time performance so more stuff could be packed on screen without blowing the silky smooth sixty frames-per-second performance. The "Stargate” warping feature was just icing on the cake. (para. 14)

The result of this was a more hectic game, only aided by the fact that a record six buttons as well as a directional pad now controlled the game. The game was completed at a furious pace in order to meet Williams’ deadline. The game was completed in four months and was programmed in split shifts. Jarvis, (as cited in Hague, 2002) states:

> ....on a dual 8" floppy drive 1MHZ 6809 Motorola Exorcisor development system. Since PCs were very expensive in those days--about $30,000--we worked on one system in Larry's spare bedroom. I programmed the system in the day, and he worked at night. And in four months it was done. (para. 15)

The release of Defender in 1980 caused Williams’ nine months gross sales to increase from $83USD million in 1980 to $126USD million in 1981. Williams moved to capitalize on the success of Defender and hence decided to build a new facility in Gurnee, which was capable of producing 600 to 700 Defender units a day.
**Scramble (Konami, 1981)**

*Scramble* (1981) was only the sixth ever arcade game to be released by Japanese company Konami. The game was released in February 1981 in Japan and was later licensed to Stern for an American release in May of the same year. Due to *Scramble*’s similarities to *Defender*, it became known as the poor man’s *Defender* as it didn’t have the same graphical flare as the later title. However, graphics alone do not make a game. With the creation of *Defender*, a new genre of games had been created - the horizontally scrolling Shmup. The impact that *Defender* had on the arcade industry wasn’t fully apparent until the following year, 1981. Here, nine more vertically scrolling Shmups were released in the arcade alone, making 1981 a very popular year for Shmups of the vertical kind.

*Scramble* was an influential game for the time, so much so that other similar games were dubbed ‘scramble clones’, much in the same way as the term or genre ‘space invader clones’ was dubbed. This situation was compounded by the fact that *Scramble* used no encryption so many different, hacked versions can be found (Scramble, 2004).

Despite the impact that *Defender* had on the creation of vertically scrolling Shmups, it still is not representative of the genre today from a game play perspective. However, 1981 introduced nine new vertically scrolling Shmups, each bringing with them variations of the game play “recipe” that *Defender* had introduced.

Although *Scramble* may look similar to *Defender*, the two games are very different in game play. Unlike *Defender*, *Scramble* used a fixed scroll speed hence the player could not speed up or slow down their velocity. *Scramble* also allowed the player to move freely along each axis using the directional pad (Y limited to 50%). Additionally, unlike *Defender* all movement was controlled via the directional pad.

*Scramble* also introduced multiple weapon systems that accounted for the targeting of both ground and air targets with separate weapons. **Figure 16** Bombs were utilized for the targeting of ground targets and, like *Sky Raider*, the player had to account for their velocity by triggering the bomb some time before they were directly above their target. A laser gun was used for sky targets; however, it could also be used on ground targets if the player were at the exact same horizontal level as the target.

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*Figure 16. Scramble. Adapted from Scramble. Copyright by Konami, 1981. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.*

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Scramble was the first game to use a fuel system. The fuel system acted in a similar fashion to a game timer, a technique previously used in Sky Raider. As the player progressed through the level they depleted their fuel source (represented by a gauge at the bottom of the screen). Once the player’s fuel had fully depleted, their craft was destroyed. The only way for the player to replenish their fuel supply was to use their bomb to hit “fuel” tanks on the ground (Figure 17).  

The only other Shmup before Scramble to use land objects in the foreground of the game had been Defender. However, in Defender the player could not collide with the land objects and hence it did not affect the game play and was merely aesthetics. Scramble took this concept further by introducing collision detection for these land object such as hill, tunnels etc in the games foreground. This factor gave the game designers the ability to generate levels where pilot error could be critical. Later levels in the game exploited this factor also by creating tight, narrow passages where the player’s...
progress was hindered by the vast swarms of enemies that filled these tight caverns, a major characteristic of modern day vertical Shmups [Figure 18].

The game play of Scramble was simple and straightforward. The player was given the task of breaking though the enemy’s “scramble system” (as quoted on the title screen). The game consisted of five different levels, each more challenging than the previous. The first level takes place in/over mountainous terrain where the player must avoid running into the ground whilst bombing enemy ground positions. This section then seamlessly moves onto the next level, which takes place in a tight cavern. The player then exits the cavern and has to dodge wave after wave of indestructible fireballs before moving onto the fourth level, which takes place over a large city. The city level then gives way into tight “machine” tunnels where the player must be vigilant in order to progress through them. The sixth and final level of the game is where the player must bomb the enemy base, which is hidden in a crevice out of range of the player’s normal weapon. Once the player has completed the game it then returns to the beginning and repeats the process, albeit at a greater difficulty level.

Two more vertically scrolling Shmups were released on the same arcade hardware as Scramble: Battle of Atlantis (1981) and 800 Fathoms (1981). Both Battle of Atlantis and 800 Fathoms are very similar in appearance and game play to Scramble, however the most striking feature of the two former titles is that both games put the player in charge of a submarine rather than a space ship. Battle of Atlantis further built upon the free-moving nature of Scramble by allowing the player to move 20% farther along the X-axis, thus giving the allowing the player to move their ship nearly to the edge of the

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[Figure 18] Scramble. Adapted from Scramble. Copyright by Konami, 1981. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
screen. *Scramble* also had a quasi sequel, which was released the following month in March. *Super Cobra* (1981) used the same game play as *Scramble* but instead of the player controlling a space ship, they played as a helicopter. *Super Cobra* further expanded upon the foreground obstacles created by *Scramble*. *Super Cobra* also feature eleven levels as opposed to the six used in *Scramble*.

**Universal: Cosmic Avenger and the “Cosmic Series”**

The creation of a new genre of shooter also prompted existing game franchises to adapt to the new style of game play that *Defender* and *HeliFire* had created. One such game franchise was Universal’s *Cosmic Guerrilla* (1979) otherwise known as the ‘Cosmic Series’ entailing four sequels, *Cosmic Alien* (1980), *Devil Zone* (1980), *Zero Hour* (1980) and *Cosmic Avenger* (1981).

Universal’s first entrance into the arcade game market was in July 1979 with the release of *Cosmic Monsters* (1979), a pre-cursor to the Cosmic series. *Cosmic Monsters* offered no real innovation to the proven *Space Invaders* style of game play and was mainly a graphical update of the original [Figure 19]. As the marketplace began to be flooded with *Space Invaders* clones, Universal needed something to set themselves apart, but still stick with the highly successful *Space Invaders* game play formula.

![Image removed due to copyright](image)

**Figure 19**

Later that same year in November, Universal released their next game, *Cosmic Guerrilla*. *Cosmic Guerrilla* used the *Space Invaders* game play model but incorporated a new set of objectives for the gamer. Instead of the player guarding his or her own position from incoming enemies, *Cosmic Guerrilla* tried something different. The objective of the game was to shoot any enemy craft that attempted to reach the middle

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17 *Figure 19* *Cosmic Monsters*. Adapted from *Cosmic Monsters*. Copyright by Universal, 1979. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
of the screen whilst dodging enemy fire that rained down from above onto the player’s position (Figure 20). Located in the centre of the screen were a number of friendly craft that the enemy attempted to take. To make matters more difficult, there were two rows of enemies on each side of the screen. The player could only shoot at these enemies once they began to move towards the centre of the screen. If an enemy ship managed to take a friendly craft from the centre of the screen, the player only had a limited amount of time in which to destroy the enemy craft before the friendly craft was lost. The game finishes once there are no more enemy craft left in the centre of the screen, or when the player’s missile base has been destroyed by enemy fire.

**Cosmic Guerrilla**, despite its innovation, had not been as successful as Universal would have hoped. In an attempt to increase revenue, Universal went back to basics and created another game in the style of *Space Invaders*, hence disposing of the *Cosmic Guerrilla* game play recipe. The result of this was the release of *Cosmic Alien* in January of 1980. *Cosmic Alien* (Figure 21) was a blend of classic *Space Invaders* game play combined with updated graphics, a scrolling star field background and more difficult enemy attack patterns that would later be the basis for Nintendo’s *Radar Scope* released in November of that year.

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18 Figure 20 *Cosmic Guerrilla*. Adapted from *Cosmic Guerrilla*. Copyright by Universal, 1979. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
19 Figure 21 *Cosmic Alien*. Adapted from *Cosmic Alien*. Copyright by Universal, 1980. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Universal decided to explore the game play of *Cosmic Alien* further by releasing a more ambitious update to the series later that year. *Devil Zone* (1980) was the result of more than eleven months worth of work developing the *Cosmic Alien* game play further. However, Nintendo had already beaten Universal to the punch by releasing *Radar Scope* [Figure 22] just one month before the release of *Devil Zone* [Figure 23]. The two games played and looked nearly identical and ironically both sold very poorly.

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20 [Figure 22] *Radar Scope*. Adapted from *Radar Scope*. Copyright by Nintendo, 1980. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

21 [Figure 23] *Devil Zone*. Adapted from *Devil Zone*. Copyright by Universal, 1980. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Devil Zone used a more advanced set of enemy attack patterns than Radar Scope, allowing for three or more enemy craft to be performing attack manoeuvres on screen at once. The same style of Space Invaders game play was retained in both games and both featured the use of depth bias techniques in the graphics department. Devil Zone did however have one very innovative feature: as well as keeping tabs of the players score, it also used a ranking system that rated the player’s ability on an ‘A, B, C’ system, a first for the time.

Before the release of Devil Zone, Universal also began working on another project based on the Cosmic series: Zero Hour was Universal’s next game in the cosmic series and was released just one month after Devil Zone. Zero Hour was a combination of many game play elements from both games in the Cosmic series as well as other successful Shmups of the time. This combination resulted in what can be seen as the first Orthodox Vertical Shmup.22

Zero Hour was the first vertical Shmup to allow movement of the player’s craft along both the X and Y-axis. Even though Sky Raider had allowed for this freedom of movement nearly two years earlier, Sky Raider did not represent the embodiment of the player on screen. Influences from other earlier “Cosmic” games is present in Zero Hour, namely in the use of a Depth Bias field of play and enemy attack patterns.

The Zilog Z80 processor, the same CPU that had been used in the Scramble hardware, powered Zero Hour. As a result, the programmers were able to combine many graphical and game play innovations into Zero Hour that were previously impossible. The first of these innovations was the animations used to depict the players craft pitching left and

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22 Figure 24. Devil Zone. Adapted from Devil Zone. Copyright by Universal, 1980. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
right. The next technological innovation came with the introduction of using many on-screen sprites. This was an important hallmark of Zero Hour as during the start of the first level the player encountered asteroids that he or she could blast into smaller pieces in the same way as Asteroids (1979).

Zero Hour is a very fast paced Shmup even by today’s standards. Enemy projectiles move towards the player at an astonishing rate. This is made harder by the fact that the Zero Hour controls are sluggish at best. Zero Hour was also one of the first games to use “levels”. These levels were called screens and increased in difficulty as the player progressed through the game. At the end of each screen, the player had the ability to use the directional controls to land their craft for additional bonus points. A star in the lower right hand of the screen was displayed for each successfully completed screen. Konami later developed the concept of screens further by introducing games with more screens or “levels” in 1982 with the release of Scramble.

No doubt influenced by the release of Scramble in February of 1981, Universal once again set out to recreate their cosmic franchise in the image of others. The last game to be released in the Cosmic series was Cosmic Avenger (Figure 25). Instead of sticking with the vertical orientation that they had pioneered in Zero Hour, Universal chose to follow in the footsteps of Konami, by releasing their first constantly scrolling Horizontal Shmup. However as Universal had done in the past, they attempted to modify existing game play models by adding their own unique twist on the game play.

Influenced by previous games such as Defender and Scramble, Cosmic Avenger attempted to incorporate some of the features from each of these games to make a new

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23 Figure 25 Cosmic Avenger. Adapted from Cosmic Avenger. Copyright by Universal, 1971. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
game that would set them apart. *Cosmic Avenger* used two main aspects derived from *Defenders* game play: the ability to increase the player’s velocity, and the use of radar that could alert the player to enemy movements outside of their normal field of view. The player could also acquire enemy smart bombs that destroy all enemies on screen, similar to the smart bombs used in *Defender*.

As *Cosmic Avenger* is basically a *Scramble* clone, many of the features seen within *Scramble* can be seen in the use of the player’s weapon system, which consists of a laser gun as well as bombs for attacking ground based targets. *Comic Avenger* also features a linear level progression similar to *Scramble*. The first level sees the player in a futuristic city setting not too dissimilar to that seen within *Scramble*. The third level is very similar to the cavern level in *Scramble*, but with one key difference: the player’s craft is submerged underwater. Although this element sounds new it had actually been the focus of three other vertical Shmups released the same year: all of which were *Scramble* clones (*800 Fathoms, Funky Fish* (1981) and *Battle of Atlantis*). After this third level the game then repeated at a harder difficulty level.

The Cosmic series innovation came via the adaptation of elements of other successful Shmups of the era. Although not a truly innovative approach to game design, Universal did manage to use it to their advantage and in the process helped to father a new genre of video games. Arguably, Universal was the “emulsifier” of gameplay techniques and was a necessary step in the development of orthodox Shmups. Universal’s last arcade game was release in 1985. *Indoor Soccer* (1985) was to be the company’s last game ever before they left the arcade market for good. One of their more recognizable franchises, *Mr. Do* (1982) was later revived by Visco in the form of *Neo Mr. Do* (1997) for the Neo Geo. In their time, Universal released twenty-three different arcade games.

Proto-Shmups created the Shmup genre as we know it today by copying the success of *Space Invaders*. Apart from *Sky Raider*, no Proto Shmup is truly original, and all owe their existence to *Space Invaders*. Game play development of the Shmup genre during this period was slow as developers were unwilling to entirely ditch the *Space Invaders* formula for fear of losing money in the *Space Invader* hungry market place.
Chapter 3: Methodology

Although methodology pertaining to specific analytical toolsets will be presented in Chapter Four, it is important to outline the steps that this discourse will take in order to address the hypothesis: that on a core, emotive level, video and computer games have remained unchanged since their commercial genesis and that it is merely the means of representing these core, emotive traits which has changed. When considering the hypothesis we have a situation akin to that presented in Figure 26, which represents a process in which emotion is filtered and embodied for communication to an end user. As emotion is an internal process of the individual, we need to embody these emotive cues in some type of form, whether it is language, music or even touch: this is where the process of representation becomes involved. As representation is such an integral part of this study, this will form the basis of this chapter.

![Figure 26](image)

When discussing representation, it is essential to consider the modalities that representation can use to communicate emotion. Chapter Three therefore looks at the modalities of representation in order to set the stage for a literature review of specific design heuristics, which can enable more effective representation of potential emotional cues, through the various modalities of representation.

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24 As “Taste” and “Smell” are not used in video games, discussion of these modalities of representation will be omitted from the literature review.
Definition of Heuristics

Although the term, heuristic has been used quite extensively in Human-Computer Interaction studies, it is necessary to define the term further. In this study, the term heuristic employs Nielsen’s (1994, pp. 25-64) interpretation of the term, which is a rule of thumb for reasoning, a simplification or an educated guess, that is able to provide solutions in subjective domains such as design. A heuristic is a means to an end – do this and then this happens – however, unlike algorithms, heuristics often come without a guarantee to their success. To combat this, heuristics are often supported by statistical analysis and literature review; if enough experts attest to the capability of a heuristic, then there is substantial evidence indicating that the said heuristic is capable of delivering the specified end product when used correctly. By establishing these heuristics by literature review, analysis becomes more straightforward and the content of the analysis is useful for practitioners. The heuristics presented as part of the extended literature review and methodology in Chapter Four will provide logical ways in which to achieve emotion in the player. These heuristics also address particular emotional content; that is, if the analysis determines that the heuristic has been effectively implemented, then it stands to reason that the underlying emotional content associated with that heuristic has also been represented to the end user (Figure 28).
To ascertain and evaluate the effectiveness in representation of these emotive traits, we need an analytical perspective that provides not only balance, but helps to explain the potential, symbiotic relationship of a wide and diverse range of methodologies. Elmer (2003) critiqued a number of recent attempts to apply a panoptic-style perspective to new media discourse. Elmer attempts to explain how our world informs consumer choice through a Foucaultian system of reward and punishment. He divides recent panoptic discourses into three categories (p. 232-233):

1. Panoptic surveillance as an absolute intrusion of personal privacy, by way of collecting and collating consumer behaviour, by means of a process dubbed ‘dataveillance’. Here, the upper echelon within any given hierarchy has the pervading power to monitor, survey and collate, without the express consent of the consumer, with a restricted ‘few’ watching a vast ‘many’.

2. Panoptic surveillance as a reciprocal process, where consumers are asked for their information, and this is provided of the individuals own volition, in return for rewards (such as discounts, prizes, etc). This approach endorses the ability of
the consumer to ‘opt’ out of the surveillance at any given time, via the withdrawal of their permission to have their data collected.

3. Panoptic surveillance and the shift to synpoticism, whereby the consumer has become the powerful stakeholder in the relationship, influencing, to a degree, what they are spectator to. Here, the analogy of ‘many watching few’ has been used to explicate the nature of mass consumerism and as a means of dictating choice.

Point three of Elmer’s (2003) critique is indicative of recent post-structuralist game discourse, whereby the consumer is ultimately responsible for dictating their own gaming experience (Sheffield, 2004). Using design heuristics to evaluate the implementation of emotional potential is appropriate as games are ultimately a product by humans, for humans. Humans develop and use heuristics in designs to better address our particular desires (Figure 29). The design heuristics used in this study are derived from the literature review as part of Chapter Four.

What is important about this approach is not the use of heuristics, but rather that the heuristics themselves span such a wide and diverse range of theoretical frameworks. Although this discourse is not a ‘Deleuzian’ type analysis, it does however find
relevance in the sentiments of this theorist. Deleuze and Guttari believed that all aspects of life are made up of three factors in varying amounts: Art, Science and Philosophy. The gamers’ perspective may take into account art and psychology, but not be able to explain the mechanical science of the game that they are playing. Alternatively, the academic may be able to explain games using only psychology, but the semiotic value of the art and its cultural consideration may be lost too, along with scientific explanation of the impact of the source code as a moving machine.

Games are diverse; they contain powers of art, science and philosophy and can only really be evaluated using an interdisciplinary approach. The heuristics discussed in Chapter Four are co-dependent. Although specific heuristics may lead to very specific emotion, some of the heuristics presented provide essential support to others and their ability to effectively convey emotion and hence satisfy desire. These heuristics are derived from a review of literature spanning not only game studies, but also fields such as psychology and semiotics. The reason for including such a wide-spanning review of literature is due to the fact that there are two main elements in this study; humans and computer and video games. To review literature relevant only to each would be to omit the essential nuances that these two dissimilar parties have in forming each other. Specific authors and publications which these heuristics are derived from will be elaborated on in the next chapter. The design heuristics as derived from the literature review are:

- The First Heuristic: Empowerment
- The Second Heuristic: Flow
- The Third Heuristic: Bring the Player to Action
- The Fourth Heuristic: Education
- The Fifth and Sixth Heuristic: Challenge & Reward
- The Seventh Heuristic: Immersion
- The Eighth Heuristic: Immediate Feedback
- The Ninth Heuristic: Contemporary Coding
- The Tenth Heuristic: Familiarity

Chapter Four provides the interdisciplinary, analytical framework that will be used throughout to help define the emotional content of specific games, and examine whether or not the representation of this emotional content has been effectively embodied. Chapter Four also examines the powers of art, science and philosophy that are contained within each heuristic. It explores how each heuristic can only really be evaluated from
these multiple perspectives. However, this alone does not help prove the hypothesis. What is needed next is a more scientific approach - the establishment of constants and variables.

**Constants and variables**

Figure 30 identifies the constants and variables integral to this thesis. As emotion and the psyche are relative constants, the variables in the study are the particular games, over time and how they embody changing desires in terms of methods of representation. This study posits that Shmups, due to their long period of commercial development and relative lack of change, are the most ideal constant for which to benchmark “other”, non Shmup games considered to be “singular” or zeitgeists in their own periods of release. Therefore, in order to test the variable of this study and hence prove the hypothesis, the fifth chapter of the thesis will be divided into four case studies.

Each case study as part of Chapter Five is divided into four chronological sections. Each of these chronological sections is a comparative analysis of Shmups and their contemporary peers, which is evaluated using the design heuristics discussed as part of

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25 I acknowledge how the individual always feeds back into the “Stimulus and Potential Emotional Cues” section of the model. i.e., people develop games, so they embed emotion by default.
Chapter Four. Period One looks at Shmups at the height of their commercial success when they were the most popular type of arcade gaming and hence embodied player desire. At the other end of the spectrum is Period Four, with very few commercial Shmups, representing only a very small, niche part of the market hence only representing a small minority of player’s desires (Figure 31).

After the comparative analysis of all four periods has taken place, the design heuristics will be discussed based on the information gained through the analysis in Chapter Five. This findings chapter will look at each design heuristic and how it has been implemented over time to accommodate newer and ‘better’ technologies rather than ‘evolution’ of the end user’s needs. There will also be an empirical study presented after the case studies that looks specifically at the potential nostalgic value of Shmups for today’s market. Based on the data gathered, a study of the nostalgic potential for Shmups is useful considering that the average gamer today would have grown up with the genre; hence if all games are the same then the nostalgic potential that the Shmup genre may hold is worthy of investigation. The information presented in this chapter is aimed at appeasing both academic and industry concerns by offering both critical insight as well as practical data. In the conclusion, the usefulness of the design...
heuristics will be reflected upon as well as a critical evaluation of the potential future of the Shmup genre.

**The 2004 and 2008 Studies into Nostalgia & Age**

In order to address the objectives of this study and support the hypothesis, two small surveys were run in 2004 and 2008. The objective of these studies was to explore if there was a correlation between nostalgic preference and year of birth. The surveys were conducted on gaming forums instead of using external data collection services. The rationale behind this approach was based largely upon the reason that this particular study addresses broad and geographically diverse user-bases. As such, forums to run the survey on where chosen based on geographical diversity and demographic diversity. By taking this approach, a more accurate user sample is possible. The implementation of the survey involved initially a review of a number of game-centered user forums to ascertain suitability, and then a pilot survey was run on each of these boards to ascertain the average age of users. Gaining average age data was deemed essential in order to gain an accurate representation of the sample and ensure diversity. Based on this data, four main forums were selected. In Australia, Aussie Arcade (AA) was used as it represented an older demographic of gamers, mostly concerned with the preservation and collecting of arcade machines. In America, two forums were selected. The first was Digit Press (DP), which focuses predominantly on older console game collectors and the second was Sega Xtreme (SX), another forum chosen as it represents a slightly younger average demographic. Representing Europe, were Shmups.com (S) and Killercabs (KC). For specific detail regarding average age, findings of the individual surveys can be viewed in the appendix.

**Existing Methods**

Before implementing the specific surveys, a number of existing studies in the field of consumerism and nostalgia was consulted. Consumer research has long focused on the potential of nostalgia to affect the consumer market. Holbrook (1989) looks at the potential of nostalgia from a musical perspective and Havlena and Holak (1991) focused on the usage of nostalgia as an advertising tool. However, of particular interest to this study is the research conducted by Holbrook and Schindler (1991), who conducted some of the first research into age and the development of nostalgia related consumer tastes. Holbrook (1993) further explored the relationship between nostalgia and age and eventually covered the topic in some detail in the *Journal of Consumer Research.*
Holbrook’s study into nostalgia and age found that “general levels of nostalgic consumption experienced by different consumers depend on development changes that occur over time and that are therefore associated with age” (Holbrook, 1993, p. 246). An earlier investigation of consumerism and nostalgic taste by Davis (1979, p. 56) suggested that “in Western society it is adolescence, and for the privileged class early childhood as well, that affords nostalgia its most sumptuous banquets”. Both of these statements gave weight to the potential that the analysis of the Shmup genre may play when considering the nostalgic preferences of today’s average gamers. Despite the significance of video games, the work to date on nostalgia and age has been predominantly focused on popular music (Holbrook, 1989) and then film (Holbrook, 1993).

Holbrook and Schindler as cited in Holbrook (1993, p. 246) conducted two studies into the correlation of age and nostalgia in 1989 and 1993 respectively. The 1989 research suggested “a non-monotonic relationship in which preferences for musical recordings peaked for that, that had been popular when the respondent was in the vicinity of 23.5 years old”. The later, 1993 study expanded the initial model used in the 1989 study to include a factor of “nostalgic proneness” (1993, p. 245) which Holbrook defines as being a psychological tendency of individuals whereby they show a “higher propensity toward nostalgia proneness than others”. This problematized the 1993 study, as Holbrook (p. 245) concluded that “age (a demographic variable) and those linked to nostalgia proneness (a psychographic characteristic)… for samples both homogenous and heterogeneous with respect to age-the effects of age and nostalgia proneness appear to operate independently in shaping consumer preference”. Therefore, the nostalgia and age research conducted into films was inconclusive in creating a quantitative link between nostalgia and age.

Lessons learnt from Holbrook’s findings have helped to shape the nostalgia and age research conducted as part of this study. The issue with Holbrook’s (1993) study was that Holbrook chose to ask respondents about which movies they were specifically nostalgic. As Holbrook concluded, this led to a problem of interpretation of the question: respondents chose films based on two factors – nostalgic memory or supposed nostalgic / retro themes. The differentiation between the two is that the former is based on experience and the latter is based on some type of retro ideal of positive emotion.
Further research into nostalgia further defines these two types of nostalgia as “first time nostalgia” and “long-standing nostalgia”. Kessous and Roux (2008, p. 193) elaborate on these semantic definitions being a “particular concept of time” whilst Floch (1988) (1990) as cited in Kessous and Roux (2008, p. 193) defines these two opposing types of nostalgia as “continuity” versus “discontinuity”.

As video games are as much about the product as they are about the experiences associated with it, the research conducted as part of this study did not treat the two as independent of each other. Participants in the survey were specifically asked to choose an era of gaming, rather than a specific product like the flawed Holbrook (1993) study. This meant that unlike the Holbrook study (ibid), participants did not choose games that embodied nostalgic traits, but rather entire eras they believed contained the most positive nostalgic affect. To refine this point further, the game Viewtiful Joe released for the Nintendo Gamecube in 2002 embodies a number of ‘retro’ emotive traits, however this is a deliberate throwback much in the same way that the movie Hair Spray is a modern, nostalgic throwback to the 1950s. By choosing an era, rather than a product, results of the survey focused on “long-standing nostalgia”. Additionally, the respondents had been alive for at least several years before their chosen nostalgic peaks which means that the majority of results were based on long standing nostalgia.

General Procedure
Despite the interest placed on film and popular music in nostalgic consumer trends, no data has been released to date that specifically examines video games. The first study, run in 2004, used video game “eras” based around a five-year cycle, which included all commercially viable home consoles of the time. Although there is some overlap between and within the classification eras, all major home consoles were represented in their respective generation. Forum members were asked to nominate what year they were born in and what period of gaming they were most nostalgic about. Forum members were asked to vote only once, even if they were members of all three boards. These surveys were run using the normal forum software, under the privileges granted to any normal forum member. It was explained that in the contexts of this question,

26 Please refer to appendix section “Nostalgia and Age 2004 Findings and Experiment Overview”.

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nostalgia should be considered to be something that it no longer current, that they as gamers are still fond of and play to this day – long standing nostalgia.

To aid the process and create a more effective data set, forum users were presented with pre-defined console generations that were developed by examining the commercial life span of certain gaming consoles in Western territories such as Australia, Europe and North America. These generations based around a five-year cycle which included all commercially viable home consoles of the time. Although there is some overlap between and within the classification eras, all major home consoles were represented in their respective generation.

Home video game consoles were broken up into different eras, Pre 8-Bit, 8-Bit, 16-Bit, Early 32-Bit, 32/64-Bit and Current Gen. The Pre 8-bit era (1980 -1985) consists of video game machines made between the latter half of the seventies and up until around 1985. Atari 2600, Atari 5200, Magnavox, Odyssey and Colecovision were all part of this category. Following the Pre 8-Bit generation, the 8-Bit generation runs from around 1985 until 1990 and consists of the Nintendo Entertainment System (NES/Famicom/Famicom Disk System), Sega Master System (Sega SG-3000) and the Atari 7800. The 16-Bit generation continues on from the eight bit generation and runs on until 1995. This era is home to the Neo Geo AES, Sega Megadrive (Sega Genesis), Super Nintendo (Super Famicom, PC Engine (Turbo Graffix) as well as a host of other more obscure systems.

The next generation to be listed was the 32-Bit generation, best represented by the Sega Saturn, Sony Playstation and Nintendo 64. This generation represented the introduction of 3D graphics into the home. The Sega Saturn launched at the end of 1994 with the launch of the Playstation six months later in 1995. Support for the Nintendo 64 and Playstation continued well past 2000 with Saturn’s production run ending early in 2000. At the time of the initial survey, the “current” generation of systems consisted of the

27 The Neo Geo AES was introduced in 1989 and still had commercial game releases until 2004, making it the longest commercially viable console in history.
Sony Playstation 2, Nintendo Game cube, Microsoft Xbox and lastly, the oldest Current Gen\textsuperscript{28} console, the Sega Dreamcast.

In order to provide more proof of the relationship between nostalgia and age, a refined version of the study was run in 2008 using a combination of old and new sample populations. During the initial phases of the 2004 study, feedback gathered from participants suggested that the informal grouping of consoles by generational years was problematic due to the difference in commercial support of each console in various territories. For example, consoles such as the Turbo Graphics 16 and the Neo Geo where commercially supported in some territories, and not at all in others. Additionally, as Holbrook’s 1990 and 1993 surveys differed so greatly not only to each other but also Schuman and Scott’s (1989, p. 377) (as cited in Holbrook 1993, p. 246) survey on commercial nostalgia it was deemed necessary to run the survey again so as to validate the previous results.

In order to address the console lifespan and commercial support criticism, external sources were consulted in order to provide a more accurate representation of various consoles commercial life spans and their different territories. As this study was mainly concerned with PAL and European territories, the consoles commercial life spans were evaluated based on these similar territories.

\textsuperscript{28} Gen - Generation
Figure 32 presents the commercial life spans for each console, which are grouped by colour into their respective hardware generations. Similar to the 2004 study, a minimum and maximum value was mean-averaged in order to ascertain the generational height which would be later used to find the nostalgic height of gamers. Figure 33 is the graphical representation of this data and when compared to the 2004 data (Figure 34) there is only a small deviation in the upwards trend, although the naming is quite different. Whereas in the 2004 study Generation 1 was identified as being Atari 2600 and other Pre 8-Bit, in the 2008 data, Generation 1 is identified as being Magnavox Odyssey, (1972-1975) and Coleco Telstar (1976-1980).
After the generational data was refined using a more authorities and objective data set, the survey was run again on several forums, including the ones used in the original 2004 survey. The forums surveyed were www.aussie-arcade.com (AA), www.digitpress.com
(DP) and a new inclusion, www.killercabs.com (KC). Each forum represents both a mix of home and arcade video game collectors and enthusiasts. DP, KC and AA although focused on collecting still also promote discussion of new software. Participants were asked to nominate the period of gaming that they felt most nostalgic about, or still played to this day. The results of these surveys will be presented as part of Chapter Six.

**Choosing the Case Studies**

As outlined in the introduction, it is the contention of this study that technology has been a driving force in the perceived development of video games, a contention shared by many games scholars. Therefore, case studies chosen for this analysis represent significant shifts in the games industry, particularly on a technological level. The case studies span a period of eighteen years from 1987 until 2005. These dates are significant because they represent the release periods of two of the most recognizable Shmups in the Western market: *R-Type* and *Ikaruga* respectively. The games examined fit into four main periods of change for the video game market.

**Period One: 1987-1990**

Period One is the height of Shmups, when the genre was the most prolific and most consumed of all arcade game genres. After the end of Period One, Shmup production began to subside, never to be equalled again. The other reason why this period is significant and worthy of inclusion is because arcade hardware was the only medium of gaming that had the technological ability to graphically represent complex objects and scenes. During period one, arcade hardware held a significant edge over the medium of console gaming, which was noticeable sub-par in comparison. What also makes analysing this period important is seeing how the medium of home gaming used different representation techniques to accommodate for the lack of visual and auditory richness. The Shmups used as controls for this period are *R-Type*, *Darius* whilst the comparative non-Shmup games are *Contra* (both arcade and NES port) and also *Super Mario Bros* amongst others.

**Period Two: 1990-1995**

Period Two follows the end of Period One and starts from around 1990, when home consoles were beginning to match the richness of visual display offered by the arcade.

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29 Shmups, a genre constituting 26.41% of all 3421 digital arcade games released from 1975.
This period also represents a shifting design mantra, in which console games were no longer simply ports of arcade games but rather a set of games which embodied the unique capabilities and requirements of the home console medium. This period of time also includes comparative analysis between Shmups and the emerging PC game market. Although affordable 3D technological was still not available in this period, it acts as an important window into how game designers were pre-empting the “third dimension” of gaming, through various types of previously untried game mechanics. Shmup controls for this period are games such as Forgotten Worlds, a Shmup which experimented with the use of space in relation to game design; Silpheed, an odd Shmup which demonstrates how the genre briefly experimented with perspective, and U.N. Squadron, an arcade Shmup which attempted to bridge the gap between arcade design and home console design. The comparative games from this era are Wolfenstein 3D, Street Fighter 2 and Super Mario World.

Period Three: 1995-2000

Period Three begins at the inception of the 32-bit home console era, a time in games history where affordable 3D technologies and CD-Rom based storage created a significant shift in consumer expectation, and subsequently influenced how games were designed. This is a period where the arcade no longer reigned supreme and in many ways represents the beginning of the end for the commercial Shmup genre. Despite this, there are a few exemplary Shmups that managed to buck the trend, namely DoDonPachi, which represents the “hardening” of the genre; Raiden, the last of the widely acknowledged Shmups in the Western arcade market, and Radiant Silvergun – a Shmup which finally managed to exploit the possibilities of the 32-bit Shmup, albeit too late to make a significant difference. The comparative games for this period in time are Street Fighter Zero 3, Soul Calibur and Gran Turismo to name a few.

Period Four: 2000-2005

Period Four begins with the commercial end of the 32 bit era and focuses on the Shmups’ retreat to Japan, to become one of the most-hardcore and niche forms of gaming. This period in time also represents ‘adulthood’ for those who grew up playing Shmups like R-Type, and brings the study full circle and leads into the final section of the body analysis chapters: identifying recurrent nostalgic themes in the Shmup genre. This final period of analysis represents a time when accessibility to powerful, well-documented hardware paved the way for small indie development of very polished and
aesthetically pleasing Shmups. This section of the analysis also focuses on the potential futures for the Shmup genre, which will be presented in the conclusion of this study. The Shmups analysed in this period are *Ikaruga*, one of the last Shmups to be released as a AAA console title world-wide; *Border Down* and *Trizeal*, which represent the growing trend in semi-professional Shmup development and Danmaku Shmups, which represent the absolute, most distilled and hardcore form of the Shmup genre.

**The Selection Criteria for the “Singular” Shmups**

Each of the Shmups chosen for the case studies are *zeitgeists* of their genre; they not only represent the best of the genre at any one point in time, but they also revered today in online Shmup fan communities such as Shmups.com. Another applicable term is the Deleuzian concept of the “singularity”, a term that denotes a specific and unique assemblage of concepts and ideas as well as the potential and inter-connective-ness of the object in question. In this regard, a ‘singular’ game is not only a zeitgeist “of the time” but also somehow inexplicably linked to all elements of the time in which it was created.
**Representation**

The power of representation is such that nearly everything we do on a communicative level, including the design of games, involves representation of some sort. We represent internal states such as feelings and concepts and replace them with signs or symbols, be they sounds, images, texts or even objects. As such, all language is a representational system (Hall S., 1997A, p. 1) and is also responsible for all meaning as it always embodies the culture of the time: “representation connects meaning and language to culture” (Hall S., 1997B, p. 15). Hall’s statement infers two separate entities: the constant, which is meaning; and a variable, which is culture. Representation then acts as a process of omni-directional discourse between the two. Therefore, how we choose to represent meaning needs to be reliant on the culture on which meaning is to be represented into. In Hall’s discussion of representation, meaning is the internal state that is outwardly represented by signs and symbols; as such meaning or ‘affect’ is a constant and the signs and symbols used to represent affect are the variables. Leaving the discussion of representation aside for moment, why should one use the term affect to describe meaning?

In a critique of Deleuze and Guttari’s *A Thousand Plateaus* (1987), Colman, (2005, p. 11) describes affect as not only the power to affect or be affected, but also a material thing. In early Deleuzian work, affect is described as “perceivable forces, actions and activities” (Colman, 2005, p. 12), seemingly devoid of any form or inherent point of origin. Later though, Deleuze and Guttari describe affect as more than “sensate experiences or cognition” (Colman, 2005, p. 12) and extend the term affect to being an entity of its own by discussing affect in relation to art. Deleuze and Guttari make the point that even “inanimate” objects have the ability to affect. In the case of objects, art and games, we can consider that because all have the ability to affect, they can be understood as their own independent entities capable of communication and therefore have the ability to affect those perceiving, or rather, experiencing them. As such, games transmit affect by the process of representation. When someone plays *Ghouls and Goblins*, the game represents to the player via aesthetics and sound, various emotions that cause the player to be affected and subsequently react. If affect is the emotion, then representation is the vessel by which it travels from the source of the affect to the eventual receiver. For example, in video games the ability to affect the gamer and create a sense of immersion is represented through elements of game that are culturally
relevant. If a gamer playing *Half Life 2* is affected to the point of immersion, it is represented through the signs and symbols transmitted or represented by the game. Based on this, “affect” in the contexts of this study conforms to Colman’s definition: “the audible, visual, and tactile transformation produced in reaction to a certain situation, event or thing” (Colman, 2005, p. 11). This definition is integral to games as their ability to affect the end user extends beyond language and accommodates all of the communicative modalities that Hall (1997A) discusses.

In Deleuze’s study of aesthetics, *The Logic of Sensation*, he makes the suggestion that sensation is what the viewer of a painting absorbs before any type of meaning is discerned, thus affecting the receiver on a primal level, devoid of the semantic connotations of learnt behaviours. Conley, (2005A, p. 174) states that “sensation opens at the threshold of sense, at those moments prior to when a subject discovers the meaning of something or enters into a process of reasoned cognition”. Sensation, according to Deleuze, shifts attention from the form of the artwork to “the nature of its encounter with other objects” (Verevis, 2005, p. 246). Deleuze as cited in Constantin (1993, p. 187) states that “I become in sensation, and something happens through sensation, one through the other and one in the other”. When one combines these definitions of affect and sensation, we can understand that games offer the ability to first give sensation, and subsequently affect the end user. 

![Figure 35](image-url)
In 2002, the International Digital Software Association\textsuperscript{30} released data on why people play video games (Figure 36).\textsuperscript{31} Eighty-seven percent of respondents stated that they played video games for “fun” (The International Digital Software Association, 2002). Other respondents gave various reasons but the vague nature of the criteria makes it difficult to ascertain any real meaning from the information presented. The survey does not provide any real insight into the reasons why people are attracted to video games but it does offer one glaring insight: people play video games to be affected and subsequently “become” as Deleuze would put it.

\textsuperscript{30} International Digital Software Association (2002). Essential Facts About the Computer and Video Game Industry.
Nicole Lazzaro, the president and founder of XEO Design, Inc., presented the paper “Why We Play Games: The Four Keys to Player Experience” at the 2004 Game Developers Conference. During her speech she surmised that video games are played for the emotional range of experience that they offer the player: anger, frustration, *fiero* (Italian - raising arms in triumph), boredom, wonder, awe, mystery, excitement, relief, amusement, *schadenfreude* (German - gloat over the misfortune of a rival) and *naches* (Yiddish – pleasure or pride at the accomplishment of a child or mentee). All of the emotions that Lazzaro mentions are the emotive traits that allow the player to become affected.

Lazzaro (2004) further delineated the four “key” types of emotion that players derive from their games: emotions from “hard fun” (Meaningful Challenges, Strategies and Puzzles), Emotions from Easy Fun (Attention-grabbing ambiguity, incompleteness and detail), Emotions from Altered States (Changes in perception, thought and behaviour) and Emotions from Other People (Competition, cooperation performance and spectacle). Lazzaro (ibid) defined the first, “Hard Fun”, as being pertinent to gamers who are driven by the need for challenge and the subsequent enjoyment derived from overcoming “hot” emotions such as anger and frustration. In “Easy Fun” Lazzaro describes that some gamers instead prefer the feeling of immersion which comes from the “immense beauty” of the game world as well as exploration, rather than competition. “Altered states” according to Lazzaro appeal to players by offering a chance for escapism and finally, “Emotions from other people” are those emotions which are derived from being in the presence of others. Emotions from other people include, pride, amusement, rivalry and are derived from “competition, cooperation, performance and spectacle” (Lazzaro, 2004).

Chris Crawford, industry veteran game designer (1984) also talks about player experience as being the motivation for playing. Crawford discusses player motivation
citing learning and education as being the primary motivator along with four “secondary motivators” (Crawford, 1984, p. 17) as being essential to successful game design. The first of the “secondary motivators”, Fantasy / Exploration, is similar to Lazzaro’s description of “altered states” and the emotion of “awe”. A better analogy might be the term “discovery” and the sense of ownership that comes from uncovering things for oneself. In this regard, we can see further similarity to the emotions of awe, mystery, excitement and even relief. Crawford further elaborates: “fantasy is an important component of human play. It is critical to our recreation, our art and our games” (Crawford, 1984, p. 18).

“Nose Thumbing” is the second of Crawford’s secondary motivators and although the name may suggest similarity to Lazzaro’s (2004) definition of schadenfreude, the real definition is actually similar to the psychological defence mechanism of “sublimation” which is discussed later in more specific detail. Put briefly, “Nose Thumbing”, according to Crawford, is a type of emotion where the player takes pleasure from doing socially unacceptable things in a “different garb” (Crawford, 1984, p. 19). That is, people generally like to be rebellious, even immoral, given a “safe” chance to do so. Crawford (1984, p. 20) cites “proving oneself” as another key motivator for players. According to Crawford, proving oneself provides emotions ranging from achievement and reward through to more “negative” types of emotions such as frustration at being beaten and alternatively, naches. The need to prove ones’ self also links closely to another of Crawford’s secondary motivators: the need for acknowledgement. In demonstrating the link between the two, Crawford (1984, p. 19) states that it is not enough to beat just anyone, but to beat someone who is worth beating. This notion of legitimization of “power” through ability and eventual comparison is similar to the notions of Foucault. Foucault (1977, p. 27) discuss the power of knowledge and how when used can cause the other, lesser entity in the relationship to experience “constraint, regulation and disciplining practices.” For Foucault, “there is no knowledge that does not presuppose and constitute at the same time, power relations” (ibid). It is with this in mind, that parallels can be drawn between Crawford, Foucault and video and computer games. Players are driven to learn, because the ability to demonstrate these learnt abilities implies mastery, especially in player versus player environments and mastery leads to self legitimization.
One can extrapolate the need for self-legitimization as an integral emotion to effective game design. The power of self-legitimization is a recurrent theme in human motivation; Foucault contests that all humans legitimize themselves through a process of comparison to “lesser” others, primarily via knowledge / power relationships. Even Freud’s model of psychosexual development suggests continual attempts at self-legitimization through opposition towards the father (1953A, p. 244). Crawford (1984) provides further discussion of the subconscious drive for self-improvement as a means to self-legitimization:

I must qualify my claim that the fundamental motivation for all game-play is to learn. First, the educational motivation may not be conscious. Indeed, it may well take the form of a vague predilection to play games. The fact that this motivation may be unconscious does not lessen its importance; indeed, the fact would lend credence to the assertion that learning is a truly fundamental motivation. (p. 18)

Crawford’s statement supports the primal, subconscious need for self-improvement posited by Freud (1953) and Foucault (1977). Despite the importance placed on this motivator, the ability to demonstrate one’s “education” is nothing without comparative benchmarks to test it against, namely other “educated” players.

“Social Lubrication” is another of Crawford’s (1984, p. 21) secondary motivators and is closely linked to the emotion of “belonging”, which is similar to Lazzaro’s (2004) “Emotions from other people”. Further similarities can be drawn between Lazzaro and Crawford’s social lubrication motivator and the widely acknowledged third tier of Maslow’s hierarchy of needs, belonging (Maslow, 1943). Crawford states that “the game itself is of minor importance to the players; its real significance is its function as a focus around which an evening of socializing will be built” (Crawford, 1984, p. 20).

The last of Crawford’s secondary motivators is “exercise”. Crawford suggests that gamers derive pleasure from improvement, and that this is strengthened by the other secondary motivators, especially when other gamers are witness to the improvement. Put into the broader contexts of Lazzaro’s work, we can see similarity to the emotion of “reward”, but this is more specific and far more personal. “Exercise” also brings Crawford’s discussion of secondary motivators full circle by linking it back to the initial and most important player motivation: the need to learn.

Richard M. Ryan, a motivational psychologist at the University of Rochester, in an interview with Psyorg (2006) stated “we think there's a deeper theory than the fun of
playing.” According to study authors, Ryan, Rigby and Przybylksi, (2006, p. 345) players reported feeling best when the games produced positive experiences and challenges that connected to what they knew in the real world. The research found that games provide opportunities for achievement, freedom, and even a connection to other players. These benefits emotionally exceeded a shallow sense of fun, which doesn't keep players as interested.

The researchers determined that gamers were most satisfied playing games that made them feel empowered, autonomous and competent. The research forms part of “Self-Determination Theory,” a widely researched theory of motivation developed at the University of Rochester, which instead of dissecting individual games, looks at the underlying motives and satisfactions that can spark players’ interests and sustain them during play. Although the research does help to develop a better-focused model for the analysis of the appeal of video games, it does little to unravel the vast symbolic nature of video games and the appeal of these symbols to the human psyche.

![Diagram](image.png)

**Figure 37**

When we compile the literature, we can come up with a list of sensations and emotions - emotive states which are not only synonymous with successful games, but also span the breadth of human experiences. It is these sensations that affect us as humans and compel us to act. Although these sensations are represented by various,
different means, they are a constant of gaming and one could even go so far as to say that these sensations form the basis of most human motivation. Put into other terms, the emotive sensations offered by games can also be referred to as experiences and as such, logical connections can be drawn between games and cinephilia. Paul Willeman (1994A) finds similarity between cinephilia and the notion of photogene as described by Jean Epstein. Epstein, as cited in (Willeman, 1994B, p. 285) describes photogene as “a fleeting moment of experience or emotional intensity – a sensation – that the viewer cannot describe verbally or rationalize cognitively”. Cinephiliacs and gamers alike are drawn to their respective mediums because of their addiction to experience, or sensation, of the medium. In cinephilia, the subject is drawn in by “habitual recognition where the film is familiar and banal because it is represented in terms of its identity and sameness” (Verevis, 2005, p. 257). The subject is subsequently given “potentiality of intensities or sensations” (Verevis, ibid.) by allowing the viewer to disfigure this experience into their own desires thus creating a repetitious state of eternal return; difference repeating.

According to Semetsky (2005, p. 89) “experience is that milieu which provides the capacity to affect and be affected”. In the case of games, the milieu or environments that embody affect and subsequently affect the player with emotion are elements of the aesthetics, narrative, mechanical design, sounds and even tactile elements. If one then considers Hall’s (1997B) earlier statement, we can consider that the capacity of this milieu to affect is ultimately reliant on the player’s own experiences.

Semetsky (2005, p. 89) states “experience makes sense to us only if we understand the relations in practice between conflicting schemes of said experience”. Therefore, if gamers are drawn to their medium because of its ability to offer sensation, then the games themselves are the milieu or environment which allows affect and subsequently, becoming affected to occur. As affect is derived from culture, then we need to consider that we are affected by games solely because we are familiar with games, because games embody our own experiences (Figure 38).
Kierkegaard (Sequel; The Video Game, 2008) discusses representation and need for familiarity by investigating the prevalence of sequels in the video game market. Kierkegaard makes the point that gamers enjoy games because they offer them an extension of already fond experience, only slightly different and hence slightly more “new”. Kierkegaard elaborates that all games merely slightly modify extensions to the experiences gamers have; as such, a sequel is not a distinctly different game, but rather the same game as the previous, with minor changes often only involving how the game is represented on a visual and aural level. Kierkegaard (ibid) states:

So don't fool yourselves thinking that the latest FPS is anything more than “FPS Ver. 1.96470760d” (or else “Wolfenstein 3D Ver. 1.96470760d”, to put it another way). And this goes pretty much for every electronic game ever made. (para. 12)

According to Kierkegaard, all games bar a very select few use a majority of re-appropriated elements from existing games which are then slightly varied to meet with changing cultural norms and improving technologies; in this regard the early development of Shmups is no different to this process. In the evolution of the Shmup genre, each game offers a familiar milieu to understand the experience, and each game offers the exact same sensation and emotion, albeit represented slightly differently. Based on this, we can consider that the sensation as described by Lazzaro (2004) to be what needs to be represented, however we still need a set of design heuristics that help us achieve this. However, before moving onto any type of design heuristics, we need to
understand the nuances of representation and how one can go about representing sensation.

Based on the work of Lazzaro, (ibid.) we can determine that the affects needed for effective game play are: Fun, Anger, Frustration, Fiero, Boredom, Wonder, Mystery, Excitement, Relief, Amusement, Schadenfreude, Naches, Fantasy / exploration (inquisitiveness), Ownership, Rebelliousness, Immorality, Self-legitimization, Belonging, Achievement, Empowerment, Feeling Autonomous, Feeling Competent and Freedom. What still needs to be explained is how all of these affects are embodied into the milieu of experiences via representation. Chandler (2001) proposes that semiotic analysis “involves studying representations and the processes involved in representational practices, and to semioticians, ‘reality’ always involves representation”. However, the term representation is problematic, due to the differing definitions the word invokes given certain contexts. In traditional art, “commonsense understandings of the term tend to conceive representation as a substitute for, or copy of “reality” in some imagistic form – film, literature or visual art” (Bolt, 2004, p. 14). Bolt states that representation “posits a particular relation to, or way of thinking about the world” (ibid.).

Based on this previous definition, representation is a type of imagined unreality, which although embodying certain affect, is not indicative of reality at all. In such a case, video games are an excellent analogy; Second Life is not a copy of real life, as the name would suggest, but a representation of a type of idealized and human mediated reality. Games in general exemplify the concepts of Baudrillard’s (1994) “Simulacra and Simulation”, by creating a new unreality in which all signs and symbols have replaced true reality of life itself with a simulation or representation of reality. Even this observation alludes that within the diversity of humanity and our means of perceiving, lays an inherent truth, an absolute and constant force embodied in a number of different and differently perceived experiences. Therefore, all experience and all representation relies on similarities and differences.

At the heart of representation is human thought, as it is the force which creates representation through similarity and difference. Olkowski (Heidegger and the Limits of Representation, 1988) as cited in Bolt, (2004, p. 15) suggests that “Heidegger’s approach to understanding representation is “the guise of technological-calculative
‘man’ posing as master”, that “the world is conceived and grasped as a picture” ergo “the world becomes a picture and is able to be modelled because man looks upon it and represents it”. Based on this analysis, Bolt proposes a system of representation dependent on that of human kind to re-interpret and subsequently reproduce reality, using thought as the mediating factor. Tom Conley (2005A, p. 174) puts this concept into more contemporary terms by discussing how cinema is a “surface”, which ultimately reflects the thoughts of those watching it, as such mirroring the sentiments of Semetsky (2005, p. 89). Representation is largely dependent on the experiences of people and their unique perceptions of the world. Based on these explanations, we can consider Bolt’s (2004) explanation to hold particular weight:

Representationalism is a system of thought that fixes the world as an object and resource for human subjects. As a mode of thought that prescribes all that is known, it orders the world and predetermines what can be though. Representation becomes the vehicle through which representationalism can effect this will to fixity and mastery. (p. 14)

By these definitions we can not only think of all games as being representation, but also a surface which allows us to represent our own experiences in much the same way that cinema is not so much a story being told, but a story being re-experienced (Semetsky, 2005, p. 89). Absolutes that are sensations and internal states are not actually embodied in the games themselves, but rather in the end users. Games must provide the “reflective surface”, so that players can see their own internal states and subsequently be affected. Thus, representation is the ability of a game to simultaneously embody both similarity and difference.

**Emotive Traits**

In the context of games, the emotive, absolute traits of fun, immersion, challenge, risk and reward etc of “successful” games remains unchanged; it is merely the way in which these emotive traits are represented, or reflected, which is different. A simple way to demonstrate this is to compare reviews of similarly successful games which are represented or coded differently. For example, a review of *Pac Mania* (Namco, 1988) states that the game is “immensely addictive” and “highly challenging” (Coin-op Confrontation, 1988). On the other hand, *Grand Theft Auto II* [Figure 39]32 bears no
resemblance to *Pac Mania* [Figure 40]³ a simple analysis of reviews conducted demonstrate that it conveyed the exact same affective qualities to the reviewer (challenging and addictive). Despite the two games having different means of representation, there is an undeniable similarity on an affective level. “The determination of the concept implies the comparison between possible predicates and their opposites in a regressive and progressive double series, traversed on one side by remembrance and on the other by an imagination the aim of which is to rediscover or recreate” (Deleuze G., 2004, p. 174).

A simple empirical survey of Metacritic.com game reviews shows that the key word, “challenging” occurred in 2276 game reviews and “addictive” occurred in 214 game reviews. This either seems to suggest that game reviewers need a larger vocabulary or more likely, game developers like to represent previously successful positive affect, using more contemporary systems. This supports the notion of resemblance posited by Deleuze (2004, p. 174) as being a regressive and progressive double series; that is on the one side we have the desire for the old, in emotion and on the other side of this double series is the need for the new. That is, game developers like to represent

³[Figure 40] *Pac-Mania*. Adapted from *Pac Mania*. Copyright 1988 by Namco. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
previously successful positive affects using more contemporary systems – akin to the system as proposed by Deleuze. More precisely, the player feels the same emotions or is rather similarly affected, but by different means of representation.

So why representation, and why these emotive traits? If all effective games have remained unchanged bar graphical and cultural updates, then it stands to reason that these emotive traits will exist in all effective games. Excitement, awe, relief and frustration, for example, are emotions that we can attribute to a long and diverse range of gaming experiences from people’s youth to the games they are currently playing. The link that bridges the gap between these emotions and how they can be created is the process of representation. *Pac-Mania* represented the emotions associated with wealth and accumulation by using a small avatar moving around a maze, gobbling up gold spheres, whilst *Grand Theft Auto II* had the exact same emphasis on wealth and accumulation emotions, but represented as a sole agent, moving around an urban maze, collecting loot.\(^34\) Although representation provides the bridge between the emotion and the player, it does not provide a specific enough understanding of *how* to achieve certain emotions. To do this, we need to explore how design heuristics enable certain emotions to be represented in game design.

\(^{34}\) Not only does the player collect items and money, but they also “collect” the developing narrative, which offers similar rewarding power to items and cash.
Chapter 4: Extended Literature Review - the Design Heuristics and their Implementation as Analytical Devices

In games production and analysis there exists a number of design heuristics, all of which are intended to help achieve the positive emotive traits that Lazzaro (2004), as well as others, identify as essential to player effective player experience. In recent years, there has been a push toward either interdisciplinary or multidisciplinary study of video games. In the practical market especially, there has been considerable effort placed on quantifying the positive emotive traits of “effective games”. In the context of this study, an effective game is one which not only receives critical praise from reviewers, but also manages to affect the player with the core emotive traits as outlined in Chapter Three.

So far, the most effective form of identifying these positive emotive traits has taken place in panoptic-style new media discourses, as examined by Elmer (2003). Ludology, a recent addition to game studies, posits the notion that games should be treated as unique and that existing methodological tools sets such as narratology fail to explain the nuances specific to the genre. As Ludology is more concerned with the systems of a game, rather than its representational elements (Eskelinen, 2001), these “other”, panoptic, methodological discourses have gone some way to directly quantifying positive affect of video game design OR providing tool sets that work towards identifying successful elements of the game itself. To quickly paraphrase the research done to date in these panoptic-style discourses, there are ten recurrent themes, or positive emotive values of effective games, which come to light when scholarly and industry work is reviewed. The culmination of these ten heuristics stems from an extensive literature review conducted in the process of writing this study and is the first instance where these have been published together. For readability, these points have been listed in point form.

- The Second Heuristic: Flow: (Chen, 2007), (Csikszentmihalyi, 1991), (Ng, 2005), (Holt, 2007), (Sweetser & Wyeth, 2005)
- The Third Heuristic: Bring the Player to Action: (Vorderer, Hartmann, & Klimmt, 2003), (Cook, 2007), (Lazzaro, 2004), (Ghozland, 2007)
The Fourth Heuristic: Education: (Robertson, 2008), (Cook, 2007), (Crawford, 1984)

The Fifth and Sixth Heuristic: Challenge & Reward (Griffiths, 2008), (Adams, 2008), (Vorderer, Hartmann, & Klimmt, 2003), Cook (2007), (Lazzaro, 2004; Lazzaro, The Four Fun Keys, 2006), (Crawford, 2003), (Ryan & Deci, 2002), (Wang, 2008)


The Eighth Heuristic: Immediate Feedback: (Cook, 2007), (Crawford, 2003)

The Ninth Heuristic: Contemporary Coding (Kierkegaard, 2008)

The Tenth Heuristic: Familiarity

Within each respective heading there are certain inter-dependencies or subsequent conditions that must be fulfilled in order for each heuristic to be implemented. The next section of the literature review will serve as a combined literature review and methodology. Each design heuristic will be discussed in terms of relevance to game analysis and then expanded upon so that we can ascertain which methodological frameworks are best suited to understanding each one. Not every design heuristic will have an emotive trait unique to it: some heuristics are integral supporting heuristics for others to function. The information presented here is integral to understanding the analytical framework used in the case studies of Chapter Five. The heuristics presented henceforth are done so in no particular order; numbers have been added to each to aid in readability only.

The First Heuristic: Empowerment

Empowerment is derived from the ability of the end-user to exert control over the virtual world. From an examination of the literature to date, there are three main ways in which empowerment can be encoded into the game:

- As a mechanism of user input: i.e. controls
- As an element of game play: macro and micro management
As a hedonistic pursuit of the id: i.e. the player’s ability to destroy everything on screen, even if it serves no use in the overall goals of the game.

Recently, there has been a push in game design toward mechanisms that allow for all three aspects of empowerment to take place. *Half Life 2* is an excellent example of points one and three, whilst *Counter Strike Source* adds the additional aspect of micro-management to address all three points. Before discussing empowerment in relation to Shmups, let us consider these two games and the means by which they offer the player a heightened level of empowerment.

In the case of *Half Life 2*, the player is given access to a new device known as the “grav-gun”. The grav-gun allows gamers to pick up various objects around the game world and use these seemingly useless objects in all kinds of manners. Not only this, but the grav-gun allows players to augment their other weapons. Two examples of this are the “orb” and grenade. Grenades can be thrown normally by hand, but the use of the grav-gun in combination with manually thrown grenades means that elite players can propel a grenade much further, and even use other players’ grenades against them. The grav-gun also gives advanced users the ability to propel orbs at next to impossible speeds and, just like the grenade, use competitors’ orbs against them. Additionally, the grav-gun allows for interaction with the environmental objects, offering further emergent game play [Figure 41].

![Image removed due to copyright](image)

**Figure 41**

Interaction with environments in FPS style games like *Half Life 2* is not a new concept. The idea was first heavily promoted in *Red Faction*, a FPS game that encouraged users

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35 *Figure 41* *Half Life 2* and the Grav Gun. Adapted from *Half Life 2*. Copyright 2004 by Valve. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
to destroy large parts of the environment in order to progress through the game world or offer them a strategic advantage.

*Counter Strike Source (CSS)*, along with other pseudo FPS games such as *Deus X*, were some of the first in the genre to explore the combination of macro and micro management styles in the one game. *CSS* used a system of macro-management, where the player customized their weaponry before the start of each game; *Deus X* used RPG style elements to give the player macro-management-style control over their game play experience. Shmups and FPS games are both inherently micro-management-style games, where the player has little or no control over their onscreen avatar of the structure of the gaming experience. Despite the innovation of *Deus X* and *CSS*, Shmups were the first games to combine the two styles of game play.

**Empowerment via Ownership**

A cornerstone of successful design as defined in HCI research is that of allowing the player the ability to customize their gaming experience (Kusternig & Semnek, 2006). This extends to allowing the end user to customize the speed of cursor movements as well as the size and layout of various icons within the digital environment. Of the Shmups studied in the document, less than five percent of those researched allow for the customization of controls, and those that do only offer adjustment of player movement speed. However, when looking at the contemporary medium of home gaming, one can see that the vast majority of games offer increasingly sophisticated levels of end user control customization. There will be those that will argue that user control customization comes at the detriment of the flow, or is even a counterproductive design facet of the fast moving, standardized arcade medium. Yet Sega and Namco are rapidly moving their technology and design of arcade games to allow for vast amounts of end user customization, including control manipulation.

Namco’s *Maximum Tune* and Sega’s *Initial D Arcade Stage 4* allow users to customize not only their in-game avatars and cars, but also to manipulate the sensitivity of controls and even their preferred gaming volumes. In the case of both games, users purchase a card that remembers these settings and is recognized by their chosen game in any locale that they wish to play. This system aids in several facets of game design: not only is it beneficial to satisfying the end users’ control requirements, but it also rewards them for playing the game more often and adds game play longevity to the arcade medium.
Empowerment: Controllers & Input Mechanisms

Shifting the focus back to controls: when comparing the control schemes of traditional arcade games to that of contemporary gaming, there is a significant distinction between the two. Traditionally, the majority of arcade games use a digital control scheme, while in the contemporary incarnation of home gaming, analogue controls are preferred. Digital controls as used by nearly the entire genre of Shmups allow for eight-way directional movement. The mainstay of the arcade medium uses either the Siemtisu LS-32 or Sanwa JLF series joystick, both of which employ four tiny switches in the base of the stick. The shaft of the joystick activates one of these switches [Figure 42] when moved and hence instructs the software to begin moving the player’s avatar at a predetermined speed.

![Image removed due to copyright](image1.png)

**Figure 42**

Analogue joysticks utilize two pentameters: one each for the X and Y axis [Figure 43].

![Image removed due to copyright](image2.png)

**Figure 43**

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Physically, the Seimitsu LS-64 [Figure 43] can be utilized in the exact same cabinet scenario as the Sanwa’s JLF and Seimitsu LS-32 [Figure 42], yet the implementation of analogue sticks in the context of arcade-based Shmups has been strangely lacking, despite its popularity in the home console medium.

**Empowerment and Fitts Law**

Fitts’ Law, an underpinning principle of HCI studies, helps to quantify the need for variable speed adjustment within game worlds. Fitts’ Law operates as a mathematical equation [Figure 44] and is used extensively in design to predict the time required to move to a target icon, as a function of the distance to the icon and the size of the target.

![Image removed due to copyright](image-url)

Figure 44

Within the equation are the variables:

- $T$ is the average time taken to complete the movement.
- $a$ represents the start/stop time of the device.
- $b$ stands for the inherent speed of the device.
- $D$ is the distance from the starting point to the centre of the target.
- $W$ is the width of the target measured along the axis of motion. $W$ can also be thought of as the allowed error tolerance in the final position, since the final point of the motion must fall within $\pm \frac{W}{2}$ of the target's centre.

Although Fitts’ law is mainly used to define the size of objects and their arrangement, the equation also takes into account the variable of the input device being used. As Shmups do not promote the player making direct contact with a target, one must consider that when applying Fitts’ law it needs to work as a relationship between the player’s input control, their on-screen avatar, and their desired position on screen.

Variable “$T$” is the time it takes the player to move their avatar from one point on the

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screen to another, to either engage an enemy or evade a projectile/enemy. Variables “a” and “b” are directly proportional to the type of input device used: in the case of variable b, a digital device will only give constant speed, while an analogue stick will give variable speed and hence impact on variable T. More often than not, traditional Shmups do not require the player to quickly traverse large areas of virtual space in short periods of time. However, for pseudo-Shmups like *Senko no Ronde*, variable speed of movement becomes integral to the player’s control over the game world. The use of an analogue stick allows players to create strategic movements and traps for direct human opponents that would not be possible under a traditional digital stick control scheme. Additionally, if we treat Fitts’ law from a purely constructivist perspective, we can see that intuitive control is essential to appeasing the needs of the end user.

**Empowerment: Game Feel Theory**

Another notion governing empowerment is the vague term “game feel”, which relates to a myriad of game systems and their combined ability to affect the player in a certain way. Author Steve Swink in his 2009 book “Game Feel: A Game Designers Guide to Virtual Sensation” provides one of the best constructivist, analytical frameworks for understanding the nuances of controller input, subsequent representation and how they change the way the player feels in a virtual environment. Swink uses a scientific approach based on cognitive psychology, constructivist notions of analysis and semiotic theory. Swink (2009, p. 6) defines game feel as “real time control of virtual objects in a simulated space, with interactions emphasized by polish”. From this definition comes three important terms: real time control, simulated space and polish.

Real time control is defined by other designers such as Cook (2005) and Koster (2007) as the game’s “Black Box” - an algorithm between the computer and end user, which provides outputs given certain inputs. Simulated space as defined by Swink (2009, p. 5) consists of objects in the game world that act as points of reference for the player to perceive movement, speed and force. Simulated space not only extends to the placement of objects within a given space, but also the feeling or sensation, which is artificially inferred by different types of collision properties. Swink defines Polish as any effect which “artificially enhances the interaction with changing the underlying simulation” (ibid.). In other words, Polish is simply how the game’s black box is represented by some type of iconic symbol with which the player can identify.
If we consider Swink’s definition of game feel and apply it using the three key terms to the game *Ikaruga*, we can understand that real time control is the ability for the player to move their avatar; simulated space is defined by the objects in the game world that offer a point of reference to tell the player that their avatar is moving; and polish is the iconic and symbolic elements of the game which give it its aesthetic feel. What is important about Polish, according to Swink (2009), is that the type of Polish can be changed radically and the game as a system of rules (Black Box) will still operate correctly.

If game feel is experience, then Swink (2009, p. 10) offers an explanation of the elements of experience that contribute to game feel:

- The aesthetic sensation of control
- The pleasure of learning, practicing and mastering a skill
- Extension of the senses
- Extension of identity
- Interaction with a unique physical reality within the game

Swink’s methodology incorporates nearly all elements of the previously discussed emotive sensations: empowerment, flow, player education, immersion, feedback, risk / reward and motivation. Swink elegantly combines all of these elements into this diagram, located on page 62 of his book (Figure 45).

![Image removed due to copyright](image)

**Figure 45**

*Figure 45* is indicative of the constructivist approaches currently being applied to game design analysis. In Swink’s approach (2009), we have a model which acknowledges what communication theorists would call “fields of experience” (Ruesch & Bateson, 1968, section 40).
1951). It has mechanisms for dealing with perception and precepts, it considers communication as an ongoing process (Barlund, 1970), and it adds quantitative aspects that have been lacking from video analysis for some time, despite being a cornerstone of the existing HCI discipline. Swink (2009) provides a quantitative model for elements of game feel such as controller input and camera systems which are invaluable in assisting game scholars in coming up with clear evaluations of not only how a game feels, but, specifically; why.

Specifically, Swink (2009) discusses the ADSR method of evaluating controller input. ADSR (Attack, Delay, Sustain and Release) is a term taken from music synthesis that defines the characteristics of a particular synthesis envelope. In music synthesis, attack is the rate at which an envelope engages, delay is the time in which the initial attack ramps down to its sustain and release is the way in which the envelope fades out. In a game which feels twitchy the attack and release are aggressive and fast, while in games with more laggy controls, the opposite is true. Using cognitive psychology theory, Swink (2009, p. 37) explains the three important cognitive steps that come between initial stimulus and eventual controller input. In the perceptual stage, the player takes on average 100ms to process the output from the game. In the next stage, the cognitive stage, the player takes an average of 70ms to evaluate the best possible approach and then in the motor stage, the player takes an average of 70ms to transfer their intent to the muscles responsible for controller input. The combined time of the

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three steps (240ms) is an integral number to game design, as control input taking longer than this feels extremely slow and “laggy”, and runs the risk of the player’s central executive not recognizing the correlation between stimulus and appropriate reaction. Alternatively, controls which are significantly shorter than this can feel overly twitchy, and hence make the player feel out of control.

Evaluating the type of ADSR curve gives valuable insight into player experience and the sensation of exercising control. Although slow attack and release curves are useful in certain scenarios they run the risk of making the player feel like they have little to no impact in the game world, and can ultimately be highly frustrating, disrupting states of flow which break immersion. Controls with fast attack and release are often preferred, but not always appropriate, especially where simulated gravity and inertia are integral to game feel. Linear attack and release, which is good for predictable twitch control, does not work well for jumping through gravity, where a logarithmic curve is far more appropriate. So the question remains, which is better? The simple answer is neither, as they need to be case and time appropriate. A more accurate answer would be: regardless of what ADSR is used for controller input, it needs to be what the player is expecting and anticipating so that controls can be learnt, immersion can remain unbroken, and flow can eventually emerge.

Furthermore, ADSR is a measure of whether or not a game is contemporary in relation to its peers. *Super Mario Bros.* for example, uses a very specific ADSR curve for Mario’s jumping. This ADSR which creates smoothed jump arches became synonymous with all of *Mario’s* peers, however we don’t really see it used in contemporary platforms. However, we do see it used in retro-styled platformers. As games change, so too does the player’s expectation of control schemes. Anything that causes some type of cognitive dissonance will always be detrimental to immersion when first encountered, however effective controls empower the player and create a sense of ownership over their gaming experience. Swink (2009) summarizes the importance of controls:

> When an avatar in a game feels like an extension of your own body and senses, identity flows outward to encompass it in the same way. Game designer Jonathan Blow calls this “proxied embodiment”—identity extends to some kind of proxy, inhabiting it and making it part of one’s own body. “My guy” becomes “me”. What’s interesting is just how capricious this transfer of identity can be. It can flow outward, encompassing something we’re controlling and a moment later be withdrawn. (p. 28)
As Swink has demonstrated, game feel is not the intangible phenomenon that it is often made out to be by intuitive designers. Game feel when correctly implemented can be highly conducive to establishing a meaningful sense of empowerment in the end user. Although Swink’s model is bordering on a holistic approach to understanding empowerment, there are also a number of other areas, such as player perspective, which when analysed can say a great deal about the changing desires of end users.

**Empowerment through Perspective**

One only has to walk into a game store to notice the amount of shelf space dedicated to FPS games rather than Shmups games. With FPSs such as *Half Life* (Valve, 1996) selling around eight million copies worldwide (Musgrove, 2004), one must seriously consider what is the lure of this genre? Although seemingly different genres, FPS and Shmups share common roots. FPS can be considered an evolutionary branch of the Shmup genre with bridging games such as Sega’s *Space Harrier* (Sega, 1995) making the transition from third person to first person perspective [Figure 47].

![Figure 47](image)

The FPS genre took the principle affects of Shmups, but changed the player’s perspective and the rules of the game in a move to make more realistic gaming experiences. Instead of the player being represented in the third person on screen, they were now quite literally the player. When an aggressor shot at the player in a Shmup, the projectile was directed to the third person representation of the player on screen, but in the FPS, when an aggressor shots at the player, the projectile is literally moving...
towards the person sitting behind the screen. Consider the difference from watching a person on TV in some sort of story to being the person actually in the story: such is the difference in immersion for the player.

The immersion that the FPS genre allows for has also put it into the middle of a larger moral debate about the impact of violence in video games. However, there has always been an overwhelming tendency for violence in video games. Provenzo (1991) noted that out of the forty-seven popular video games analysed, forty of those were violent in nature. Braun and Giroux (1989) studied the most popular arcade games in twenty-one Montreal video arcades and found that seventy-one percent of those were also violent in nature. What has changed though is the way in which the player perceives this “violence”. Most early video games were abstract in their portrayal of violence in the game world. During most of the eighties, the protagonist was represented as a “blip” on the screen under the control of the player (Cooper & Mackie, 1986). As the blip evolved, so too did the depiction of the violence, or rather, the ability to depict the violence more realistically. Ballard and Weist (1996, p. 717) described the action depicted in Mortal Kombat as follows: “The game includes characters that can kill or be killed by electrocution, ripping out the heart, or decapitation with a quivering spinal cord attached”. However, in the above instances, the player was merely interacting with the game world using an onscreen avatar, no violence was directly orientated towards the player: it was orientated towards their onscreen avatar.

The FPS genre and technology facilitated the removal of this middle man and hence changed the player from being represented by avatar (Figure 48) to actually being the avatar (Figure 49). Once one considers the importance of perspective, one can see that gamers aren’t drawn to violent games: they are drawn to games that more successfully connect the game world to them. Think of those people who watch car races on television and lean side to side with the action. Play close attention to these people and you will notice their tendency to lean is directly related to the perspective of the picture they are viewing, that is, in-car cameras will cause them to move their body more so than a third person perspective of that car moving around the track.
In a study of empirical literature on video game violence, Karen E. Dill and Jody C. Dill (1998) cited studies in which researchers noted the difference in the player’s physical state between players playing and players observing a Virtual Reality game. The study by Calvert and Tan (1994) found that the player’s immersion level was directly related to the impact of real physical changes in their bodies. To research this, two test groups were exposed to *Dactyl Nightmare*, an extremely realistic game for the time. The first test group was actively playing the game, while the second test group observed a live video feed of the action as it unfolded. Unsurprisingly, the group playing the game experienced significantly higher physiological responses than those merely watching. Post-test, subjects who played the game demonstrated significantly more aggressive types of thought.
In first-person, anxiety mechanisms are more likely to be triggered due to the blurred line between virtual reality and reality. Players participating in *Dactyl Nightmare* encountered very real feelings such as nausea and dizziness, as opposed to those merely observing the action. The player’s sense of empowerment within the game world is related to the manner in which they experience the game world. Developmental psychologist Erik Erikson (1950, pp. 54-64); (1959, pp. 10-13) cites the importance of autonomy and control within humanity and the development of the psyche. When we punish someone, namely a criminal, we send them to gaol and we remove their autonomy and empowerment. The importance of one’s autonomy and empowerment is a strong enough human instinct to keep the majority of us out of gaol. This instinctual need for empowerment has a follow-on effect even into the virtual world, as emphasized by Ryan et al. (2006) and Ryan & Deci (2002).

The empowerment felt in the genre of FPS is directly linked to the ability of the player to interact with the virtual environment in a manner that is similar, yet embellished when compared to their own realities. In Shmups, there is no element of exploration, as exploration infers a type of endless possibility that is impossible when the world progression (scrolling) is always predefined. Additionally, as FPS games use a system of rules similar to that of reality, that is, you can move with your feet, look with your head, touch with your hands, it is much easier for players to understand the system of rules that dictate their ability to interact. Playing from a first person perspective also illuminates potential aspects of personification that might lead the player to not associate with their defined avatar. It is in the intuitive and faceless nature of FPS style games that the attraction lies.

Based on the literature reviewed, measuring empowerment relies on analysis of the control mechanisms, the extent to which the player can control not only their own experience, but also the game world as a whole, and finally the ability to sublimate or nose thumb in a safe environment. By investigating this heuristic, one can evaluate how the emotions of Fiero, Schadenfreude, Ownership, Rebelliousness, Immortality, Empowerment (Feeling Autonomous), Feeling Competent and Freedom are conveyed in the control and variable.
The Second Heuristic: Flow

Csikszentmihalyi (1991) defines a state of flow as being a combination of various interlinking elements. Although flow is essential to successful game design, (Chen, 2007) (Sweetser & Wyeth, 2005) it is difficult to know what will constitute flow in the end product. However, there are a number of simple principles that must be followed in order to recreate the sensation reflected by this heuristic.

Ng (2005) researched the difficulty inherent to designing action games with significant narrative. Part of the reason for this difficulty was that traditional means of implementing narrative meant that the fast paced nature of the action genre was hindered when narrative elements were not implemented correctly. Ng states that flow can be interrupted via external distractions; therefore we can perceive flow to be heavily linked with technological factors. For example, if the player had to wait for any aspect of the game to load then this would be a significant contributing factor to breaking the player’s sense of flow. Techniques such as creating memblocks, LOD and loading game assets on the fly all ensure that the gamer experience remains uninterrupted by technological issues. The technical components of a game also become integral in the design.

In game mechanics, Ng (2005) provides one of the best discussions on flow and its importance to providing an immersive experience for the gamer. In his 2005 paper “Uplift; Designing Flow in Action Games”, Ng traces work performed to date on the subject of flow in video games, and notes a distinct absence of discussion on the topic within Ludologist groups. Ng traces existing work on the topic of flow to Prof. M. Csikszentmihalyi in his 1990 book “Flow: The Psychology of Optimal Experience”. Through an analysis of martial arts, Csikszentmihalyi “emphasized the importance of unselfconsciousness and described this state as "the mind of no mind" - in other words, a state in which one is completely focused on a task without making a conscious effort at concentration” (Ng, 2005, p. 5). Shmup players and gamers in general refer to this mental phenomenon as being in the zone, a mental state in which the only reality is the reality of the game world and all other distractions are ignored. Games designers also

40 LOD is short for “Level of Detail” a technique used to reduce the polygon count of objects as they move further away from the camera.
describe this phenomenon as “immersion”, an essential component of good game design.

Csikszentmihalyi’s work on flow was one of the first scientific evaluations of the subject. Csikszentmihalyi cites seven characteristics of flow that are encountered in those experiencing the phenomenon. Within Csikszentmihalyi’s model of flow are seven criteria: a challenging but tractable task; perfect concentration; clear goals with immediate feedback; full immersion in the task; the sensation of exercising control; the loss of self-consciousness; and the transformation of time. Most of the criteria are self-explanatory and can be seen in other heuristics. Some of the less obvious criteria are: perfect concentration, where the task is highly intuitive and full concentration can be devoted to the task at hand, rather than taking the medial steps required to achieve the task. Full immersion in the task is similar, however Ng (2005, p. 7) makes a distinction between the two, as “it is more a case of the former being the opportunity to concentrate, as a requirement, and the latter being the effect of that concentration”.

Ng (2005) discusses flow in relation to several games with the specific inclusion of two arcade Shmups: *Mars Matrix* and *Ikaruga*. Ng’s discussion of flow in these two Shmups focuses on the game mechanics, namely the score system applied in both games. Both of the score systems utilized in these Shmups rely on highly specific enemy placement to infer necessary movement to the player. Flow can be implemented and evaluated through game mechanics, narrative and technology and requires a diverse tool set to ascertain its effective implementation. Principles derived from game design theory can be used in this regard, as well as elements of narratology and evaluation of technologies.

**The Third Heuristic: Bring the Player to Action**

This heuristic involves actively understanding the modalities of video game feedback (visual, auditory and tactile) and how they relate to the player’s own experience, desire and motivation. The necessity for this heuristic stems from the work of Vorderer et al (2003) and Cook (2005) who both describe models that rely on a post-structuralist theory to understand them. The literature most relevant to this heuristic stems from traditional psychoanalytical theory, starting with the works of Sigmund Freud (1990), Carl Jung and the extended version of defence mechanisms as defined by Anna Freud (1967).
Discussed earlier in the literature review of representation were the two processes involved with the stimulus given from video games: sensation and affect. In discussing sensation, it was mostly likened to the type of emotive reaction that occurs prior to affect, and prior to the assemblage of stimulus with semantic memory. Sensation is devoid of the semantic meaning that only comes with conscious thought and is subsequently associated with the pre-conscious and subconscious of the psyche. Freud’s structural model is one of the most recognized ways of interpreting how the subconscious may cause specific player reaction given certain stimulus.

Figure 50

Sigmund Freud’s Structural Model (1976) explains human behaviour by separating conscious and unconscious thought into three individual psyche structures, Id, Super Ego and Ego. Id impulses are based on the pleasure principle whereby one seeks immediate gratification and pleasure whilst avoiding pain. Freud believed that Id represented our most base instincts: aggression and sexuality (death instinct and life instinct). Put simply, Id represents a selfish, primitive, childish, pleasure-oriented part of the personality with no ability to delay gratification. In contrast, the Super-Ego is the parent like figure that imposes standards of right and wrong, good and bad. Freud believed that these standards of the Super-Ego developed over time in ones mental growth and is linked to the reality principle – a mechanism which helps adapt the Super-Ego to societal norms. As the Id and Super-Ego represent two extremes, it is the job of the Ego to mediate between the two systems and finds a compromise that is acceptable and this often yields, internal states of anxiety as the Ego tries to balance the often, conflicting drives.

Normally, the Id impulse or the pleasure principle is suppressed in favour of the reality principle as the Super-Ego represses behaviours that are not appropriate for civilized society. However, under certain situations the Ego can employ a series of Defence Mechanisms aimed at reducing anxiety and conflict between the Id and Super-Ego. Guilt, embarrassment and shame often accompany the feeling of anxiety. Defence mechanisms work by distorting the Id impulses into acceptable forms, or by unconscious blockage of these impulses.

Anna Freud clarified and conceptualized much of Sigmund Freud’s work on Defence Mechanisms in *The Ego and Mechanisms of Defence* (1967). Instead of Sigmund Freud’s definitive singular term, Anna Freud described various different defence mechanisms, of which several remain highly pertaining to game the experience offered by video games, Projection, Identification and Sublimation.

Projection (Freud A., 1967, p. 122) works by imparting the negative aspects of one’s psyche onto others so that people may experience a socially negative impulse or desire without letting the ego recognise it. Comparisons can be drawn between projection and the Jungian archetype of the shadow, whereby our own negative aspects which we refuse to acknowledge in ourselves, are projected onto others. In many games the antagonists are merely a reflection of the gamers own shadow, rather than being presented as fully fleshed out characters. This is to say that all effective in game antagonists elicit response in the player as they represent a portion of the player’s own negative attributes.

Identification as described by Anna Freud (1967, p. 109) is the unconscious modelling on an individual based on another behaviour. This can be seen as an integral aspect of personification and is also manifested in games through avatar selection; gamers choose who they want to be, not because that avatar represents them, but what they desire.

Lastly, sublimation is probably one of the most significant defence mechanism when discussing video games due to the negative publicity that the medium faces in relation to suspected links with juvenile violence. Sublimation (Freud A., 1967, p. 52) is the refocusing of negative energy into more socially acceptable tasks. We can see this in the way that video games offer a socially acceptable means by which to undertake a number of both socially acceptable and socially unacceptable tasks. This ranges from
experimentation with gender - male gamers playing as female avatars - to the more sinister homicidal acts seen in games such as *Postal 2* (1997).

At least part of the appeal and subsequent popularity of video and computer games is derived from what they offer the player in terms of psychological catharsis. Based on the function of the Id as described by Freud, it is easy to see why there is a common belief that games should only appeal to those prone to anti-social behaviours and who are predominantly driven by violence. If this were true then it stands to reason that gamers form the four percent of the population that is prone to antisocial behaviour (Preston, 1997, p. 8). Indeed, computer and video games offer a socially acceptable means through which the Id can indulge in socially unacceptable things such as greed, domination, death, destruction, risk, power and danger by use of the defence mechanism “Sublimation” although this is not the only reason why people are drawn to games. Computer and video games do offer a way of expressing socially unacceptable behaviours into a socially acceptable medium of video games, however not all emotion created by computer and video games is based on Id impulses alone. Despite the individual negative affects created by computer and video games, most in the genre will aim towards the player creating a greater good by vanquishing the game’s foe, hence appealing to the right and wrong nature of the Super-Ego. Take *Mars Matrix* for example: although the player’s purpose in *Mars Matrix* is to quell a rebel uprising against a fascist dictatorship (who the player is acting on behalf of), the player will move to completion of this task as empowerment, sense of competency and achievement are all essential motivating factors when playing games (Crawford, 1984, p. 19).

Even though the Shmup world may be virtual, the player will still use Ego to balance the Id and Super-ego impulses to achieve a “satisfactory” outcome by use of risk management and the alleviation of anxiety which comes from balancing these desires. This unimpeded connection of the psyche to the virtual world can be explored by further by using psychological principles, combined with the Vorderer et al. model.

**The Function of Id, Super-Ego and Ego for Shmups**

As discussed earlier in relation to game structure, the Vorderer, Hartmann and Klimmt (2003) propose a model that playing video games is a sequence of four re-occurring situations. [Figure 51]
To demonstrate, let us consider this model in relation to *Ikaruga*. The game has four primary features in which the player can interact within the virtual world: Movement, Shooting, Change, Polarity and Bomb – all of which are components of the physical input system of the game. These features form the first part of Vorderer’s et al. (2003) sequence, “possibilities to act”. In *Ikaruga*, the player can choose to have their ship as one of two different “polarities”, white or black. Whilst the player is black, their ship can absorb black bullets and is rewarded with points for doing so. Additionally, when the player absorbs bullets of the same polarity, it accumulates power for their bomb weapon. Enemy ships when destroyed by bullets of the same polarity, it accumulates power for their bomb weapon. Enemy ships are either black or white; shooting a black ship with white bullets will do twice the damage as hitting it with black bullets, but when the enemy dies, they will not release any more bullets. Being struck by bullets of the opposite polarity will kill the player. Destroying three consecutive white or black ships yields a “chain” score bonus, but this requires certain risk.

The second of step of the model, “specific necessities to act” involves the introduction of a certain piece of in-game stimulus such as projectiles, bonuses, enemies and even other players Observing the above rules of Ikaruga and the “possibilities to act”, if the player where presented with an in-game “boss,” then this would constitute a “necessity” to act. In the case of Figure 52, the player chooses not to shoot or bomb the enemy; rather they try to increase their score by changing their polarity to absorb the enemy’s barrage. Hence the Klimmt sequence of events is as follows.

1. Certain possibilities to act
   - Move (Offensive/Defensive
   - Shoot

Figure 51
It is important to note that this situation had more than one solution that could have yielded a positive outcome. Alternatively, the player could have chosen one of three other possible techniques in this situation; shoot the enemy and do twice the damage to the enemy. The player could have used the energy acquired from the technique to bomb the enemy or the player, or they could have simply used movement alone as a defensive technique.

Vorderer et al. (2003) claim that whether or not the player accomplishes the task, their motivation to continue the game will continue. In the case of successful completion, Vorderer et al. state “(completion) leads to a euphoric experience of enjoyment and leads to an increase of the motivation to continue the playing process and face the game situation”. Alternatively, Vorderer et al. describe how a dissatisfactory outcome will “elicit adverse emotions (anger frustration). This may lead to an even stronger motivation to continue playing in order to solve the task in the next run, but will diminish the entertainment experience.”

The Vorderer et al. model suggests that all outcomes to the third sequence will result in a positive affect for the player. However, as we have seen there are a number of ways in achieving this positive affect; however some are better than others. Case in point, one can play *Ikaruga* without any exploration of the score system and still complete the game, hence satisfying the survival impulses of the Super-Ego. Or, the player can utilize more Id impulses to take risks and hence increase their score after all, it is not enough to merely survive a Shmup, one must dominate it.

![Figure 52](image)

<table>
<thead>
<tr>
<th>Change Polarity</th>
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<tbody>
<tr>
<td>Bomb</td>
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2. A specific necessity to act
   Player is under attack by a Boss.

3. The player’s attempt to resolve the necessity to act by applying (some of) the possibilities to act
   The Player chooses to Change Polarity to match the Enemy’s Bullets and hence greatly increase score.
   The Player also chooses not to shoot the Enemy

4. A result which influences the enjoyment felt by the player and the configuration of the subsequent situation
   The player aims for Extrinsic motivation by way of a good score.

![Figure 53](image)
Ikaruga. Id and Super-Ego both represent different behaviours of the player. In the case of Shmups, Id is concerned with taking risks to promote score (both intrinsic and extrinsic). Super-Ego is concerned with minimizing risk to maximize survival. In the case of most Shmups, a score system will always reward certain risks. In the third phase of Klimm’t models, the Ego must compromise between these impulses. In the case of Shmups, the Ego will way up risk and player ability. If the player is more proficient with the game, then it is more likely that the Ego will steer more towards the Id impulses. However, if the player is less capable and the perceived risk is great, then it is more likely that the Ego will side with the “safe” instincts of the Super-Ego. Depending on the input given to the Ego in the second phase, a response will be chosen and an outcome decided. In the case of Figure 53 the player’s ability was significant; hence they chose the risky path to achieve a better score.

The model of the psyche as proposed by Freud and the Mechanisms of defence as conceptualized by Anna Freud form an integral part of understanding how end-users are compelled to act in a certain way. Anxiety and the potential to alleviate anxiety have an essential role in the decision making principles of an end-user. The result of these internal, anxiety states leads to us being affected, however the role of the subconscious in decision making needs to be explored further.

The Role of the Subconscious & Ellis’s ABC Model

If sensation is concerned only with the attributes of the subconscious and pre-conscious (Conley, 2005B, p. 255) then we can derive from Freud’s work that sensation is mainly a gratification type of experience: that is, sensation compels gamers to act because of its
ability to give the player gratification. If sensation offers the ability for gratification then it is a very powerful means of compelling the player to act, especially when gratification is understood in the context of biology. When we experience pleasure: in this case gratification, a side effect is the release of neurotransmitters such as dopamine and endorphins, both responsible for pleasurable, euphoric states (Perry, Ashton, & Young, 2002, p. 85)

At one stage, Freud and Jung both agreed that there are elements of the human psyche common across all human creeds and races (Perry Y., 2009). Jung analysed myth and legend from disparate civilizations (Walker S., 2002, p. 9) and Freud observed the dreams of various patients (Freud S., 1976), some of which were geographically or biologically related, but for the most part a wide and diverse sample. In the research of both Freud and Jung was the similarity in primal experience that seemed to be shared by all of those they studied (Freud S., 1994, p. 104) (Jung, Franz, Henderson, Jacobi, & Jaffe, 1968, p. 98). Further to this, sensation and the importance of the subconscious in relation to affect can be further strengthened by including the work of Albert Ellis’s “ABC” model, published in its most complete form in 2008, a year after Ellis’s death. The ABC model explains how stimulus (A) is subconsciously processed (B) and eventually turned into some type of emotive response (C). Ellis’s model complements the earlier, proposed model of stimulus reaction discussed in relation to representation [Figure 54].
Ellis’s ABC model (2008) also explains the importance of the subconscious in any type of decision-making process. According to Ellis, all conscious reactions require an underlying belief that is not learnt, but rather an element of the subconscious mind. That is, we are only affected because there is an existing belief that occupies sub-conscious thought. Ellis’s model also demonstrates that we are unable to be affected unless we can relate the stimulus to some type of underlying belief (Figure 55).
The question that the work of Ellis, Jung and Freud then raises is: what are the underlying subconscious beliefs that are common across all of humanity? One of the areas which Freud was most concerned about was the role that sexuality played in the decision making (conscious or not) of an individual. To Freud, sexuality defined a lot in terms of one’s own motivations (Freud S. , 1953B, pp. 123-246). Although his most famous model of development, the Oedipus complex, is widely discounted today, there is an argument to be made about the importance of relationships, not necessarily just sexual ones, on the development of an individual. Jung is an excellent starting point when discussing the importance of relationships in the function of the subconscious. Just like Freud, Jung proposed a model of the psyche that separated function into conscious and subconscious processes [Figure 56].

Figure 55

Jung proposed the notion of the collective unconscious, an almost spiritual component of the human psyche, in which we as a race share common experience (Jung, 1981). Although not technically a correct analogy, popular culture often embodies notions of the collective unconscious in things such as telepathy, or the hive mind of the Borg from Star Trek, however, these analogies are incongruous with what Jung was actually trying to describe. Whereas the Borg multi-task their decision making in a fashion similar to a multi-core CPU configuration, Jung’s model of the collective unconscious is more about having an instinctual understanding of certain stimuli. What is notable about Jung’s model of the psyche is the important role that comparison plays. In the majority of Jung’s work there is always juxtaposition at play, within the psyche are different entities representing ying and yang opposites offering the individual an important point of reference to define themselves. One of Jung’s most useful references to comparison is in his 1964 publication of Approaching the Unconscious, in which he suggests that we as a race need a sense of opposition to justify our own existence (Jung C. G., Approaching the Unconscious, 1964). Jung also elaborates on the need for “other” forces to provide legitimization in Freud and Psychoanalysis (1961A, p. 323) stating that “man can appropriate its power only by identifying with the daemon”. In Jung’s terms, the daemon represents a divine and internal force on the psyche – another internal juxtaposition within the psyche that provides the essential reference to define the self. Comparative benchmarks formed an integral part of the unconscious mind, according to Jung. He theorized that we as humans share a particular type of collective unconsciousness that allows us to identify certain symbols in a similar fashion, no matter what the time or context. He referred to these symbols as Archetypes and divided them into five main types: The Shadow, The Anima or Animus, The Syzygy, The Child and The Self (Jung C. G., 1981, pp. 3-75). All of the archetypes proposed by Jung rely on some type of relational difference to give a point of reference for each and hence
meaning. For the most part, these relational differences are between the proposed archetype and an individual’s own internal representation of themselves, whilst some archetypes such as the Syzygy and Anima / Animus have relational differences built into them.

Freud also proposed models of the psyche that rely heavily on relationships and hence relational difference (Psychosexual Development, Oedipus, Electra Complex etc). As mentioned earlier, the relationship between the son and the mother, and between the son and the father all play an integral role in everyone’s psyche, according to Freud. However, not everything in life or a game will look like the “castrating” father, nor will individual objects convey any type of sensation without being put into some type of context offering the possibility for relational difference. To understand how relationships can trigger powerful sensations, one needs to consider the modalities of communication that the game offers the player, and how meaning can be conveyed without the need for learned semantic definitions.

![Diagram](image-url)

*Figure 57*
Dealing firstly with sight, there are a number of components that make up this modality. In the contexts of semiotics we have the three most commonly recognized types of symbols: index, symbol and icon. In Pierce’s model (1903), Symbol and Icon rely on the individual learning the semantic meaning of a particular symbol; indexical signs are also a conscious process, however to a lesser extent than the others. As semiotics is a study concerned primarily with constructivism, we can consider that all symbols are learnt, hence their ability to affect lies in the conscious mind (2008). However, according to Ellis’s ABC model (2008) there needs to first be the moment of sensation which happens in the sub-conscious mind which eventually leads one to be “affected.” What is needed, is a system to understand, low-level, subconscious triggers which eventually lead to conscious affect. One of the proposed means of doing so is to evaluate the potential for kinetics to elicit sensation in an end user. I would therefore like to propose the notion of “Kinetic Visemes” – a system which seeks to understand the sensation of observed movement relationships.

The term “viseme” is derived from musicologist, Phillip Tagg’s (2004) usage of the term “museme” to identify a short, section of music which infers a particular affect; the term “Kinetic Viseme” is a term used to define the relational difference between objects on screen without semantic interpretation of the object’s individual form or appearance impacting on the underlying relational meaning. Barthes (1964, p. 10) acknowledges the ability of “objects, images and patterns” to signify on a “large scale,” albeit with conscious need for “linguistic admixture.” Birdwhistell (1971, p. 101) as cited in (Elam, 1980, p. 63) observed over 20,000 facial expressions and found that within the kinetic systems of body language lay kinemes, distinctive units of movement which are comparable with phonemes. When combined, kisemes form “kinemorphic classes” (ibid), similar to how letters are the building blocks of words. Barthes (ibid) notions that these individual component initially cause a process of signification that it is then linked to a semantic definition when combined. In this regard, we can see that kisemes initially cause a moment of sensation, followed by affect once the conscious mind is able to combine these smaller elements and link them to semantic definitions. However according to Elam (ibid) “Birdwhistell insists however, that any comparison is formal rather than substantial: there is no direct correspondence between kinesic and linguistic units, but only a more general analogousness between language and movement as overall syntactic systems.”
Daniel Ster (1973, p. 117) provides rationale for why Kinetic visemes should be treated as unique from other types of symbols stating that “while language is a “symbolic event” kinetic units are not symbols.” Birdwhistell (1971, p. 117) as cited in (Elam, 1980, p. 64) also states that kinetic visemes make “statements about the context of the message situation,” and not necessarily providing any well defined semantic definition. Elam (ibid) goes on to state that “such signals [kinetic visemes] serve in the first instance to draw attention to and so designate the protagonist in an interaction sequence, placing him in relation to other present and to the communicative situation.” Finally, Elam (1980) provides his ultimate justification for the differentiation of movement to visemes by stating the importance of the kinesic message:

At the same time, kinesic messages have their own material and formal autonomy even in the most memetic of performances: the establishment of patterns and recurrent movements, rhythmical variations, changes in tempo and constellations of positions has been an essential part of the aesthetic information of the spectacle throughout its history and has, indeed, been the very “raison de tre” of highly visual displays (p. 69)

In the case of this study, kinetic visemes are a form of symbol that identifies affect by analysing the spatial relationship of one or more object(s) over time. The metrics of this particular symbol are based around the work of Elam (1980, p. 66) and can be defined as the following:

- The object’s tendency to move to or away from an object
- The speed and predictability of the movement (or lack thereof)
- Consistency of movement vectors in relation to other objects

Kinetic Visemes are based on kinaesthetic semiotics, which originally began as a style of understanding the semiotics of movement in dance and theatre. Semiological studies of theatre started with the works of Jean Alter, Keir Elam, Erika Fischer-Litcher, Patris Pavis and Jiri-Veltrusky (Aboo Backer, 2007, p. 21) and culminate in recent writings by Arts scholars such as Jane Desmond in her book “Meaning and Motion: New Cultural Studies” (1997). The main reason for the using the different term of Kinetic, rather than Kinaesthetic, is that theatre and dance studies have an additional focus on form and aesthetics whilst the model being proposed here is solely based on movement of nondescript objects, and are hence devoid of any bias introduced by aesthetic representation.
Kinetic Visemes are particularly useful in video game analysis as an observer can identify relationships and subsequent affect based on this relationship. To observe the significance of Kinetic Visemes, one must first strip back the viseme layer of representation to only show the kinetic aspect of representation. To do this, let us analyse the Kinetic Semiotics of a small section of a boss fight from the Shmup *Ikaruga*.

![Figure 58](image)

Figure 58 represents the first object in the Kinetic Viseme. “Object” A is emitting a consistent string of fast moving sub-objects all travelling along the same vector, as represented by the red arrows. As these objects are moving away from the larger object, we can infer ownership, or a relationship between the two sets of objects. The fact that these sub-objects move away from Object A at a high velocity infers the power of object A over the sub-objects. Power is also conveyed by observing that the vector at which these sub-objects move away from object A is consistent and regimented as if they were soldiers following strict instructions. Now let’s look at the next layer of objects in the exact same scene.
Figure 59

Figure 59 is the very same scenario, with the addition of Object B. If we look at the movement of Object B over time in relation to Object A and its sub-objects, we can see that Object B has a tendency to move away from Object A. As the movement vector of Object B changes a few times we can also infer a lack of certainty in the movements of Object B, as if it were at the whim of Object A. From this series of Kinetic Visemes we can infer that Object B is inferior to object A, as its spatial movements seem to be dictated by other objects rather than it dictating the portioning of virtual space. The affect would therefore be power, Object A being the representation of power of oppression as is demonstrated by its dominance over Object B.

Figure 60

Alternatively, Figure 60 identifies a set of Kinetic Visemes that demonstrate how Object A could become subservient to Object B. In Frame 1 of Figure 60, Object B encroaches
on Object A with a consistent approach vector demonstrating equal aggression and confidence. In this example, Object B has identified with the aggressor and has begun to emit a consistent stream of sub-objects aimed directly at Object A, inferring a sense of purposefulness. Frame 2 of Figure 60 is the next step of the Kinetic Viseme, whereby Object B continues to defy Object A’s monopolization of virtual space by further encroaching upon it in the same consistent, powerful manner. Finally, Frame 3 of Figure 60 demonstrates Object B’s dominance of Object A as it forces Object A to quickly move away from Object B without emitting any type of sub-objects towards it. This particular kinetic visemes first demonstrates repression of Object B, then defiance and then finally dominance of Object B.

Figure 61

Figure 61 is the very same scenario as depicted in Figure 58, Figure 59 and Figure 60 with the iconic, indexical and symbolic visemes in place. What this aims to demonstrate is the importance of Kinetic Semiotics in order to understand the relationship qualities of certain objects within video games. Interestingly, the above scenario could be represented using a number of different visemes, however the affective quality of the relationships being demonstrated on screen would remain the same. Importantly, Kinetic Semiotics demonstrates relationships. Once one can observe the relationship, they can ascertain the relative affective quality of that particular relationship. In the case
of video game and especially Shmups, Kinetic Semiotics is a way of observing power and dominance.

Using the object’s tendency to move to or away from another object, the speed and predictability of the movement (or lack thereof), and the consistency of movement vectors in relation to other objects, it is easy to devise a system where emotive traits of relationship can be identified from Kinetic Semiotics.

**Bring the Player to Action: Movement**

The movement examples below will form the basis for analysis in the case studies and will be adapted for use in extrapolating meaning from other movement relationships such as the relationship between the input mechanism and the avatar.

*Purposefulness: Figure 62*

Fast, purposeful movement of an object infers confidence and to some extent a sense of empowerment.
Indirection: Figure 63

Movement that is erratic and inconsistent suggests a relationship with the environment in which an object is confused. This can also be interpreted as indecisiveness and lacking in power or control.

Forcefulness: Figure 64

Fast, purposeful movement of an object away from a stationary object infers a hierarchy of power. Object B belongs to Object A because it moves away from Object A in a controlled, linear and purposeful manner. As its vector does not change, it infers that it
has no free will or sense of empowerment over itself: the object at its point of origin therefore determines its centre of control.

**Forcefulness and Control**

![Figure 65](image)

Figure 65

When an object (B) shares the same movement vector as its point of origin (A), Object B can be determined to be a sub-object of A. Affectionally, as the sub-object shares the same movement vector, Object A can be deemed to be forceful and direct.

**Lack of Control**

![Figure 66](image)

Figure 66
If a sub-object (B) moves away from its point of origin (A) but does not travel on the same movement vector, the relationship can be interpreted as accidental, similar to the way objects react during an explosion. In this case, although Object B can be identified as a sub-object of Object A, the movement can be seen to be unintentional and hence almost accidental.

*Playfulness, Disempowerment:* Figure 67

![Figure 67](image)

Alternatively, indirect, erratic and inconsistent movement away from an object can infer that the object at the point of origin has little or no control of the sub-object and is not a source of power or control. This type of relationship can also depict child-like playfulness as Object B does not try to control the space which Object A controls; rather Object B questions the authority of Object A, indirectly.
Victim Relationship: Figure 68

Playfulness can also turn to evasion depending on whether the space has certain occluders in it that prevent line of sight or inhibit movement (Objects C, D, E and F). In this example, Object B can be seen as being “scared” of Object A as it attempts to evade Object A by putting occluding objects between them. This relationship infers that Object A is dominant, however Object B is not subservient to Object A, but rather terrified by it. This terror can also be observed in the erratic movements of Object B. A lack of constant speed and movement vectors infers a state of panic and lack of purpose.
Hunter /Prey Relationship: Figure 69

When one object (A) uses occluders (C & D) to evade another object (B) this can be a sign that Object A is the more powerful in the relationship as it is aware of B, but B is not aware of A. This type of relationship is that of a hunter and its prey; there is no indecisive movement and everything on the hunter’s side (Object A) is planned and methodical.

Power Relationship: Figure 70
Repulsive forces around an object which cause other objects (not necessarily sub-objects) to move away can infer power and dominance of the main object (A) and submissiveness / fear of the other objects (B, C, D, E). In this case, Object A is a force to be reckoned with and holds the power in this scenario.

**Inferior Relationship:**

![Figure 71]

Inversely, when an object (A) is pursued by faster moving objects along the same movement vector, Object A can be deemed to be the inferior in this relationship, especially when other objects (B, C, D, E) move as close as possible to Object A as fast as possible.
Mutual Relationships: Figure 72

If Object A and Objects B, C, D & E move towards each other with consistent speed and a purposeful vector, the relationship can be seen as mutual on both sides. However, superiority of one object can be observed by the total distance travelled by the objects in relation to each other. In this example, Object A is the dominant because it chooses to travel less distance in the same time when compared with Objects B, C, D & E. However, the key element that differentiates this Kinetic Symbol from that of aggression is that all parties will decelerate logarithmically before touching.
Fearful Relationships: Figure 73

![Diagram of Fearful Relationships]

When objects share common approach vectors, they can be assumed to be part of the same family of objects. In this case, Object A is the focal point of all approach vectors for all other objects. This infers that everything other than Object A is part of the one group of objects. This can make Object A seem like a “god-like” entity as all other objects feel the need to challenge Object A’s space. As such, Object A can be viewed as not the most powerful, but that with the most potential.

Fight or Flight Relationships / Underdog Relationships: Figure 74

![Diagram of Fight or Flight Relationships / Underdog Relationships]
In this example, as there is no central focal point for approach vectors, it is difficult to ascertain which objects are more significant than others. The only way to deduce the superiority of objects in this scenario is to observe over a longer period of time and see which objects become deleted first. The last object standing can be considered the superior; however this scenario demonstrates that no one object is perceived to have any higher power or potential power than another.

**Bring the player to Action: Sensation to Affect**

According to Ellis (2008), affect is always the result of an underlying belief that is processed on a subconscious level. It is these sub-conscious beliefs that affect the gamer and compel them to first feel and then act in a specific way. Anna Freud further conceptualized the work of her father in regards to the mechanisms of defence, which are certain subconscious processes all designed to protect the psyche given certain stimulus. In both Anna Freud’s and Sigmund Freud’s work, the defence mechanisms are part of subconscious process, however they will elicit specific, conscious reactions in people when triggered. Anna Freud clarified and conceptualized much of Sigmund Freud’s work on Defence Mechanisms in “Ego and Mechanisms of Defence” (Freud A. , 1967). Instead of Sigmund Freud’s definitive singular term, Anna Freud described various different defence mechanisms, of which several remain highly pertinent to the experience offered by video games: Projection, Identification and Sublimation.

Projection works by imparting the negative aspects of one’s psyche onto others so that people may experience a socially negative impulse or desire without letting the ego recognize it. Comparisons can be drawn between projection and the Jungian archetype of the shadow. In many games, the antagonists are merely a reflection of the gamer and their chosen protagonist. Identification as described by Anna Freud is the unconscious modelling of an individual based on behaviour. This can be seen as an integral aspect of personification and is also manifested in games through avatar selection. Lastly, sublimation is probably one of the most interesting areas in relation to video games due to the negative publicity that the medium faces in relation to suspected links with juvenile violence. Sublimation is the refocusing of negative energy into more acceptable tasks. We can see this in the way that video games offer a socially acceptable means by which to undertake a number of both socially acceptable and socially unacceptable tasks. This ranges from experimentation with gender, such as male gamers playing as female avatars, to the more sinister homicidal acts seen in games such as *Postal 2.*
Again we see the presence of relational difference in compelling the player to act. Anna Freud’s defence mechanisms rely on a comparison or juxtaposition of entities; most often the contrast of the “idealized” psyche against imagined or real “threats”. The sheer diversity of what could trigger a defence mechanism in games is as diverse as people are different, however in most cases there are common, shared experience factors such as birth, sex and death which can be considered more or less universal constants. These themes should be carefully considered when looking for elements of games that can trigger powerful underlying beliefs and subsequently bring the player to action. To understand how these themes can be encoded and subsequently used as stimulus in games, it is necessary to understand the role of semiotics and how an amalgamation of structuralist and constructivist approaches can be used to better implement the models of Vorderer et al. (2003) and Cook (2005).

**Bring the Player to Action: Semiotic Theory and Coding**

If psychological response is a constant across contemporary gamers, then coding of emotive elements is the variable, dictated by hermeneutic factors (Figure 75). Hermeneutics and its relationship to coding in the context of this study is a combination between the Schleiermacher and Dilthey post-structuralist perspective and the pre-German romantic perspective of “pure” interpretation: how do I interpret as opposed to how do I communicate as cited in Dithley (1991, pp. 113-114). It is important to consider one’s own similarities to humanity as a biological organism whilst at the same time acknowledging one’s own differences based on societal experience and other manipulating factors. In Figure 75 there is a direct influence of societal norms and life experience on both the subconscious and conscious minds. Although perception is usually only linked to conscious processing, it is impossible to deny the impact that reality has on influencing the subconscious mind.
Semiotic theory in most contexts is treated as a purely constructivist type of methodology: objects do not have meaning; meaning is given to objects by people. Lemke (1994) claims that semiotics is often too concerned with constructivism, particularly in the post-modern type writings that are essentially some type of inverse “myopticism” (Cerecina, 2007). That is, they are exceptional at seeing the abstracted, distanced truths of perception but often fail to consider the obvious biological facts, common to all. In some ways, semiotic analysis practitioners such as Tagg (2007) have acknowledged the existence of certain affective constants in the use of his “Inter Objective Comparative Material” (IOCM) system, whereby the subject of analysis is compared to other similarly affective materials to provide objectivity in such a subjective field. Tagg acknowledges that despite the differences between people, there are many similarities in interpretation of affect. Based on this reasoning, this study will use semiotics to understand how the conscious minds of designers (who make games) implement subconscious triggers from their own psyche into the games they make and hence form a potentially powerful communicative loop with the gamers who eventually play their games. Although other researchers have attempted this approach, there have been inherent flaws in their approaches.
In terms of Ludology discourse, Lindley (2005) defines the experience of playing a game as being part of “Ludic space”, complex “systems of experience incorporating concepts of game or game play and related experiences”. As with most Ludologist discourse, “Ludic space” is a variation of an existing term: “game play”, a highly ambiguous term at best. Therefore, in Lindley’s discussion of the semiotics of video games (2005) “Ludic space” is merely referring to the game play experience and the subsequent interactions of the player in the virtual world based on stimulus. Although one can examine video games from a semiotic perspective, Lindley makes the distinction that video games are a temporal experience and that the process of having many different “time scales” within a game drastically alters the player’s perception and subsequent meaning of symbols. It is in this regard that Lindley clearly defines the semiotic structure of video games as being more hierarchical, as opposed to semiotic models as described by Metz (1974) for cinema, or the multi-modal system as explored by Kress and Van Leeuwen (2001).

To define the temporal system of Ludic space, Lindley defines four layers or temporality that affect the way in which meaning in video games is conveyed. The discourse level is the layer of the game which conveys narrative to the player through traditional conventions such as verbal, textual and cinematic conventions, all of which are similar to those explored by Chatman (1978) Rimmon-Kenan (1983) and Stam et al., (Stam, Burgoyne, & Flitterman-Lewis, 1992). Beyond the discourse level is the performance level, a state in which the player is active in influencing the narrative structure of the game. This can be likened to a number of existing semiotic models, such as that of the “active receiver” (Manovich, 2001) in which the receiver actively influences outcomes of the semiotic discourse. Lindley (2005) further defines the performance level as “only those parts of the virtual world directly experienced by the player. In purely narrative systems this is the plot”.

The simulation level is the representation of the virtual world in which Lindley seems to draw heavily from cinematic conventions. Lindley defines this level as being the current visualization of the game. Although modern games are massive in scale, only a small portion of this can be represented on screen at any one time. Additionally, the simulation level, although restricted by the rules of the game, is largely controlled by the player. This leads to the final level of “generative substrate” (ibid) or the rules of the game world. Lindley likens this level to the system of rules that defines our written and
verbal discourse: syntax, spelling grammar etc. and as such draws parallels with Saussure’s \textit{parole}.

Although semiotics has much to offer in the analysis of video games, Lindley’s model is overly complex as it is more focused on analysing games as a whole rather than as a process of re-occurring choice, reaction and modelling as described in the Vorderer et al. (2003) model, or even Cook’s (2005) game design model. However, temporality is significant in understanding the semiotics of video games and in many ways Lindley has merely offered another semantic variation of the term “hermeneutics” (Köchler, 1983) (Peirce, 1981) or the more personal, communication empathy as proposed by Rogers (1989, p. 233). As Lindley’s model can only be used to examine video games after the player has gone through the game and altered the simulation to suit themselves, it does not offer a useful means by which to design the semiotic language of video games during the production phase, nor does it define symbols and meaning on an individual basis.

This can also be explored in terms of the contemporary video game industry. Although there are members of production teams who are responsible for the overall vision of the game, the development team - coders, animators, tech artists, designers etc. - are all placed in roles which have them developing the micro elements of the game. For example, team roles can be so specific as to focus solely on one type of asset or one character. Anecdotal evidence also suggests that the design of video games is largely emergent, relying heavily on focus testing which ultimately changes the original holistic vision.

Additionally, in the case of Shmups, only twenty out of the 331 games surveyed emphasized any story line, and even fewer still allowed the player to change the game narrative experience on the discourse level through features such as rhizomatic level choice. Consequently Lindley’s proposed semiotic hierarchy of games is largely flawed for widespread use in both analysing and developing games. The key to examining the semiotics of Shmups lies in revisiting the Vorderer (et al. 2003) model, specifically the second stage of the model: “a specific necessity to act”.

In the second stage of the Klimmt and Vorderer model, the player is compelled to perform an action based on certain stimuli in the game world, and how they perceive this stimulus. Examples of this can be seen in the placement of rewards in two-
dimensional games that are intentionally placed so as to move the player around the map, explore new areas or undertake significant risk. In this way, semiotic discourse in video games can be understood as an indirect dialogue between the designer (sender) and the gamer (receiver). As such, this study is reminiscent of Sheffield’s (2004) remarks in which post-structuralist discourse of video games is largely a dialogue between the designer and gamer, a sentiment also shared by Crawford (2003).

Also notable about this type of approach to design and analysis is HCI semiotics, a field of study largely concerned with the practical implications of research, uses this model for interface design. Barbosa et al. (2001) look at how we can design software and software interfaces to elicit specific reactions from end users. These authors draw heavily from the more traditional semiotic models of Saussure, Baudrillard, Barthes and Strauss to define the inherent meaning of symbols based on the traditional “sender and receiver” model. From the visual standpoint, to explore the second stage of the Vorderer et al. (2003) model in relation to Shmups, this study relies on Pierce’s (1981) breakdown of visual communication: iconic, symbolic and indexical.

In the case of the Vorderer’s et al. (2003) model, compelling the player to act through visual communication occurs when the player is presented with an iconic or symbolic type signifier. Indexical signs are usually reserved until the fourth stage of the Vorderer et al. (2003) model, “a result which influences the enjoyment felt by the player and the configuration of the subsequent situation”. We can think of indexical signs as giving the player feedback on what just happened and thus updating their experience. For example, when a player sees an enemy in iconic or symbolic form, they are compelled to act accordingly. If the player destroys this enemy then they are presented with an indexical symbol in the fourth stage of Vorderer et al. (2003) model, demonstrating that they have eliminated the threat. An example of this is seen in Sonic the Hedgehog where the protagonist, Sonic, destroys enemies by jumping on them. If Sonic manages to achieve this, an indexical `puff of smoke’ communicates to the player that they have been successful.

As the Vorderer et al. (2003) model has given game researchers a methodology to understand games on a small, contained, mechanical level, so too does the Peircean semiotic model offer both researchers and designers a more malleable tool. However, this does not mean that overall structure is ignored, rather the end result is more of a
gestalt – a combination of individual approaches which when combined creates something far more useful and scientific. Peirce’s (1981) model will be used throughout this study to identify visemes and their relevance to Shmup design. This information will then form the basis for further psychological, hermeneutic and game-specific discussion in relation to each case study.

Compelling the player to act is one of the more intensive heuristics to evaluate simply because of the multitude of problems associated with interpretation. To summarize this heuristic: one needs to evaluate games based on the psychological impact that a piece of stimulus may have. To do this, we can rely on the wealth of existing knowledge in the field of psychology; however it can be augmented by semiotic analysis which accounts for changes in representation, created by hermeneutic factors such as changing social contexts and technological innovation in the field of games graphics technologies. By analysing this heuristic, one is able to understand the entire gamut of emotions and this is largely why this heuristic requires such significant discussion throughout the case studies.

The Fourth Heuristic: Education

This heuristic has already been covered in some detail in regards to player motivation however, specific methods of analysing and implementing this heuristic still need to be discussed. Although Crawford (1984, pp. 15-22) and Robertson (2008) both attest to the importance of player education, the best framework for analysis and implementation has been developed by game designer and critic, Daniel Cook (2007). The trend of mapping the game structure as a recurring cycle of events as opposed to a simple progression from start to finish is a model that is beginning to gain significant credibility within the games industry. Cook (ibid) hypothesizes a four-step model akin to the Vorderer et al. (2003) system that can be used to solve design issues in a practical context. Like the Vorderer et al model, Cook (2007) suggests that the player is an “entity that is driven, consciously or subconsciously, to learn new skills high in perceived value; similar to the motivation argument of Crawford (1984, pp. 15-22). He notes: “players gain pleasure from successfully acquiring skills” (Cook, 2007). Cook subsequently derived a model encompassing the following four steps: Action, Simulation, Feedback and Modelling.

In the action phase, the player commits an action as simple as pressing a button in the case of new players, or complex button combinations where more experienced players
are concerned (known as batched commands). During the next stage, Simulation, the result of that action will become apparent; that is, a door opening or the player moving. Depending on the situation, the feedback stage uses auditory, visual or tactile feedback to inform the player whether their action was good or bad. Based on this feedback, the player then enters the modelling stage, where this information is absorbed and the behaviour either learnt through reward or discouraged through punishment.

Cook’s model relies heavily on the semiotic coding of affect to provide the mechanism for simulation and feedback. Also, unlike the Klimmt and Vorderer model, Cook’s system is about learning how to best teach the player, by coding emotion into various elements of the game such as visual, auditory and tactile feedback. Another key difference between the two models is that Cook’s system is intended for use in design testing, both during the pre-production and production phases, to explore any flaws in the game design. Klimmt and Vorderer’s model, in contrast, is used more as an analytical tool, to ascertain the relative success of failure of the game designer in coding sensation into their game play.

Neither model is particularly effective by itself, however; both rely on slightly different frameworks in order to work. As Klimmt and Vorderer’s model is more concerned with the coded elements used to inform decision making, there is an emphasis placed on the multidisciplinary inclusion of psychological theory. Cook’s (2007) model conversely is concerned with encoding of sensation; it relies on semiotic systems, visual, auditory and tactile. Cook’s model also encompasses some areas of psychological theory, drawing particularly from cognitive psychology to better understand how to best teach the player. Cognitive psychology defines the capacity of short-term memory (STM) to be equivalent to approximately seven new items per thirty second burst (Tarnow, 2005). These items can be divided into two categories of Sensory memory: Iconic memory (visual memory) and Echoic memory (auditory memory). In the environment of video games, the player must be given immediate feedback through these two sensory systems as to which game-specific skills need to be committed to memory in lieu of other less essential elements.

Cook’s system of skill atoms can not only be used to examine how games work, but also as a tool for designers to evaluate whether their games are introducing skills in a logical
and progressive fashion. Although Cook’s model of player skill atoms is a highly valuable design tool, it can be strengthened with the addition of a “timing” factor as quantified by the established research into STM. To augment Cook’s model, we need to ensure the player is not receiving more than seven atoms per thirty-second period, and that feedback is being given in the form of Iconic and Echoic stimulus to facilitate quick assimilation of skills. This time frame is essential to the design of Shmups, as the pace of the genre does not allow for much time to elapse before another concept is introduced to the player.

In order to successfully ascertain the effectiveness of this heuristic, this study will analyse the case studies based on the ways in which the player is educated, if at all. This analysis will be strengthened by cognitive psychology principles as well as semiotic theory to help understand how the player interprets essential feedback and stimulus. By evaluating this heuristic, one is better able to understand the ways in which empowerment, feeling competent, and the feeling of autonomous control are represented in the ever-changing form of representation.

The Fifth and Sixth Heuristic: Challenge & Reward

It is difficult to discuss challenge without reward because in the case of all games, they are used as an essential counterbalance to each other. Further, this heuristic is a complementary heuristic: it is a requirement for other heuristics to be effective. Take, for example, the heuristic of player education and the heuristic of empowerment. Both require the existence of challenge to provide the player an environment in which their own skill can be measured in terms of education and compared to other NPC’s and game entities in the form of empowerment. Continuing this theme is the inextricable link between reward and education. Both Cook (2005) and Crawford (1984) attest to the importance of offering the player meaningful chances to learn, therefore, education might be considered to be the reward, and challenge the opportunity to use the newly required skills and further improve. Challenge and reward are alternate sides of the same coin.

43 For further explanation of Cook’s skill atom model, please refer to http://www.gamasutra.com/view/feature/1524/the_chemistry_of_game_design.php
Many game designers refer to systems of risk and reward in their game design. Rewards are placed strategically to either encourage the player to learn new skills, or to create tension in the game so that the player takes a risk to achieve a reward. When using this approach to game design, one can treat risk and reward as ‘tokens’ - icons within the game that represent polar opposites (Hannah, 2004). As such, we arrive at the term token metrics, a term used to describe the delicate interplay between these two opposing sets of tokens. As risk increases, so too must the potential for reward. In the case of Shmups design we have a number or recurrent types of risk and reward tokens. Risk tokens can be collision objects such as scenery, enemy ships and most importantly, enemy projectiles, whilst reward tokens are most often associated with items such as power-ups, tokens designed to increase the power of the player.

One of the key aspects of token-based design is a system of balance: for every token there needs to be a counter token. The balance between these tokens can be discerned based upon an equal ration of difficulty to reward. *Aero Fighters 2* exemplifies this by rewarding the player with point tokens for destroying and subsequently “dashing” to a dangerous section of the screen to redeem the token, that is, the further towards the top of the screen the reward token is, the higher the reward is. [Figure 76] divides the play field of *Aero Fighters 2* into three distinct sections. If the player were to destroy something in the red section and subsequently dash towards it before it scrolled down to the yellow section, then they would be rewarded with the highest possible token. The reward for obtaining tokens in the red section is offset by the risk of limited line of sight. As the player moves towards the top of the screen in a vertical Shmup, they are less able to anticipate enemies, hence requiring higher levels of confidence and resulting in a higher level of difficulty. In the case of most Shmups, novice players will spend most of their time in the green section, a safe area that allows them sufficient time to avoid or engage enemies.
Although this type of reward system seems to be an extrinsically informed system, the mechanisms of player score are a hard and fast way for the player to establish the legitimacy of their own game education: “I am getting better, my score says so”.

Token metrics measure the relationship between difficulty (challenge) and the ratio of reward opportunities, whether they are score elements, pickups or even dialogue breaks. Valve, the creators of Half Life, use a similar system in their own game designs known as experiential density which measures the time between events, however, this system does not work to counterbalance risk and reward, rather to ascertain that the player is getting enough action based on the level of difficulty. Like experiential density, token metrics is mostly common sense: more powerful weapons need to be scarcer, rewards need to be such that they don’t make future challenges too easy, easy enemies should approach the player through more obvious approach vectors etc.

The obvious issue with inappropriate token placement, specifically challenge-based tokens, is the possibility of burning the player out. According to Cook (2005) burnout occurs when the player is not given adequate feedback for negative actions and when the game challenges are un-equitable, that is, needlessly difficult. When challenge is not managed correctly, it can be detrimental to the heuristics of flow, immersion and empowerment. Valve, as cited in Birdwell, (1999) have an intuitive solution to this problem stating that if the player acknowledges their failures as their own, then the challenge is fair and equitable. As a flip side to this, “when they [the player] succeeds,
and the game rewards them with a little treat — scripted sequence, special effect, and so on — they’ll feel good about themselves and about the game” (Birdwell, 1999).

One way of evaluating the interplay of challenge and reward is through observation of game feedback loops. Feedback loops are not to be confused with game feedback, but rather constitute the system of balance employed by multiplayer games to help in creating a level play field. Garde ⁴⁴ (2008) describes a feedback loop as being a system of rules, made transparent to the player and which helps create clear-cut cause and effect type relationships. This description sounds like a simple explanation of game mechanics, however, a feedback loop is a type of game system that works only towards balance. According to Garde (ibid) there are two main types of feedback loop: the positive loop, which is a system that rewards leading players, further increasing their lead, and negative feedback loops which punish the winning players to help benefit players who are losing.

According to “Casual Game Design” (2006) both positive and negative feedback loops can be bad when implemented incorrectly. A positive feedback loop will frustrate losing players as they don’t see any opportunity to win and will bring the game to a needlessly short end whilst negative feedback loops in a design may make “the players feel that are out of control, or feel they’re being penalized for a good performance” (Garde, 2008). Just like token metrics, evaluating feedback loops comes down to common sense. In a FPS, if a player receives a powerful weapon like a rocket launcher, then the designers should use a double-edged sword approach and make the player significantly slower whilst using this weapon. What is desirable is a system which allows catch-up of losing players so long as they are doing the right things, and which allows for leading players to begin losing only if they are not constantly exhibiting the level of skill required to be a leading player ⁴⁵ [Figure 77].

⁴⁴ Ivan Garde is a character animator by trade who writes independently about a number of game design related issues.
Implementing the challenge heuristic leads to a myriad of emotions, both positive and negative, including anger, frustration, fiero, boredom, excitement, relief and schadenfreude. When combined with successfully implemented reward systems, the gamer is exposed to feelings of self-legitimization, achievement, empowerment, autonomy, competency and relief. Interestingly, reward can also be intentionally small such as in Resident Evil where ammunition, even for the most basic weapons is sparse. When a player then receives a different, albeit only moderately more powerful weapon, the sense of perceived value is high and therefore Resident Evil is an excellent benchmark on how to balance these analogous states. What is critical about evaluating these two heuristics is that they be analysed together, due to the way in which they inform the usage of each other.

**The Seventh Heuristic: Immersion**

Although immersion is considered to be a component of Csikszentmihalyi’s (1991) model of flow, Brown and Cairns (2004) and Ermi and Mäyrä (2005) make the point that as flow is elusive, immersion needs to be treated almost independently of it. Ermi and Mäyrä (ibid) conducted research into the area of immersion and video games and through their literary analysis, put forward several definitions of immersion in video games. They concluded that immersion can be derived from several different sources:

- “The conventions of the game matching the user expectations, meaningful things to do for the player, and a consistent game world”. McMahan (McMahan, 2003), as cited in (Ermi & Mäyrä, 2007, p. 54)

Through use of empirical research, Ermi & Mäyrä formulated a model of immersion which breaks the phenomenon down into three components:

- **Sensory immersion**: The quality of the audiovisual systems of the game
- **Challenge-based immersion**: This is closely related to Cook’s system of player skill atoms, where a player will feel most comfortable when the challenge and subsequent skill required to match the challenge are equally balanced.
- **Imaginative immersion**: Coherence of the game assets in relation to secondary world creation.

Most significantly, Ermi & Mäyrä state that for a game to be immersive requires a “particular kind of a game and a particular kind of a game player”, in a constant, symbiotic loop that adheres to the player’s own reality principles. This particular model is worthy of note as it has been one of the more recent models to use a Deleuzian style perspective and therefore a constructivist perspective as seen in Figure 78.

Ermi and Mäyrä’s model of immersion fits well within the contexts of this study. It follows the same post-structuralist approach that the literature review of representation adheres to, and as such accommodates changing means of representation. Figure 78 also demonstrates the interdependency of the design heuristics as familiar elements such as player cognition, social context, and quality of representation (audio/visual), which are
all integral to creating an immersive sensation for the player, one of the core emotive traits.

Measuring this heuristic via application of Ermi and Mäyrä’s model is fairly straightforward. Comparative analysis of audiovisual technologies is one way to ascertain technological immersion. Social contexts can readily be ascertained through semiotic analysis as well as by examining a game’s usage of popular references. Finally, imaginative immersion elements can be examined under the guise of secondary world creation and aesthetic cohesiveness, that is, does the game feel focused? Furthermore, if the heuristics relating to flow and empowerment remain unfulfilled, then we can consider immersion to be broken.

**The Eighth Heuristic: Immediate Feedback**

Cook’s (2007) model of player skill atoms is one of the most widely recognized forms of game design analysis. As noted earlier, the model is a means of establishing not only whether the player is being taught skills in a logical order, but also a mechanism by which the designer can examine whether or not they are giving the player adequate feedback via sensory means. Video games, as the name suggests, rely primarily on feedback from visuals, with sound and tactile elements coming in as secondary and tertiary feedback modalities respectively. The modality of visual feedback is the most obvious, and probably the easiest to evaluate. In semiotic theory, the three modalities of signs are Symbol / Symbolic, Icon / Iconic and Index / Indexical. The former two groups of terms: Symbolic and Iconic, are linked with giving the player cues as to when and how to act, whilst it is the modality of Index / Indexical signs which is responsible for all forms of player feedback. Indexical signs signify to the player that something has happened and are the primary measure of identifying the types of feedback being offered to the player, however, there is still a cognitive perspective required to understand how timing of feedback can also impact on player experience.

The cognitive aspects of feedback are covered quite well by Swink (2009, p. 37) and were discussed at length earlier on in relation to the empowerment heuristic. The way in which the Limbic system of the brain commits input stimulus to semantic, long term memory (LTM) is a scientific measure of the success of a feedback system. Swink identifies a crucial period of 100ms where the game output is processed by the player, and a subsequent period of 70ms where the player comes to a decision.
significant about this timing is that it is the crucial length of time required where an action can be associated with an outcome by the human brain: I do this, this happens. This process is essential to a number of other heuristics and when implemented successfully, means that the player will always be able to associate action with reaction.

The modality of the feedback is also critical and factors into how the player comprehends the scenarios unfolding in front of them. Tactile and auditory feedback can be used as complementary modalities, or by themselves. Significantly, music, especially non-diegetic, is not a means of feedback, rather it is a mechanism that causes the player to undertake some course of action. Auditory cues, such as explosions and other general sound effects, however, are essential means of feedback and are relatively easily analysed by use of inter-objective comparative material or even hypothetical substitution.

Despite the modality that is used in the feedback system, this study will evaluate the effectiveness of this heuristic based on whether feedback is given at ALL points in the game; how long after the event the feedback mechanism is used; and the semantic potential of the feedback: that is, will the player understand whether the feedback is positive or negative?

**The Ninth Heuristic: Contemporary Coding**

Another way to describe this heuristic is simply by saying that the game must be relevant. If all communication is based on culture, then it is essential that the game is communicating with the player using the most effective social norms. The reason for the importance of contemporary coding is that we do not actually see a real version of the world; rather, we see the world filtered through our own perception. “Perception depends on coding the world into iconic signs that can re-present it within our mind.”

The force of the apparent identity is enormous, however. “We think that it is the world itself we see in our mind’s eye, rather than a coded picture of it” Nichols (1981, pp. 11-12) as cited in Chandler (2007, p. 151). This sentiment supports the literature reviewed earlier, and also suggests that humankind posits itself at the centre of all relationships. Therefore, the world as people know it, only exists in our own heads. Contemporary coding is not just limited to time, but also locale and culture. As such, hermeneutics is a valid way of questioning the relevance of certain coding practices. Hermeneutics, although historically associated with the interpretation of biblical texts has in more
recent times has become associated with the entire process of interpretation, not only of written texts.

This heuristic is a complimentary heuristic for compelling the player to ac”, and instead of dealing with subconscious, psychological issues, it is more concerned with conscious semantics and how they inform interpretation of the games people play. In a way, this heuristic ensures that a relevant context is provided for all game experience. This heuristic isn’t related so much to sensation, but rather to emotion. This heuristic is remarkable also as it doesn’t actually convey any specific emotion, but rather provides the milieu (Semetsky, 2005) for all emotion to exist. The heuristic of contemporary coding is therefore closely linked to the concept of representation and the model of communication as proposed by Hall (1997B): that is, all communication is representation and representation does not only work within certain, relevant contexts.

The Tenth Heuristic: Familiarity

The need for familiarity has been one of the driving factors behind the push for sequels and extensions to existing intellectual properties (IP) in the games market. Kierkegaard (2008) discusses the advantages that sequels have over new intellectual properties in the contemporary games market, by discussing how gamers become emotionally invested in certain game experiences. Kierkegaard likens this emotional investment to a financial one, making the point that gamers are far more likely to be drawn to existing intellectual properties as they already feel familiar and at ease with the experience, given their existing emotional investment. Gamers feel more comfortable purchasing titles with which they are already partly familiar. They have experienced the game world before; they are fond of it and wish to continue their emotional investment. Kierkegaard (ibid) contests that a sequel will always be more appealing than a new intellectual property, as familiarity plays such an important role in consumer trends.

As familiarity is a trigger linking the game to already existing experience in the player, it can be responsible for triggering a wide variety of emotions and sensations. A player who interacts with a world similar to their own experiences might have a stronger attachment to the game as opposed to another gamer who may not have any points of reference for the experience. Familiarity can also compel the player to act through mechanisms of constructivist meaning of observed stimulus. Standardizations such as common input schemes are also an element of familiar game design, and can create
intuitive experiences for players already well versed in their current genre. However, the
most significant element of the familiarity heuristic is the ability to trigger the powerful
sensation of nostalgia.

**Familiarity & Nostalgia**

Derived from the Greek words, νόστος (nostos = returning home) and ἀλγός (algos =
pain/longing), Nostalgia was originally considered a medical condition, investigated by
Swiss medical student Johannes Hofer in 1688 A.D (Lowenthal, 1985, p. 10). It was
originally treated as a disease during the seventeenth through to the late nineteenth
centuries: people suffering from nostalgia would live in fear of not being able to return
to their homeland, an extreme dysphoric affect. By the 1850s nostalgia was losing its
status as a particular disease and coming to be seen rather as a symptom or stage of a
pathological process. It was considered as a form of melancholia and a predisposing
condition among suicides. Nostalgia was, however, still diagnosed among soldiers as late as the American Civil War.

Nostalgia has received a more positive meaning in the twentieth century, and although it
shares common roots with the original definition, the effect is quite different on the
‘sufferer’. A symptom of the Capitalist era, Nostalgia is now a marketable affect,
especially in the realm of popular music, films and video games. Capcom, Midway,
Namco, Sega and Irem, amongst other game designers, have released “retro”
compilations throughout the relatively short history of video games.

Pollick (2004) elaborates on the inconsistencies of nostalgia between what actually
occurs and what is perceived:

> While nostalgia in reasonable doses can provide a sense of comfort for stressed-out
> adults, too much nostalgia can have a negative effect. It is very common to believe that
> an earlier decade was preferable to present day conditions, but that viewpoint can be
> misleading. People who grew up in the 1950s may remember hula hoops, Elvis Presley
> and penny candies, but they usually don't indulge memories of McCarthyism,
> repressive roles for women and a lack of racial equality. Every decade has its positive
> and negative aspects, so an unrealistic sense of nostalgia may create an unhealthy
distortion of reality. Some people can get caught up in feelings of nostalgia that make
their current lives seem mundane or unfulfilling by comparison. (para. 4)

Nostalgia in the contemporary context is an odd concept. It is an event that manifests
itself in the present as a fond representation of the past. Furthermore, nostalgia is tainted
by time and is an ever-changing event. Colebrook (2002) explains that:
Repeating the past, always transforms the past, for the past is as much in production as is the present. Each performance or memory of the past opens the past anew. Repeating Shakespeare’s *Richard II* would mean producing the play today with all the power and newness that it had for its time; it is looking at the different ways in which time takes eventful turns. (p. 64)

This raises a pertinent point: game developers have chosen one of two paths in capitalizing on nostalgic intellectual properties. The first method has the developer releasing the game in its original form, graphically and musically similar to the original. The second method involves the re-use of specific nostalgic affect rather than certain product. The latter example is probably best demonstrated in Sega’s *Outrun 2006* (Sega, 2006). A follow-up to the original *Outrun* (Sega, 1985) (Figure 79). *Outrun 2006* is the affective recreation of the original. It is everything that is important to video games: it is new, it is graphically impressive, and it is contemporary, just as the original was some twenty years ago.

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47 Comparison of Outrun: 1986 and 200. Adapted from *Outrun* and *Outrun 2* respectively. Copyright 1986 and 2000 by Sega. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
To quote Colebrook (ibid) again, we do not see an Elvis impersonator as the next Elvis. To recreate the same impact of Elvis, a band or singer today would have to recreate the same “sensation” as the original, rather than the same product.

Frederic Jameson (1991, p. 76) describes an “art language” in which the past is realized through stylistic representations and consumed as pastiche - a hodge-podge or imitation of the past probably best represented in video games through the works of Hideo Kojima. Jameson’s work focuses on a nostalgic “mode”, which by Jameson’s (1991, p. 18) definition “satisfies a desperate craving for history, while reinforcing the past as a vast collection of images, a multitudinous photographic simulacrum”. Hideo Kojima’s *Metal Gear* series probably best embodies Jameson’s nostalgic mode. Kojima’s depiction of the Cold War era takes modern day stereotypes and perceptions and replaces the real history with them in order to satisfy our “image fixations and historical cravings” (Grainge, 2000). *Metal Gear* depicts a cold war filled with technology even surpassing today’s standards, plus characters replete with archetypal referencing: ‘Snake’ the smoking anti-hero, and the harsh-faced commander, Roy Campbell to name but a few.

As demonstrated by the *Metal Gear* franchise, nostalgic mode is more tied to the present than to the past. If one were to look at the evolution of the character of “Snake” throughout the franchise’s twenty-year history, one would see an evolution of the anti-hero archetype, based strongly on contemporaneous popular culture trends. The Original MSX and Famicom versions of *Metal Gear* featured a Snake whose character’s resemblance is overtly similar to some of the stars of two of the highest grossing films
of the eighties (Figure 80).

Moving forward to the most current Metal Gear, *Metal Gear Solid 3: Snake Eater*, (Konami, 2004) we can see an aged “Snake” whose resemblance to the original 1987
version is still similar, but slightly modified to conform to modern day anti-hero stereotypes.

The original *X-Men* film, released in 2000, grossed an estimated $157.5 million at the box office, ranking as the eighth highest grossing film of the year (Box Office, 2000). This was followed by *X2: X-Men United*, which in 2003 grossed $214 million, and finally *X-Men: The Last Stand* in 2006, which grossed $234 million (Box Office, 2006). From this example alone we can see how referencing Hugh Jackman can lead to highly successful implementation of nostalgic mode as defined by Jameson (Figure 81). The success of the Metal Gear franchise can also be measured quantitatively: Hirohiko (2006), and Konami (2005), put the gross earnings of the
franchise at $18.3 million, making it the twenty-third highest selling franchise of all
time.

In video games, the commercial importance of nostalgia is being demonstrated in
recently released Xbox Live Arcade (XBLA) sales figures. XBLA offers subscribers not
just independently developed games; it also offers a number of older existing games
from years past. In the company of such strong competition, two seemingly unlikely
games topped the most recent XBLA sales charts - Street Fighter II and Teenage
Mutant Ninja Turtles (Coates, 2007) \[(\text{Figure } 82)\]. In the case of Street Fighter II, a
game that is over fifteen years old, 17,914 XBLA users bought it within the first forty-
eight hours of release making it one of the highest selling games of 2007, despite being
available for only two days of the year (Turnell, 2006).

Another figure to emerge from Coates’ (2007) report was the significant spike in XBLA
software purchases that occurred on the release of Teenage Mutant Ninja Turtles and
Castlevania, both significantly older titles \[(\text{Figure } 83)\]. What is also worthy of note
about \[(\text{Figure } 83)\] is that there is also a spike in XBLA growth when “Arcade
Wednesday” was first rolled out. What is significant about Arcade Wednesday and the
commercial significance of nostalgia is that each game released as part of this

\[\text{Image removed due to copyright}\]

\[(\text{Figure } 82)\] Top Performing XBLA Titles for the 06-07 Financial Year. Reprinted from [Online]
Developing Hits Games for Xbox Live Arcade. (Available)
http://www.xnagamefest.com/presentations.htm Copyright by Microsoft. (2007). Reprinted under the
terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

\[(\text{Figure } 83)\] XBLA Market Growth. Reprinted from [Online] Developing Hits Games for Xbox Live
Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

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All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

promotion was an old existing arcade title or game that promoted “retro” type approaches to aesthetics and/or game mechanics.

![Image removed due to copyright](image.png)

**Figure 83**

**Familiarity & Pseudo-Individualisation**

Although pessimistic in his views of popular capitalist culture, Adorno (1991) makes an important observation as to the function of this culture and the art that it produces. Adorno, although a believer in Marx’ socialist theory, focused on culture, not economics, and saw that instead of capitalist culture collapsing, it was actually becoming more entrenched through cultural mechanisms. Gauntlett, the author of “Media, Gender and Identity suggests “that culture industries churn out a debased mass of unsophisticated, sentimental products which have replaced the more ‘difficult’ and critical art forms which might lead people to actually question social life” (Gauntlett, n.d.). Adorno coined a number of terms, which are helpful when looking at consumer’s desires in terms of product purchases. One of the more appropriate terms in relation to the familiarity heuristic is the concept of standardization.

Shmups as well as other genres of gaming use a number of features, aesthetic, kinetic and mechanical, that when combined form the basis of their respective genres. These features are synonymous with all Shmups and when a particular game deviates from these standards it is no longer deemed to be a Shmup. Similarly, in popular music, Adorno cited a number of standardizations: formulaic features such as using a repetitive catch or hook in a chorus or certain genres relying on a certain type of backbeat to define them. In Shmups, standardizations can be seen in every aspect, such as game

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52 These features are described in the earlier Shmup genre definition.
play features like bombs, player stock, levels and bosses. Even artistic assets and storyboard features are fairly formulaic across the genre.

Looking at the history of Shmups, one can see that despite massive technological jumps, the formalization of genre-defining elements or standardizations described above has been rather slow in comparison. Due to the success of the initial formula delivered by Space Invaders, other manufacturers wishing to cash in on this craze used the model of Space Invaders as a base to create their own ‘unique’ games. However, even though these were ‘new’ games, the resemblance to Space Invaders was still highly apparent with only one of two features modified to make it stand out.

Adorno referred to a similar process in popular music that he refers to as Pseudo Individualization. Pseudo Individualization is a process by which a product is slightly modified to be re-sold to the original product’s user base. It relies partly on nostalgia and partly on familiarity: consumers see a product which offers something new, but is similar enough so that they can associate a positive affect with it almost instantaneously. A practical example of this is the number of Space Invaders clones manufactured after the release of the original game. Each only varied slightly in order not to alienate the existing user base, but to offer something unique and new. Lessing (2004) cites similar examples of these processes:

So I've been telling this story about the birth of Mickey Mouse for some time now. The story goes like this: Walt Disney was a great creator in the tradition of great creativity: his creativity was to rip, mix, and burn popular culture. Even Mickey Mouse, who was born as Steamboat Willie (released in 1928), was a rip, mix, and burn take-off on Buster Keaton's Steamboat Bill (released in 1928). (para. 1)

Grainge (2000, p. 86) suggests that “Americans are drawn to its recent history and recreation of cultural artefacts because of a certain alienation and detachment from vital issues experienced in the present”. This sentiment supports the notion of the preference that people in the West seem to have for similarity. This is also supported when we use the lens of pseudo-individualization to our day to day, consumer lives. Issues such as brand loyalty and fanboy-ism all stem from the extent to which familiarity rules the mind of the consumer.

In the context of this study, familiarity, this tenth heuristic, is the most integral. If all games are simply re-presentation of known sensation, then it stands to reason that ALL games in a capitalist culture must abide by this heuristic. However, this heuristic
extends beyond mere aesthetic comparisons and can even be extended to “game feel” and the all-important mechanical aspects of the game (rules, systems etc). This heuristic, although not solely able to create effective games, is probably the most powerful of all of the heuristics simply because of the myriad of emotions that it can trigger. Not only does familiarity trigger the powerful emotion of nostalgia, but it also has the potential to make the game easy to learn through standardizations, a more appealing product purchase, through existing product loyalties and a compelling experience as it can trigger existing memories and experiences in the player. Familiarity is a powerful trigger for emotions and experiences that the player has already experienced; designers just need to know which triggers to use and how.

Each of the case studies will have an emphasis placed on the importance of familiarity, however, a closing section of the document will be dedicated solely to the importance of nostalgia in game design heuristics as this theme of familiarity and the potential for Shmups and nostalgia fits with the professional relevance of this study. Additionally, before moving into the comparative analysis of the case studies, an analysis of the development of the Shmup genre will not only serve to give the reader essential contextual knowledge, but also demonstrate the incremental steps that the genre took to ensure that familiarity was always present in subsequent titles in the genre.
Chapter 5: Analysis and Case Studies

Period One: 1987-1990

The period of time leading up to this first case study has been covered in terms of Shmup development, however, there were a number of preceding events in the wider gamers’ market which led to a changing of the guard. Consumers turned to the arcade due to its superior technology, providing user experiences that could not be matched at home. Additionally, consumers and retailers alike had already been “burnt”, not once but twice by the home games market. Irresponsible spending and lack of software quality control were significant, contributing factors that led to what is known as the ‘Video Game Crash of 1983’. However, the financial implications of the crash of 1983 stretched far wider than that of the 1977 crash, as the market for video games had grown considerably. One company to be hit the hardest was Atari. During 1983, Atari lost more than $536 Million US dollars, at that time almost $2 Million per day (Jung R., 2002), mainly due to poor software quality control. Games like the Atari 2600 version of Pac Man and E.T. The Extra Terrestrial (Atari, 1983) left the public with a sour taste in their mouths because of the poor quality control standards imposed by Atari. Commodore computers also had a role to play in the crash of 1983, by slashing the prices of computer hardware and entering into predatory pricing, a move that cut many other companies such as Mattel, Magnavox and Coleco out of the market.

With the near demise of Atari and a large number of Western developers, the home video game market endured a massive change of dominance. Atari, which was once at the top of the home video game market, was fighting it out for second place with Japanese company, Sega, whilst at the same time Nintendo dominated the home console market with the introduction of the Nintendo Entertainment System (Famicom) in 1983. Nintendo were not about to make the same mistake as Atari, and introduced tough new quality control regimes. Unlike Atari, only Nintendo could manufacture game cartridges for the NES, a process ensured by encrypting their cartridges.

The shockwave from the home video game console crash was also felt to a lesser extent by the US arcade industry. The Bernstein Research Report on “The Video Game

53 The 1997 crash was caused by market saturation of Pong clones.
Industry’’, prepared by Christopher Kirby, marketing analyst for Leisure Time Industry with Sanford C. Bernstein & Co. Inc., made few surprising discoveries. Kirby, an arcade market observer, as cited in Arcade (2004) concluded that:

…the coin operated game market (video games) has encountered a flat growth stage with results being a unit decline in 1983. This is not falling off in total play time by players, but a reduction in the number of machines purchased by the operator and a reduced income per machine. This is seen to be a direct reflection of the saturation of the market. (para. 3)

Kirby (Arcade, 2004) also concluded in his report that in 1983, there were estimated 1,220,000-arcade machines in operation in the US. The same report also showed that during 1983, amusement machine operators in the US on average lost $616.00USD per piece of equipment and around $80.00USD for each arcade piece.

The arcade industry, although not impacted by all of the effects of the video game crash of 1983, was also about to dramatically change. Until 1984, all Japanese manufacturers of arcade machines were exactly that: machine manufacturers. To release an arcade game in Japan prior to 1983 meant that the company not only had to create the software, but be responsible for the manufacture and maintenance of their own machines. In 1984, the Japanese Arcade Machine Manufacturers Association was created. JAMMA was more than just an organization; it was a hardware standard that is still used to this day, which lets arcade boards or PCBs be easily and quickly installed in any JAMMA compatible arcade cabinet. JAMMA as an organization also abolished the previous ruling that only manufacturers of arcade machines be able to create their own arcade software. Now, any software developer could produce their own arcade software and hardware without having to worry about the creation and maintenance of expensive arcade cabinets. JAMMA also meant that arcade operators could buy more software, as they didn’t have to fork out for an entire arcade cabinet any more. Instead, when they were done with a game, they could simply replace the PCB inside the machine.

Even though JAMMA did not take off until 1985, it still had a massive impact on the number of games being released in the arcade, especially by those companies that previously did not have the financial capability to enter into hardware development. Arcade Shmups were the beneficiaries of this newfound arcade software development movement and it also led to the creation of game companies such as Toaplan and Capcom.
It was also around this time that arcade Shmups and home console Shmups began to move in two separate directions. During the mid to late eighties and early nineties, arcade hardware still had a clear graphical advantage over its home console counterparts. A battle for the consumer’s dollar could not be won on graphics alone, so Shmup developers needed a way to make the purchase worthy for the consumer. Console based Shmups began to emphasis re-playability, a concept embodied in-game elements such as unlockables, secret areas and weapon power ups that could only be obtained through considerable practice and memorization of the game.

Some games, such as Konami’s *Life Force*, were completely re-written for their home console counterparts, offering players a completely different experience of the games they knew and played in arcades (}
Not only was this a way of capitalizing on existing, popular franchises, but it was a way for software developers to broaden their user base to the new home console market. Nintendo’s NES system, although not known for its abundance of Shmups, also paved the way for Japanese developers to enter the re-emerging Western console market. Nintendo, looking for an entry strategy into the American market place, approached Atari to launch the system under the name of the Nintendo Advanced Video System, however the deal was not to be. Retailers, already bitter about the Atari fiasco, were sceptical about the new system. Nintendo tried to distance itself from the market collapse by emphasizing the fact that the NES was more than a video game system, and even released the system with the ROB robot accessory. Capitalizing on gimmicks and carefully worded press release, Nintendo released the system in 1985 in New York where 90,000 of the 100,000 units were sold (Goldberg, 2005).

What Nintendo had done to alleviate retailers’ fears was to lock developers into a binding contract by which they could only produce games for their system, and all quality control was exclusively maintained by Nintendo. So what did this mean for Shmups and arcades? Developers were still allowed to produce games for the arcade and then port them to the NES, however, that game could not be sold on any other system. This led to situations such as that demonstrated by *Life Force*: if Konami were to port *Life Force* to another system beside the NES, then the NES version would need to be an original game. This is why in the case of *Life Force*: we have vertical sections where the arcade version is solely horizontal etc. Shmups released for the NES became more and more home console focused. Although there were a number of direct arcade ports, Nintendo’s strict policy on ports led to the development of Shmups specifically tailored for the system and hence the special needs and considerations of the home market.

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*Figure 84.* Comparison of *Life Force*. Adapted from respectively from *Life Force* (NES Version) and *Life Force* (Arcade Version). Copyright by Konami, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Shmups for the home market became longer, and in some cases, slower, games. Various modes of play were added that emphasized replayability such as the secret “Z’s” in Hudsonsoft’s *Star Soldier* and the NES/Famicom exclusive of *Gradius II* which added the now compulsory weapon edit mode to the franchise.\(^55\)

![Image removed due to copyright](image)

**Figure 85**

By no means was this the end for arcades though. Although the NES would slowly change the way developers created Shmups, the arcade was still the spiritual home of the genre. During the late eighties and early nineties, the genre reached its pinnacle as far as numbers of new Shmups being released.\(^55\)

![Figure 86](image)

**Figure 86**

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\(^55\) *Gradius II*. Adapted from *Gradius II*. Copyright by Konami, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Arcade games release in 1989 reached a staggering 436\textsuperscript{56} games, the highest ever on record. This record level of software development was fuelled by consumers, all eager for the graphical, tactile and auditory experience that simply could not be delivered by consumer level electronics. Due to the pervasiveness of the arcade medium, this section of the study will focus on the singular Shmups: \textit{R-Type} and \textit{Darius}, and will compare this to the equally significant game: \textit{Contra}.

\textbf{Zeitgeists R-Type}

![Image removed due to copyright](image.png)

Alex Kierkegaard (2006) of Insomniac.ac introduces \textit{R-Type} (Irem 1987)\textsuperscript{57} better than anyone else. “It's hard to overstate the impact Irem's now-legendary shooter had when it first appeared, almost two decades ago”. Kierkegaard (ibid) elaborates further on the mass appeal that \textit{R-Type} had upon release:

\begin{itemize}
  \item Information obtained from MAME version 0.115B. This number also includes clones and revisions.
  \item Figure 88 \textit{R-Type} Arcade Flyer. Adapted from \textit{R-Type Flyer}. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
\end{itemize}
Without warning, *R-Type* invaded every half-decent coin-op establishment from East to West, and went on to dominate the shoot 'em up scene for many years afterwards. It was the kind of game that was impossible to ignore. (para. 4)

*R-Type* is as well regarded now as it was in 1987, consistently ranking highly on the Shmups.com yearly Top 25 and is one of the oldest games on the list to consistently be held rated highly by members of that community. Arriving in arcades worldwide around 1988, *R-Type* filled the gap left by a lack of any new *Gradius* games and thrust the then infant company Irem, into the spotlight. Arcade reviews of the game as cited by Kierkegaard (ibid) during its release years showered the game in high praise:

*R-Type* from Irem Corporation is, if possible, even more playable than its best-selling predecessors [*Defender*, *Nemesis* and *Salamander*], ... Other than the incredibly addictive nature of the game, the stunning graphics will take your breath away. They are far larger than those in other similar games, and are highly imaginative and very colourful. *Computer & Video Games*, Aug '87 (Solvalou, 2006)

Irem’s *R-Type* was probably the most talked about arcade game of 1987 for its amazing graphics and its exciting game play. *Sinclair User*, Apr ’88 (Solvalou, 2006)

*R-Type* is undoubtedly the most impressive coin-op of the lot, and one of the hardest to get to play -- because there's almost always a crowd round the cabinet! Graphically it's stunning: some of the later, more organic, palpitating levels are truly revolting. As for the game itself, it is simply second to none. *Crash*, Oct 1988 (Solvalou, 2006)

Even notable by today’s standards is *R-Type’s* detailed and highly stylised 2D graphics, powered by the M-72 hardware platform, which was one of the first to utilise the powerful NEC V30 processor. Along with the V30, the M-72 board utilised many custom chips including “blitter” chips that enable the hardware to produce larger, more colourful sprites and at a higher resolution than even Konami’s *Gradius* hardware could manage.¹ The graphic flexibility that the hardware offered allowed *R-Type* to stand above its competitors in the same release year. Even games such as *1943 - The Battle of Midway* (Capcom, 1987) from more established developer Capcom, paled in comparison.

Aside from the technical complexity of the visuals, the artistic style in itself represents another zeitgeist of the 1980s: H.R. Giger’s work in the movie *Alien* and later influence on the sequel *Aliens*. Released in 1979 and 1986 respectively, the *Alien* movies had a large impact even on Japanese audiences, with Konami and Sega both purchasing the rights to produce model kits based on the franchise. Giger’s work and the art presented

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¹ Gradius resolution: 256x254, R-Type’s resolution: 384x256
in R-Type can be best described as “Biomechanical”. The flyer (Figure 88) and first level boss (Figure 90) are blatantly similar to Giger’s Necronom IV and his subsequent work for Alien. (Moby Games (2005) also note the influence of Giger on R-Type and its subsequent level design, stating that “the stages of R-Type are made in an organic style, certainly inspired

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59 Figure 90 R-Type. Adapted from R-Type. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
by H. R. Giger’s artwork for the Alien movies. When it came out, it was considered trend-setting since it broke off from the stereotypical sci-fi mould of other Shoot'em'ups”. Henderson (2006) writes that “[R-Type] bore more than a passing resemblance to the work of the Swiss artist, H.R. Giger - the man responsible for the look of Ridley Scott's film Alien, and its 1986 sequel which would still have been fresh in the minds of the IREM graphic artists at the time”. References to Giger’s own visual style are portrayed throughout the game. The juxtaposition of biological and mechanical style are portrayed throughout the game. The third stage bears significant resemblance to Giger’s New York series. 

Image removed due to copyright

Figure 91

Image removed due to copyright

Figure 91

All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

*R-Type’s* seventh stage (Figure 92) is even less subtle in its referencing of Giger, even reproducing the same hues of fleshy red that Giger employs in his *Victory* and *Robotuck* portfolios.

Image removed due to copyright

Figure 92

Phallic references abound in Giger’s own work, yet these phallic images are more often visually depicted as mechanical or robotic, rather than being anatomically correct. *R-Type* has phallic references throughout, yet this example shown in the level five boss of *R-Type* (Figure 94) has significant resemblance to Giger’s renditions.

Figure 93

Image removed due to copyright

Figure 94

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61 Figure 92 *R-Type*. Adapted from *R-Type*. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

62 Figure 93 Analysis of Giger’s landscape work. Adapted from *Landscape X* and *Victory IX*. Copyright by H.R. Giger 1972 and 1983 respectively. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

63 Figure 94 *R-Type*. Adapted from *R-Type*. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
In the case of *R-Type*, this phallic sprite also thrusts forwards and backwards out of its sheath-like housing, even expelling a fountain of blue “orb” from time to time. However, instead of this fountain of blue orbs emerging from the front of the sprite, they are expelled through a peripheral side outlet. This is also very interesting when comparing this image to that of Giger as seldom does Giger ever depict ejaculation with *Robotuck* being one of the only examples in his repertoire to do so. What is also highly symbolic about this figure is its representation of the Freudian theme of “castration anxiety”. For the player to defeat this boss, they must focus their attacks on this penis-like object and destroy it, however this sprite is part of a larger ship or body and its size is almost insignificant compared to that of the ship as a whole. Yet the difference as suggested by colour and aesthetics of these penis-like objects when compared to the rest of the ship, bring this immediately to the player’s attention. Grof (2002, p. 21) describes a similar effect of penises being used to represent death by commenting on Giger’s work *Dune I*, describing its penis-like walls as “phallic death symbols”. In a way, the phallic depiction of the level four boss bears high resemblance to Freud’s model of the castrating father, trying to overwhelm the child [the player].

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*Figure 96* *R-Type*. Adapted from *R-Type*. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
These babies launch themselves at the player from the grotesque, biological flooring and ceiling of the level. Their small bodies and large heads, refer to those of babies, bar their green skin and bulbous, fly-like eyes. Their eyes, a hybrid of Giger’s Birth Machine I and Necronomicon, their green skin akin to Western renditions of “Martians”, and their visual connection to Giger’s own tortured mutant babies depicted in Giger’s Biomechanoid XII and Landscape XIV, is undeniable.

Giger and Popular Culture
H.R. Giger is often referred to as the “Soul of the Twentieth Century” (Grof, 2002) due to his widespread popular culture influence spanning mainly from the success of his first, Western movie credits in Alien (1978). Giger’s work around this period is prolific. Giger branched out into all forms of art and created art for bands such as metal band, Celtic Frost all the way through to working with pop-singer Deborah Harry. Giger’s influence has also translated to architectural endeavours as far wide as Japan, where a H.R. Giger, cigar bar was opened and subsequently shunned by the artist.

66 Figure 97 The Giger Bar, Japan. Reprinted from [Online] H.R Giger Nous nous voyons dans ses tableaux comme des sortes d'embryons rampants (Available)
The aesthetics of Giger’s work were powerful enough to gain resonance with not only consumers, but also other artists. Consequently, the work of Giger spread, often illegitimately, to video gaming during the 1980s and 1990s. Games such as Nintendo’s *Metroid* (1986) borrowed heavily from Giger’s Alien designs [Figure 98], *Darwin 4078* (1986) [Figure 99], *Chelnov* (1998), *Alien Crush* (1988), *Gradus III* (1988) and even to the kiddie *Alex Kidd: Lost Stars* (1986) all took significant liberties when seeking inspiration for their own games.


67 Figure 98 Example of *Metroid*. Adapted from *Metroid*. Copyright by Nintendo, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

68 Figure 99 Example of *Darwin 4078*. Adapted from *Darwin 4078*. Copyright by Data East, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
There is no denying the powerful influence that Giger had over consumer driven artistic mediums of the time, however the question of why these aesthetics so easily digested by the consumer comes to mind, especially considering the often explicit nature of the imagery in question. The answer to this question lay in further examination of the sensation transmitted by Giger’s work.

**Platformers**

The trend towards using pieces of the foreground landscape to compress and funnel the player’s movement is something that epitomizes this era of Shmups, and is drawn primarily from the genre of platformer games. A platformer is a type of game whereby the player needs to make their avatar navigate some type of side cut environment. The name is drawn from the fact that platformer gamers have floating platforms that the player must move between, usually in a linear, left to right fashion (Figure 100).

Probably the most iconic platformer of the 1980s is *Super Mario Bros*, which was released for the Famicom (NES) in 1983. *Super Mario Bros* is derived from the original, single screen contained game, *Mario Bros*, but stretches the playfield horizontally across multiple screens; a technique utilized heavily in the horizontal Shmup genre.

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*Figure 100* *Super Mario Bros*. Adapted from *Super Mario Bros*. Copyright by Nintendo, 1983. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Platforming games nearly always involved the depiction of some type of mascot or protagonist on screen. Namco utilized the strong characterization of *Pac-Man* to develop a scrolling platformer based on the original intellectual property in 1984, however the game was overly difficult and quite short. Where platformers gained significant resonance was on the home consoles of the time, predominantly the NES. The reason for this is that most platformer games could not be undertaken in the small amounts of time mandated by arcade software design; instead they were more often than not, longer, more narrative-driven types of experiences. Further to this, platformer games developed for home consoles were often driven by narrative or explorative experience, not scores, like their arcade brethren. In fact, platformer games were more or less designed to be beaten, unlike arcade games, which had significant difficulty ramps to cater for the score-based competition that they promoted.

As platformer games were driven by exploration and the subsequent emergent narrative, a greater emphasis was placed on the aesthetic themes to help give the player a sense of context for their actions. Certainly Shmups, and all arcade games for that matter, relied on aesthetics to a certain extent, however it rarely factored into the mechanical design of the game; that is, it served no real mechanical purpose. In home console platformers, as one of the main mechanics tended to be exploration, much thought was put into creating satisfying and diverse environmental designs to appease the player’s sense of immersion.

The use of environmental elements had been absent from many Shmups prior to the advent of games like *R-Type*. This can be partly attributed to the fact that horizontal Shmups were not as popular as vertical Shmups until the mid-eighties, at which time the explosion of platformer games gave inspiration to the Shmup genre. Although the link between Shmups, Platformers and Giger is not direct, the wide spread adoption of the platform genre by both developers and gamers ultimately impacted on the development of the Shmup genre. Omitting *Scramble* and its successors, the use of environmental elements in the active game player layer was not common in Shmups preceding this time. As Giger mainly contributed to environmental concepts for movies such as Aliens, it was more problematic for Shmup developers to add his influence to the on-screen entities. Giger’s influence lent itself much more too environmental and textural cues in the game; elements best reserved for backgrounds and “platforms”. Based on this, it is easy to see how platformers may have initially influenced Shmups such as *R-Type*. 

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however the real representational power is ultimately derived from adding Giger’s contemporary and powerful psychological components to the new Shmup/Platforming hybrids of the genre.

**Birth Trauma**

Visual references to the work of H.R Giger are a continuous feature of *R-Type* and its successors and so too are the themes represented in his works. It is thanks to *R-Type* and its obvious association with Giger that one can see the significance of a design feature pertinent to the vast majority of Shmups: “Passageways”. Nearly all Shmups feature some sort of passageway reference in their visual and level design, from *R-Type* to *Gradius* to *Ikaruga* Figure 102

Passageways are also an integral part of many of the games from this period. Platformers promoted a sense of constricted space, especially in later levels and 3D games such as Sega’s *Galaxy Force* used passageways to create a sense of anxiety and urgency for the player. According to Giger and Grof, the appeal, or rather the universal understanding of passageways is directly related to the process of birth.

Although Sigmund Freud eventually moved away from the importance of birth, as being a contributing factor to later neurosis, the concepts that Freud explored early in his career had a deep and profound impact on one of his students, Otto Rank. Rank, would later conceptualize Freud’s theories of birth and the trauma associated with it in his 1952 publication of “The Trauma of Birth” (Rank, 1952). Rank (1952, p. 11) states that it was Freud who initially said that “all anxiety goes back originally to the anxiety of birth”. Where Freud and Rank differed though was in the way they perceived the importance (and later existence) of precocious cognitive memory (Matherne, 1999). Rank (1952, p. xiii) states that “in attempting to reconstruct for the first time from
analytic experiences the to all appearances purely physical birth trauma with its prodigious psychical consequences for the whole development of mankind, we are led to recognize in the birth trauma the ultimate biological basis of the psychical."

Birth and the trauma associated with birth is an underlying aspect of many of Giger’s works such as *Birth Machine I* and *II* and his *Death Delivery Machine*. The passageway theme and their references to Shmups become more apparent when looking at Giger’s 1969 *Passage* series.

Giger (1974) talks about this series in the 1974 publication of *Passagen* ["Passages"]:

> The Initial “Passages” paintings were created in 1969 following a series of dreams. Most of the time in those dreams, I was in a large white room with no windows or doors. The only exit was a dark metal opening which to make things worse was partially obstructed by a giant safety pin... Then I found myself stuck as a tried to pass through this pipe. My arms pressed against my body, unable to move forward or backward. (p.24)

Grof, (2002, pp. 12-41) concludes that Giger’s nightmares were dreams associated with anxiety and feelings of isolation, a sentiment also expressed by the artist himself. It is this overwhelming sense of constriction that we see employed by all Shmups. All of the Zeitgeist games employ this tactic in varying ways. Some such as *R-Type* do it through very literal visual depictions of the uterus and vagina, whilst other do it more unintentionally through enemy placement and projectiles used to funnel the player through the passageways. It is also very important to consider that the player has no control over the scrolling speed or direction of the game and as such, the only way out is to proceed deeper into these constrictive funnels or passageways.

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70 Figure 101 Example from Giger's Passagen. Adapted from *Passagen*. Copyright by H.R. Giger, 1974. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
By such heavy usage of *Giger-esque* imagery in *R-Type*, Irem, have inadvertently added something very Giger-esque to the design of the game. Grof (H.R. Giger and the Soul of the Twentieth Century, 2002) comments about this unique aspect of Giger’s own work:

By seeking the source of his own nightmares and disturbing fantasies, Giger discovered independently from the pioneers of modern consciousness research, the paramount psychological importance of the trauma of biological birth. The existence of a fascinating and important domain in the human unconscious, which contains the powerful memory of our passage through the birth canal, intuited by Giger and reflected in his art, has not yet been recognized and accepted by official academic circles. Intimate knowledge of this deep realm of the psyche is also absent in the work of Giger’s predecessors and peers – surrealists and fantastic realists. Giger's artistic skills and his talent to portray the Fantastic match those of his models – Hieronymus Bosch, Salvador Dali, and Ernst Fuchs, but the depth of his psychological insight is unparalleled in the world of art. (p. 15)

Giger’s fixation with death, sex and birth themes in his art has worked its way into *R-Type*, and thanks to the revolutionary nature of the game, has influenced the genre as a whole. Psychologists such as Otto Rank allude to the fact that the trauma of birth is one of the most intense, almost unimaginable traumas that a human can face. Grof (H.R. Giger and the Soul of the Twentieth Century, 2002) explains further in the context of Giger’s work that the birth process melds the experiences of birth and death into the one event; an event that he attributes to being one of the most traumatic experiences in a human development. He further explains the violence which the foetus is exposed to in the birth canal in the form of uterine contractions that constrict the foetus.

In the first stages of biological birth Grof explains the real physical implications on the foetus: “the uterine contractions periodically constrict the foetus and the cervix is not yet open…. the subject feels caught in a monstrous claustrophobic nightmare” (Grof, 2002, p. 19). Shmups offer release in the form of forward movement, yet this forward movement is impeded greatly by the placement of scenery, enemies and projectiles; this
scenario is more akin to what Grof (2002) describes as the second stage of biological birth:

In the next stage of delivery, the uterine contractions continue to encroach on the foetus, but the dilated cervix allows gradual propulsion of the foetus through the birth canal. The reliving of this stage does not involve the exclusive identification with the role of the suffering victim like the previous stage; it also provides access to enormous reservoirs of pent-up murderous aggression. (p. 19)

It is this aspect of Shmups that causes the player [the foetus] to lash out and press forwards. The continual movement forward of the game is akin to the uterine contractions, and the barrage of enemies and contractive passageways represent the oppressive constriction of the cervix. Shmups such as *R-type* have taken this representation one step further through visual representations of the birth passageway and as such have heavily referenced some of Giger’s other seminal works. Grof (2002, p. 20), when discussing Giger’s obsession with toilets, garbage trucks and refuse stations explains that the “foetus can often encounter in the final stages of birth various forms of biological material - vaginal secretions, mekonium, blood even urine and faeces” as such he states that Giger is “sharply aware of the erotic overtones of these subjects and activities”. Not only can we see heavy reference to this in R-type’s backgrounds and enemy design, we can also see reference to Giger’s other main themes such as the “bio-mechanoid” in the visual design of *R-Type’s* levels.

The erotic bio-mechanical nature of *R-type* can be seen throughout each level. Backgrounds are biological, yet mechanical and have utilized extensive visual reference...
that of the birth canal, faeces, bodily fluids and other unknown, yet familiar biological entities.

*Figure 103* R-Type and its sequels also utilize a colour palette of deep, fleshy reds juxtaposed with harsh dark mechanical greys hinting further at Giger’s juxtaposition of flesh and machine. The game’s visuals and Giger’s work in general can be seen as rather lewd by the misinformed, and probably went a long way to the game’s success with teenage boys. The second level boss of R-Type draws heavily once again from Giger’s work, particularly the works Landscape X (1972) and Passage XXIX (1973) *Figure 104* and their visual referencing of the vagina.

*Figure 104*

Birth as depicted by Giger and as a constrictive force that epitomizes the level design of nearly all good Shmups is not only about these dark “murderous impulses” or feelings
of doom as Grof (2002) describes. The birth motif can also be a source of great healing and transcendence, as depicted in both Western and Eastern cultures in the form of Buddha and the resurrection of Jesus to name. This healing nature of rebirth is also quite literally depicted in R-Type in the form of the second level boss Figure 105. During the boss encounter, a long enemy worm creature passes in and out of the various openings on the main boss character. Its movement is designed to shield the clitoris like weak spot of the boss. Attacking this worm creature damages it, but each time it passes out of the enemy’s openings it has a renewed body as if it has been reborn.

The meaning implied by the visuals as well as their kinetic movement is representative of penetration and birth, a theme that is not only heavily utilised by Giger but also reminiscent of the Ouroboros, the snake eating its own tail. Jung identifies the Ouroboros as an immoral archetype. In the case of R-Type the combination of movement and visuals suggest a self-fertilizing process, particularly with the visual reference to vaginas, penetration and birth.

Not only in R-Type, but in all Shmups, we must consider that the primary goal of the player is to overcome this sense of constriction and move to the final phase of birth, where the constriction is overcome and the player has reached the phase of

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Figure 105

R-Type Boss Encounter Series 2. Adapted from R-Type. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
transcendence as they have conquered this birth experience. It is the constrictive nature of good Shmup design that makes the player need to reach this final point of transcendence and in some contexts it can even be considered therapeutic for the psyche. Grof’s extensive work into perinatal psychology also suggests that reliving the birth experience through “Holotropic Breathwork” can be highly beneficial to a person’s state of mind as it offers a way for transcendence from old to new that is already so integral to the human experience. In Grof’s 1992 book “The Holotropic Mind” he divides the birth process into four stages, citing the last as the most “ecstatic”. According to Grof and Bennet (1992), the stages of birth are outlined as the following:

1. **First Perinatal Matrix:** BPM I (Primal Union with Mother)
   - Amniotic Universe - The womb. The only world that life knows at this point. Blissful feelings of peace and joy, in a healthy womb.

2. **Second Perinatal Matrix:** BPM II (Cosmic Engulfment and No Exit or Hell)
   - Cosmic Engulfment; No Exit - Equilibrium disturbed; contractions begin. Unbearable feeling of being stuck in hell with no way of escaping.

3. **Third Perinatal Matrix:** BPM III (The Death-Death Struggle) Death versus Rebirth Struggle - Second clinical stage of childbirth; intense struggle for survival.

4. **Fourth Perinatal Matrix:** BPM IV (The Death-Rebirth Experience) Death versus Rebirth Experience - The child is born. Intense ecstatic feelings of liberation and love. New world begins. (p. 30)

By examining the third and fourth stages of Grof’s model one can see the correlation between these life defining processes and that of the Shmup formula. “Pleasure is our reward for successfully insisting on ourselves in the face of an opposing insistence on the part of others”. (Weiss, 1942, p. 137) That is, there can be no pleasure without pain. What is worthy of note about nearly all Shmups, particularly Shmups from this era, is the lack of scrolling used during boss encounters. Removing the element of forward movement and placing an impassable object into the way of the player is much more akin to the second stage of Grof and Bennet’s (1992) model. As such, the affect of this experience is highly traumatic for the player, more so than the rest of the level. This also makes sense from a design perspective, as the “boss” needs to be the ultimate enemy; players need to fear it and it must be harder than the previous enemy encounters of that
stage. This leads to another interesting aspect of Shmups of this era: the boss encounter music.

**The Music of R-Type**

In the case of *R-Type*, as well as many Shmups from this era, the boss encounter music is tense, and despite having plenty of forward momentum provided by quick moving surface rhythms, the short looping melodic phrases counteract any movement suggested by other melodic or percussive lines. This motif fits well with the depiction of the second stage of biological birth. The juxtaposition of movement and lack of movement is tense and stifling to the gamer. In the case of *R-Type* the driving lines inferred by the pulsating quaver and semi-quaver lines of the bass and counter melody are stifled by the juxtaposition of a slower, crotchet-like triplet feel in the melody. This juxtaposition of slow and fast is akin to the compression placed on the foetus during Grof’s first stage of birth. This repetitive four bar feel in the melody is also very non-committal to resolution, and features plagal cadences and unresolved sevenths to add to this very uneasy feel, also suggesting to the player that this is a figurative dead end and that the only way to resolve the music is to beat the boss. Grating on the ears of the player are high pitched melody notes alternating only by a minor second backwards and forwards creating a great sense of dissonance and uncertainty. Other examples of this minor second movement can be seen much Grind Core style metal with bands such as Coal Chamber using it to similar effect in songs such as “Loco”. Besides the propulsion offered by the counter melody, the piece never suggests that it is going to resolve by itself and the structuring of the rhythmical lines continuously leans into the next phrase, giving no sign of stopping.
This sense of compression and never ending hopelessness is also a key feature of much boss music of the era. *U.N. Squadron (Area 88)* is another such example that uses this juxtaposition of fast and slow to create pulsating compression during boss encounters. In the case of *U.N. Squadron*, the relentless pulsing nature of these contractions is emphasized by the short, fast climbing bass line that is relentless in its motion but stationary at the same time due to its repetition.  

Score 1
During the boss encounters in *U.N. Squadron*, this bass line plays repeatedly and unchanged over a rhythmically and melodically contrasting melody line. Just as in the *R-Type* boss music, the *U.N. Squadron* boss encounter music also features heavy use of long sustained triplet patterns. This is highly indicative of Japanese Epic Form, a musical style from video games from the early nineties that fused elements of progressive rock and disco with Andrew Lloyd Webber-esque melodic lines. In comparison with the bass line, *U.N. Squadron’s* melodic line is slow and less angular, yet it makes up for this lack of tension through thick harmonization based around inverted minor chords. The combination of differing rhythms, dissonance, contour and flow in these two lines grind and pulsate against each other, neither bowing to the other in relentless competition.
Compression, and its many implementations within Shmups, is something that has developed over time, and different trends have emerged while others have fallen by the wayside. This period of Shmups from around 1987 to 1991 features heavy use of compression techniques that involve the use of scenery, not only enemy placement.

The above examples (taken from the second stage of *R-Type Leo*, the third game in the series, demonstrate many of the identifying “funnelling” tactics employed in Shmups of this era. Figure 1 in the table is highly symbolic and represents Grof’s (2002) description of the onset of biological birth where “the subject feels that they are being sucked into a gigantic whirlpool or swallowed by some mythical beast… another experiential variety of the beginning of birth is the theme of descending into the depths of the underworld”. We see this theme of descent played out in many Shmups. *Darius* and its sequels is one such series that does this often, so too are the descending passages in games such as
*Eliminate Down*, a console-only Shmup of this era. This “descent” into hell is often quite literal for the player as this movement signifies that danger is ahead. Alternatively, some Shmups will actually depict the player ascending after successful completion of a level, such as can be seen in the end screens of Capcom’s *U.N. Squadron*.

The second part of Figure 106 illustrates one of the more simplified and most often used funnelling techniques in Shmups: the simple use of scenery to constrict the player’s movement. This tactic is the cornerstone of post-proto Shmup design and came about solely through advances in hardware capability. Even the most advanced proto-Shmups with scenery objects in the foreground did not or could not utilize this feature. The third figure in the above table represents a funnelling technique that only really began to come about around the early nineties. Massive pieces of moving scenery not only cause the player to move through a forward barrage of funnels, but backwards also, against the “inertia” of the scrolling. This example is also highly claustrophobic for the player because as this ledge begins to fall on top of the player, the field of view has not yet scrolled along far enough to expose any route of escape. When the route of escape becomes visible to the player, they find that it is blocked directly ahead of them, leaving only a narrow rear-diagonal passage to pass through. This tactic was first introduced in *Xevious*, where indestructible, rotating tiles encroach on the player from the top of the screen. Not only did these constrict the player’s movement and force funnelling and compression upon them, but it introduced a blocking tactic found in the last example of the *R-Type Leo*.

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75 *Figure 107* *U.N. Squadron* level end screen. Adapted from *U.N. Squadron*. Copyright by Capcom, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40. *Defender* and its sequel, *Stargate* are both prime examples of this.
Funnelling using enemy placement is by far the more contemporary way in which this compression affect is transmitted. This also correlates with the fact that the majority of Shmups released today are vertical. However, vertical Shmups of this era did experiment with enemy placement for funnelling purposes and this method is a legacy of pattern based enemy movement seen in proto Shmups such as *Xevious* and *Gyruss*.

*U.N. Squadron*, already noted for its use of foreground scenery to promote compression, was one Shmup from this era that used pattern based enemy movement particularly well to create this affect of constriction and compression. The *U.N. Squadron* figure below (Figure 108) is an effective example of how pattern based enemy movement can provide a powerful sense of constriction. The movement of the enemies are purposeful and so too is the desired position of the player.

![Image removed due to copyright](image-url)
Zeitgeists: Darius & Darius II

Although *R-Type* illustrates the link between Giger, his depictions of birth trauma, and the implementation of this to promote anxiety in the player, there is one Shmup in particular which introduced this style of compressive game play earlier, namely *Darius* (1986, Taito). *Darius* is a strange and often overlooked Zeitgeist game in Shmup evolution. Although based on the same principles of the Shmup of the same era, *Darius* places significant emphasis on navigating tight passageways, so much so that the arcade cabinet for *Darius* utilized three CRT screens to create an extreme widescreen experience for the player. This was not a gimmick, but rather an essential part of the game. Such was the complexity of the labyrinth of obstacles utilised in *Darius*, that the player needed extreme amounts of time to react to them, hence the addition of extra width to the play field to increase the player’s line of sight. As the foreground obstacles were so numerous and complex, the regular emphasis of offensive enemy ships in Shmups is more subdued to help alleviate the complexity of the foreground objects.

![Figure 109](image)

Figure 109

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77 As opposed to the 4:3 ratio employed by most vertical Shmups, the product of three of these typical displays resulted in an aspect ratio of 12:3 or 4:1
The extended length of the playfield allowed for a number of changes to the traditional Shmup formula. Due to the extended line of sight of the player, enemies and their barrages could encroach on the player at a high speed; doing so with a regular 4:3 perspective not only would have been difficult for the player but a major design flaw. The length of the playfield also allowed more objects to be present on screen at any one time, and also allowed the unusual ability to allow enemies to frequently enter from the rear of screen, a tactic that would be considered cheap if done with the constrictive 4:3 aspect ratio as seen in Figure 110.

In an odd twist for the Shmup genre, *Darius*, through its unique extended play perspective, promoted exploration of the game world. Not only did the myriad of obstacles add to this, but so too did the unique inclusion of branching level paths in the game. At the end of each stage, the player was greeted with a barrage of the level boss. Successfully beating this boss allowed the player to choose from two different paths. The significance of this would have been lost had it not been for the fact that certain weapons necessary to the player beating the game were only available in certain areas of

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78 Konami’s 1981 Shmups, *Super Cobra* was a vertically scrolling Shmup with a 3:4 aspect ratio. *Super Cobra* also made extensive use of funnelling and compression, yet it’s extremely narrow field of view made dodging these obstacles particularly difficult.
the game. Therefore, re-playability through exploration, a key factor lacking in the Shmup genre, was promoted in *Darius* like no other Shmup could.

Due to the hardware utilised for *Darius*, it was extremely difficult for other manufacturers to re-use many aspects of *Darius*’s design in their own games, yet one can see the influence of these passageways on Shmups, particularly *R-Type*. Another key influence of *R-Type* apart from the overwhelming use of Giger references is the use of various aquatic themes in *R-Type*, no doubt an influence of *Darius*’s own bio-mechanical aquatic bosses.

Due to the unique nature and expensive outlay of the official *Darius* arcade hardware, operators were quick to pressure Taito into further supporting this unique hardware platform. *Darius*’s unique style of play had already heavily influenced the direction of
the horizontal Shmup genre and with the subsequent release of *R-Type* in 1987, Taito needed to reclaim its market share. *Darius II* was released in September 1989; two months before Irem were able to release the sequel to the hugely successful *R-Type*. What *R-Type* had borrowed from the original *Darius*, was in turn borrowed from *R-Type* for the *Darius II*. *Darius II* still had much in common with its predecessor: 4:1 aspect ratio, compressive style of foreground object placement, power-ups and branching level design, however the success of *R-Type*’s visuals and faster paced gameplay had their share of impact on the design of *Darius II*.

Sections of *Darius II* share blatantly Giger-esque visuals and motifs. Level backgrounds are adorned with references to Giger’s biomechanical landscapes (Figures 113, 114).
Figure 112. Darius II and Giger Boneship Example. Adapted respectively from Darius II. Copyright by Taito, 1989. Alien Bone Ship Concept. Copyright by H.R. Giger, 1978. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

Figure 113

Figure 114

Figure 112. Comparison of Egg from R-Type and Giger’s Art. Adapted respectively from R-Type. Copyright by Irem, 1987. Alien-Egg II. Copyright by H.R. Giger, 1978. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Not only could the same Giger-esque references been seen throughout *Darius II*, so too could original enemy design be taken directly from *R-Type*. The “Blob Boss”\(^{83}\) from *R-Type* and its uncannily similar counterpart in *Darius II* are testament to this (Fig. 115).\(^{84}\) Not only is the visual styling of both very similar, their attack pattern and movement, comprised of a large mass made up from smaller independent moving pieces, is uncannily similar also.

*Figure 115*\(^{84}\) Comparison of R-Type and Darius Blob Boss. Adapted respectively from *R-Type*. Copyright Irem, 1987. *Darius II*. Copyright, Taito, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

*Darius II*, despite sharing much in common with its predecessor, benefits from some major changes. First, while there is still the emphasis on exploration through the usage of branching level design, the exploratory nature of the obstacle placement in-game has given way to more emphasis being placed on enemy formations and frequency, in order to promote compression and funnelling when compared to the original. Despite having a

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\(^{83}\) There is no actual name reference to this boss character in the game’s documentation
play speed more similar to that of *R-Type*, it appears that *Darius II* has taken much inspiration from the train-like, symmetrical enemy patterns seen in *Gradius (Nemesis)* and *Gradius III*, also released in that same year. These enemy formations form long lines of enemies akin to those seen in *Gyruss* and those later encountered in games such as *U.N. Squadron*. This represents a major shift in the design of the *Darius* series, with the emphasis on object funnelling being replaced by enemy formation funnelling. The two mechanisms of compressing the player are also highly different from each other in terms of affect.

Funnelling using walls, caverns and other impenetrable barriers forces the player into a purely defensive and submissive position. They are forced in the direction that the game designers intended and their massive offensive capability stands for nothing in these sections. Now consider the use of enemy funnelling: in enemy funnelling, the player is able to overcome these imposed funnels by use of their weapons, rather than their movements. This forces the player into a dominant and offensive mode, empowering them and satisfying Id impulses. When analysing the genre as a whole, these passive funnelling methodologies used in the period between 1985 and 1992 represents a significant identifying component when compared to Shmups both proceeding and preceding this era.

**Zeitgeists: Contra**

*Contra*, also known as *Gryzor*, is one of the most recognizable arcade games released in the late eighties. The game was a mix and match of platforming and on rails shooting that played heavily on culturally significant themes of the time. The name Contra is derived from the Contra-Iran affair that happened during 1986 in which

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85 Figure 116 *Contra* Flyer. Reprinted from *Contra* arcade flyer. Copyright by Konami, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
senior officials within the Reagan administration sold weapons to Iran despite the weapons trading embargo. On the game’s marketing material, the Contra name is also explained stating that the name is given to soldiers excelling in guerrilla tactics which is apt, considering that the existence of the Nicaraguan contras, themselves a brutal, well trained guerrilla force, were present in the years prior to the game’s development. Further cultural referencing can be seen in Figure 117 with clear depictions of H.R. Giger styled enemies and two protagonists, Bill and Lance, who are modelled after Sylvester Stallone and Arnold Schwarzenegger respectively.

Whereas R-Type brought platforming conventions to the Shmup genre, Contra attempted to bring shooter elements to the existing platformer genre. Although this “run and gun” formula, which was pioneered by Contra, has been formalized in much later games such as Metal Slug, there were a number of key areas where Contra suffered. Contra suffers from a number of issues when analysed from a mechanical perspective. The most obvious of these issues is the fact that Contra is a horizontally scrolling game that uses an unconventional 3:4 screen aspect ratio. Unlike in R-Type, where the player has greater line of sight and hence more time to plan their offensive, the claustrophobic nature of Contra’s 3:4 aspect ratio means that the player is constantly on the back foot, needing to make a number of short, spasmodic and inconsistent movements to be able to survive the compressive forces. The 3:4 aspect ratio acts as a constant occluder, which prevents all but the most experienced of players from making purposeful and powerful movement. Put concisely, limited line of sight means less time for the player to plan and hence the player feels less empowered as their power in the game is mostly reactive instead of proactive (Figure 118).

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Figure 117

When considering the compressive elements of *Contra*, one must also consider the game mechanics, which are a combination of platforming, and run and gun shooting. While platforming relies on the negotiation of a 2D environment using a combination of left and right movement as well as jump, run and gun places a higher emphasis on negotiating barrages and the environmental negotiation is a much lower priority. As such, platformers tend to avoid constant enemy barrages and run and gun games tend to avoid complex environmental negotiation, however, *Contra* is a combination of these two opposing mechanics. In *R-Type*, the player is able to move anywhere on screen and maintain their position unless presented by some type of barrage, occlude or other compressive force. *Contra*, conversely, has the added complexity of gravity, forcing the player to carefully negotiate barrages whilst maintaining the best possible screen position. At the time, this juxtaposition was revolutionary, but in hindsight it is confused and overly complex. Figure 119 shows the platforming elements of a section of *Contra* with both protagonists resting on a particular ledge. If either protagonist falls, or jumps downwards they then lose the strategic advantage associated with having the higher ground.
Figure 119

Figure 120 adds the run and gun compressive elements on top of the environmental considerations brought about by the use of a platforming mechanic. In the case of the first level, most compressive forces travel horizontally and the player negotiates these by transitioning vertically through the screen. On paper this might not sound like such a bad idea: bullets travel horizontally, the player needs to move vertically to negotiate these. However, when we consider that the developers have simulated gravity this becomes problematic. Instead of the player transitioning along the vertical axis in a linear progression, the developers of *Contra* have used a logarithmic jump curve which slows the players transition at the height of their jump, hence making them “hang in the air” during this vertical movement and hence be highly susceptible to the bullets that travel in a linear fashion along the vertical axis.
If we look closely at the explanation of kinetic visemes, we can see that long, straight movements imply a sense of power and purpose, whilst spasmodic and irregular movement suggests lack of purpose. Shmups have long avoided logarithmic ADSR curves in player input movement as they are inconsistent from the player’s perspective and can make them feel cheated and out of control, hence compromising empowerment. Linear ADSR’s Figure 121,87 as used in the majority of Shmups including R-Type, “enhance the perception of instantaneous response” and hence feel purposeful and predictable. In R-Type, the ADSR curve is the same no matter what direction the player wants to move in; vertical horizontal or diagonal Figure 121, Figure 122. Contra has a curious combination of a linear ADSR for horizontal movement a variable ADSR for vertical and diagonal movement, which is informed by simulated gravity Figure 123.88

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All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

Figure 121

![R-Type Diagram]

Figure 122

![Contra Diagram]

Figure 123
Evaluating Period One

Period One: Empowerment

One of the key ways in which empowerment was created during this period of time was explicitly controlling the player’s line of sight. As discussed earlier, line of sight is one of the main factors that can either empower or disempowering a player. In the contexts of *R-Type* and *Darius*, line of sight was promoted by the use of horizontally scrolling movement and a traditional 4:3 screen resolution (or 12:3 in the case of the deluxe version of *Darius*).

The use of horizontal scrolling and traditional 4:3 screen ration was a technique appropriated mainly from the console games market of the time; no one owned a 3:4 television set, therefore all console games where made to use the most of this area unless they were arcade ports of 3:4 games. Consequently, the consumer also began to expect this standardization in the arcade. Although this point relates more to how contemporary the game feels, it also has a direct role to play in player empowerment. The use of extended line of sight allowed the player’s avatar to effectively be a “one man army”. As coders during this period lacked both capable hardware and established artificial intelligence methods, arcade and console games relied heavily on using more “plebe” type enemies rather than singular, cunning types of enemies.

In more traditional terms, the extended line of sight allowed the player time to evaluate the telegraphing of incoming enemies and subsequently come up with ingenious ways to remove them from the screen. Shmups during this and later periods also relied on set enemy behaviours and patterns-based level design. Whenever a player encountered a certain type of enemy, they were then able to predict and subsequently execute a pre-learnt manoeuvre to deal with the enemy. Games such as *Contra*, however, relied more heavily on swamping the player with random encounters. Combined with the limited line of sight, this led to a type of compressive game play style where the player was constantly on the back foot. It should be pointed out though that *Contra* is not necessarily representative of all “other” games of the time. *Super Mario Bros.* was an example of an ‘other’ type of game, which used line of sight and pattern-based enemy behaviour to its advantage, one of the reasons why the game is still popular today.

Aesthetics also played a significant role in giving the player a sense of empowerment and subsequently creating sensations such as fiero, excitement, schadenfreude,
ownership and competency to name but a few. Graphical capability is where the arcade versions of software had the upper hand. One intriguing aspect of game aesthetics during this time is the way in which the Shmup genre led the way in creating more and more elaborate explosions, thus strengthening the visual cues which relate to schadenfreude.

Depending on the contexts of the game, explosions in Shmups became more and more elaborate, utilizing more fire and more frames of animation not because technology allowed it, rather because it was alluring to gamers. On a semiotic level, explosions represent destruction and annihilation; explosions are even considered a sign of power of those creating them. O’Neill (2006) refers to the explosions created by terrorist groups such as al-Qaeda as “essentially a performance, made-for-TV terrorism that is meant to be seen and heard rather than to effect real change”.

Realistic explosions in Shmups were a design element that only really began to be explored in the early nineties, however, the most significant change occurred in the games as studied in Period One. Figure 124 eliminates many of the stylistic variables encountered when doing a comparative analysis of video game explosions and instead focuses on an evolution of explosions in Capcom’s 19XX series, one which spans these four periods in questions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Game</th>
<th>Sprite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>1942 (Capcom)</td>
<td><img src="image1.png" alt="Sprite" /></td>
</tr>
<tr>
<td>1987</td>
<td>1943 Kai (Capcom)</td>
<td><img src="image2.png" alt="Sprite" /></td>
</tr>
<tr>
<td>1990</td>
<td>1941 Counter Attack (Capcom)</td>
<td><img src="image3.png" alt="Sprite" /></td>
</tr>
<tr>
<td>1995</td>
<td>19XX - The War Against Destiny (Capcom)</td>
<td><img src="image4.png" alt="Sprite" /></td>
</tr>
</tbody>
</table>
The explosion sprites in the above table have not been enlarged or enhanced and they have all been the explosion sprites dedicated to the “plebe” enemies on the first levels of each game. Not only can one note an increase in the size of these sprites, but as the series progresses each one of these explosions gains more and more frames of animation. Additionally, due to the style of each game, these explosions also become more numerous as the years pass. Comparing the images in the table above, it also becomes apparent that Shmup developers moved away from using basic spherical explosions between these two periods. This change in artistic styling of explosions can also be attributed to further Westernization of Shmups throughout the early nineties.

The use of spherical style explosions is a Japanese stylistic marker, epitomized throughout the 1960s, 1970s and 1980 in such seminal anime series as *Gundam, Akira* [Figure 126], *Starblazers, Macross* [Figure 125] and even *Robotech*, the Westernized amalgamation of both *Gundam* and *Macross*.

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*Figure 126* Akira explosion example. Adapted from Akira. Copyright by Ryōhei Suzuki Shunzo Katō, 1988. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

*Figure 125* Macross explosion example. Adapted from The Super Dimension Fortress Macross. Copyright by Bandai, 1982, 1983. under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
It is difficult to localize this phenomenon to only Japanese arcade Shmups during this period, as they were the only nationality producing them commercially in this medium. However, a comparison between Japanese developed arcade Shmups and Western computer Shmups of the same era does go some way to correlating these results. Take, for instance, *Battle Squadron*, a vertically scrolling Shmup for the Amiga developed by European developers, Innerprise, in 1989. Compared with the explosions seen in the above figure in the same year, *Battle Squadrons* depictions vary greatly from that of *Arbaelester*, *Dangerous Seed* and *Omega Fighter*.

Explosions as an indexical signifier are integral to the Shmup genre. More significantly, though, is the visual depiction of explosions as a potential nostalgic element; synonymous with one era more so than another as depicted in [Figure 128]. The occurrence different of explosion types over time will be examined at the end of this study to see if they do in fact play any role as a defining, nostalgic sign.

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9[Figure 127] Explosion example from *Battle Squadron*. Adapted from *Battle Squadron*. Copyright by Innerprise, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Period One: Flow
A less obvious game element that impacts on the creation of flow is the technology behind the game. During Period One, the majority of games relied on limited amounts of physical memory. Unlike optical mediums which became more predominant in subsequent periods, solid state memory, as employed by all of the above games, is extremely fast, but extremely limited. Modern concepts such as load screens were not used during this period of time because they simply did not need to be used. This technological consideration also factored into the types of narrative conventions able to be given to the player. As there was limited physical space available, there was no room for any superfluous elements such as overly long story FMV elements or even extensive use of aesthetic elements. Consequently there is no real difference in flow when comparing Shmups to their rivals during this period. According to Csikszentmihalyi's (1991) model of flow, the necessary factors are “a challenging but tractable task, perfect concentration, clear goals, and immediate feedback, full immersion in the task, clear goals and immediate feedback, the sensation of exercising control, the loss of self-consciousness and the transformation of time”. Based on the above observation, there is no detrimental impact on how these were represented for the player within the larger definition of flow.

Period One: Instant feedback
This heuristic has been dealt with in some detail in regards to explosions and to the sensation of empowerment. However, the difference in feedback offered between the Shmup genre and the other forms of gaming once again comes down to evaluating the difference in technologies used. The reason for this is that the games in Period One
generally share the same standardizations in terms of feedback systems. All use some type of indexical symbolism such as explosions, smoke trails and even score elements, however it is the quality and modalities offered for this feedback that provide the most useful tool for evaluation.

Once again, the more powerful arcade hardware used in *R-Type* was able to provide more simultaneous samples at any given time. The hardware used more colour at a higher resolution and also incorporated more active layers that a designer could potentially use for aesthetic type feedback. The main standardizations for feedback during Period One are:

- Score
- Indexical Symbolism (explosions, smoke trails)
- Aural Cues (sound effects and even music to a lesser extent)

*Contra, R-Type, Super Mario Bros* and *Darius* all utilized this feedback standardization. The main difference was that *R-Type* was able to provide more feedback cure and at a higher fidelity when compared to its competitors. Another key difference when comparing *R-Type* to *Contra* is colour contrast between foreground and background, and the impact that it has on a type of ineffective game experience that has been dubbed here as “screen cluttering”. Put simply, a greater colour palette and use of contrasting colours in the foreground and background creates a clear-cut sense of space around the player’s avatar. This phenomenon is particularly evident when comparing Figure 129 to Figure 130

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92Figure 129. *Contra*. Adapted from *Contra*. Copyright by Konami, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

93Figure 130. R-Type Boss Encounter 1. Adapted from *R-Type*. Copyright by Irem, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Due to the use of colours in Figure 129, it is quite difficult to ascertain any type of definition between the player and the background elements, especially to the untrained eye. Although Figure 130 is not indicative of every level in *R-Type* it does demonstrate a very clear distinction between avatar and environment. What this means in terms of feedback is that it is very clear to the player what will result in a “collision event” and subsequently makes it easier to model behaviours as potential threats are more clearly outlined. This particular approach grants the player a sense of explicit control and mastery over their environment and leaves little opportunity for collision events such as projectiles to approach them without fair warning. This is particularly useful when one considers that the majority of games from this period were one-hit, one kill. As such, telegraphing needed to be clear and distinctive and this is one aspect in which Shmups of the period were quite effective.

**Period One: Bring the Player to Action**

This heuristic has been discussed at length during this period and as demonstrated earlier, the psychological response to certain visual stimulus was undeniable. This period of time referenced some very powerful cultural motifs in order to strengthen this heuristic and its subsequent affect. As such, in discussing this heuristic, familiarity and contemporary issues will also be covered. During this period there were two key themes that were used to bring the player to action. These were the threat of terrorism and the
threat of exotic alien forces. What both these elements share in common is the archetype of “the other”, namely the negative aspects that individuals deny in themselves yet project onto others.

In games which have powerful technology, creating vivid, aesthetic depictions of either terrorists or exotic “others” is far more straightforward and so long as the initial design is strong, will always be more effective in eliciting responses in players when compared to examples with lower fidelity. However, graphics aside, to evaluate this heuristic we must really ask exactly, ‘what was at stake’ in the games analysed during this period?

None of the games examined during the period utilized wealth and accumulation, as they simply were too quick to be concerned with elements of macro-management. What was clear, though, was the emphasis placed on “sweeping”, a game mechanic whereby elements must be systematically removed from the environment. To understand the compelling forces of sweeping, we must really consider the underlying psychological considerations of projection, and the archetype of the other.

In the computer games examined in this study there are dozens, if not hundreds of plebes, all working for a greater, repressive entity. In R-Type, there was the ‘Bydo’ and even in Super Mario Bros there were the evil minions of “Bowser”. These two different, yet similar forces hark back to the sentiments of Carl Jung namely the need for opposing, “god-like” forces to shape our own psyche (1961B). Jung (1961B, p. 323) states that man can “appropriate its power only by indentifying with the daemon,” thus we can see how the prevalence of enemies / daemons within the game environment embody the ability of the player to not only be repressed, but also transcend. Therefore, what is compelling about the games during this period that focused on masses of enemies, was the opportunity for self-legitimization and the feeling of supreme competency that came with overcoming the minions of a seemingly god-like force. Further to this, gamers are compelled to act because they can recognize themselves in the enemies that they are overcoming.

However, this type of sweeping game mechanic was predominantly a legacy of the dominance of arcade games during this period of time. With the advent of more powerful consoles and computers, there was also a push towards more intrinsically motivated game mechanics such as problem solving and exploration. The gradual evolution of the arcade version of Donkey Kong, to Super Mario Bros. to games like
Metroid are indicative of this changing desire on the behalf of gamers. In some regards then, Period One heralds the popular demise of sweeping based games in favour of the more balance approach of sweeping combined with wealth and accumulation, a type of game mechanic only available outside of the “bustling” constraints of time based arcade game play.

Period One: Education

Arcade games, especially Shmups, relied heavily on pre-existing standardizations in order to train the player. As Period One represents a point in Shmup history where it had only really just reached a point of standardization, there was still a relative low entry barrier (LEB). Presumed skills were basic control and an understanding that ‘what is not, you is more than likely trying to kill you.’ This constant remains true for all of the games studied in Period One, however with innovation comes the risk of assuming an existing experience in the end user. This is one area where Contra, despite its innovation, falls down.

For the novice player, Contra offers little in the way of providing ‘safe’ areas for the player to learn new skills. In games such as R-Type and Super Mario Bros., all use the same type of game play through out, therefore they only need to offer safe areas in the early stages of the game. In the case of Contra though, constantly changing perspective and goal systems only act to confuse the player and create a significantly high entry barrier (HEB). Further to this, this pastiche of game elements can make players feel cheated and even incompetent.

Where Super Mario Bros and generally all Shmups of the era offer significantly improved player education experiences is in the way they teach the player without making it obvious that they are being taught. What this leads to is a player experience whereby they feel empowered and competent and importantly they take ownership over their mastery of skills. How this translates directly into the case studies is through early sections of the first level that allow for the player to totally dominate the game, but at the same time, learn vital elements that they will encounter later.

In R-Type and many other Shmups of the period, the player is taught that similar enemies will act the same and that the most common way to deal with enemies is to draw fire, strafe and engage. One common mistake made by games is this era was not considering a logical progression of player skill. Contra suffers in this regard by not
giving the player adequate time to explore the complex ADSR curves that define its various movement axes before encountering any enemies.

**Period One: Challenge and Reward**

The standardization of score was a defining element of nearly all games studied in Period One and as such offered a clear, measureable means of giving the player reward. It was not specifically the score itself that was rewarding for players, rather that it offered a measuring stick to compare and legitimize the player compared to their peers. Score mechanisms are only really useful in public arenas like the arcade and to a much lesser extent, the home console market. Given this, it is easy to deduce that challenge is derived from this same system since the challenge is to maintain one’s bragging rights.

If the reward is largely external to the direct experience of playing a game, then it raises an interesting point: namely that the design of games during this first period makes the player feel mostly anxious during their game experience, with relief only coming during level changeovers or ultimately, death. Shmups are actually quite effective at promoting extended periods of anxiety, due to the automatic scrolling and subsequent compression and funnelling of the player’s avatar that occurs. This provides an experience unique to Shmups and was not achievable in the platform game genre. Although large amounts of anxiety can increase the perceived value of any reward, there is no real evidence to suggest that extended periods of anxiety were wanted by the player. What is evident is that the players were willing to endure these prolonged periods of anxiety and stress for the eventual pay-off which was their name on the high score table.

Alternatively, reward for platform games is largely based on letting the player experience more of the hard-coded narrative. In many platformers, challenges were designed in such a way as to prevent the player from continuing the narrative experience. Although Shmups such as *R-Type* did have narrative elements built into the game, they were only used to give context to the player’s actions and the actions of the enemies and as such can be seen as a secondary type of reward system to score.

**Period One: Immersion**

If we consider Ermi and Mäyrä’s (2005) model of immersion then we can see that games such as *R-Type* and *Darius* had a clear advantage when it came to sensory immersion as demonstrated in the quality of visual representation, especially when compared to the platforming genre, which was predominantly based on the lesser
powered home console hardware. Combined with graphical capability and a high level of popular culture referencing, games such as R-Type and Darius had more potential for imaginative immersion when compared to their platforming peers, especially Super Mario Bros, which had a highly stylized aesthetic that was highly influenced by its Japanese developers. The quality of the visuals and their potential to create imaginative immersion led to strong feelings of awe and mystery in the player, as for the first time, players could create associations between the highly fleshed out graphical representations of on screen enemies and draw subsequent comparisons to other, similar examples from film and television, such as Aliens and Predator.

Challenge-based immersion was better handled by the arcade genre during this period of time, particularly when considering that platforming games tended to de-emphasize competitive play in favour of narrative exploration. Although Shmups did not promote directly competitive styles of game play, score systems and high score tables in a public environment created indirect PvP, which had been a widely acknowledged standardization since the inception of electronic arcade games. That the platforming genre was also largely based around the home console market meant that there was no public exposure of scores, and subsequently these types of games did not attract any real type of PvP interaction. As discussed earlier, the lack of competition can lead to diminished sensation, particularly schadenfreude, fiero, anger, frustration and most importantly, achievement.

Contra did try to combine the best elements of platformers and Shmups but fell short of succeeding largely due to the game utilizing an ever-changing set of game mechanics that created inconsistency for players. In competitive gaming it is naive to think that all competitive players are drawn to all competitive games. What is usually the case is those players who are extremely good at one particular type of game will play this type of game competitively. This is the problem then with Contra: it is a collection of disparate types of game mechanics which ultimately don’t add up to an effective, arcade game experience, especially given that all arcade games of this era promoted some form of competitive game play. Ultimately, immersion was better achieved by the Shmup genre during this period of time due in part to a long established set of standardizations.

94 “Player versus Player”
that leant the genre toward competitive play, and due to the genre having some of the more powerful hardware of the era.

Period One: Contemporary Coding

As discussed throughout, the links to popular culture references such as films like *Rambo, Alien* and *Predator* is undeniable in all of the singular games discussed in this case study. Arguably, the two most significant contributing factors are the development and widespread adoption of the platform genre and the influential work of H.R. Giger. Of these two factors, most likely the most significant for consumer desire was not Giger, but rather the platform genre. The release of *Super Mario Bros.* in 1983 came during a period of time when consumers in the home console market had grown tired of the lack of quality control, a legacy of Atari in particular. Despite the desire of the public being mainly focused on arcade software, the release and subsequent success of *Super Mario Bros* is testament to the game’s undeniable popularity. Although platform games had been around for some time, many did not promote emotions associated with exploration and narrative-driven game design, as the arcade medium did not allow for this more slow-paced approach to game play experience. Arcade games were designed to get you on and off the machine as quickly as possible. Reward and gratification was often swift in an attempt to give games the short addictive bursts that were required to promote replayability, and hence produce greater profit for operators.

What the home console medium and *Super Mario Bros* did was change the emphasis on game design from short bursts, to more of a ‘value for money approach’. Arcade games were charged on a per experience basis, whilst home console games were purchased in their entirety of potential experience. In order to reassure consumers in the home console market that they were not only receiving quality once again, but also value for money, the development mantra of home console games began to more towards narrative experience and exploration. Home console games became longer and more focused on emotions associated with exploration rather than the competitive style used more in the arcade medium. Although many Shmups did have narrative elements, a new emphasis was placed on the potential for aesthetics to create emergent narrative for the gamer. *Super Mario Bros* and *Metroid* did this via rich and contrasting visual themes, while Shmups such as *R-Type* and *Darius*, which had less time to establish secondary worlds for the player, instead relied on strong, contemporary themes that already had a large, existing, emotive value such as the referencing of H.R. Giger and Aliens.
Although these themes can be considered contemporary, they also appealed to the player’s sense of existing familiarity.

**Period One: Familiarity**

Another dominant feature was the emphasis on sci-fi and often very pessimistic themes that stemmed largely from the ongoing threat of nuclear destruction brought about by the Cold War. Steve Russell, one of the most important people behind the development of *Space War!* alludes to the importance of the Cold War in terms of shaping the desires of a game playing youth and how it ultimately shaped the way he made games as a developer.\(^95\) Many of the games discussed as part of Period One had a strong emphasis on depicting the enemy as an abstract, alien “other” – always with immense power and a matching desire to use it to quash the forces of “good”. This follows the theme of cold war propaganda as used by many Western governments to demonize the USSR during this period of time (and vice versa).\(^96\)

“Reds under the bed” and other visual propaganda tools were used to vilify the Russians, specifically Communism, and turn them into a ‘secretive’ other.\(^97\) This type of secretive other was a theme explored at length in games such as *R-Type*, *Darius*, *Contra* and *Metroid*. Enemies such as the Bydo (*R-Type*) and “The Belser Army” (*Darius*) all gave the player very little information about the agenda of their enemy other than simply inferring that they were a force of undeniable evil, intent on dominating the forces of ‘good’. These types of themes create the juxtaposition of us

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\(^95\) For the complete interview, please refer to http://www.youtube.com/watch?v=59PMsQ-5jg

\(^96\) Figure 131 Russian Cold War Propaganda. [Online] Reprinted from Russian Art and Books. (Available) http://www.russianartandbooks.com/cgi-bin/russianart/Pr00025 Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

\(^97\) Figure 132 Examples of the United States anti communism. propaganda. [Online] Reprinted from Examples of American Cold War Propaganda. (Available) Figure taken from http://www.designer-daily.com/examples-of-american-cold-war-propaganda-2918. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
and them, which was a dominant feature of the cold war and subsequently an underlying mindset of those that grew up during this period of time.

Beside the elements of cultural familiarity and nostalgia lay the standardisation of gameplay mechanics utilized by the games analysed as part of Period One. Some of the key standardizations emphasized by the case studies were score, levels, us versus them attitudes, minions of AI controlled plebes and short, level structures. In terms of nearly all of these standardizations, the games analysed from Period One used them as players would expect. However, the emphasis of standardizations in nearly all commercial games of this genre meant that there was room for experimentation, although the experimentation undertaken all involved elements of game design that had been tried nearly a decade earlier. The 3D level designs of Contra for example, stem back to earlier, Z axis scrolling games made by Atari such as Sky Raider (1978) whilst the non-linear approach to level structuring as used in Metroid is a return to text based adventure games and MUDs of the early eighties and late nineteen seventies. Probably the most original game of Period One; Super Mario Bros is simply a revisiting of game mechanics used in Defender (1980).

**Period One in Summary**

Period One provides the baseline for the preceding periods largely due to the Shmup genre being more effective at conveying affect than its peers. It is therefore hard to take away any type of best practic” from this period, other than looking at how R-Type especially created strong sensation and emotion in the player by best applying the design heuristics for that period. The influence of the home console market and the platformer genre during Period One indicates that consumer trends were about to move away from Shmups in favour of platformers in the next period. With this in mind,
Period Two provides the first aspect of consumer desire divergence away from the tried and tested Shmup genre.
**Period Two: 1990 - 1995**

One of the underpinning trends of games during this second period is the usage of strong characterization. This trend towards characterization is driven largely by the marketing campaigns of Sega and Nintendo, each looking for an iconic mascot to help sell their new wave of 16-Bit home consoles; the Megadrive and Super Famicom. The need for characterization led to the development of more and more platforming types of games. Characterization seemed to go well with this genre, as the protagonist could be depicted on screen as a human-like entity, rather than something less personal like a space ship or aircraft. Other genres of gaming featuring strong characterization also began to emerge. One such title synonymous with this period is *Street Fighter II*, developed by Capcom. Newer and more proficient technologies meant that for the first time, human-like AI became a common feature in games, allowing for a convincing, simulated human versus human encounter to happen.

New technology also allowed game developers to explore more visually realistic game worlds. For the first time, technology allowing the player to utilize three axes of movement became a common feature amongst not only the more powerful arcade platforms, but also home consoles and computers. For a medium, which since its inception had largely only designed for two axes of player movement, this presented new opportunities for game design, and also new challenges for the Shmup genre.

Technology and personification / characterization will form the main analysis in this period.

**Street Fighter 2**

*Street Fighter 2* signalled a changing of the guard in local arcades worldwide and the introduction of the game in 1991 might be described as a gaming phenomenon. Consequently, it can be seen as a major turning point within the history of Shmups. The concept of the one-on-one fighting game had been around for some time with many sighting Technos’ [98 *Karate Champ*](#) as the game that started it all. Bousiges (2007) states that

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98 Many sight Data East as the developer of *Karate Champ*, yet it was only distributed by Data East. Development of the game came from Technos Japan.

99 *Figure 133* *Karate Champ*. Adapted from *Karate Champ*. Copyright by Technos Japan Corporation, 1984. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
This is where an entire genre began; the one-on-one fighting game. The list of titles Karate Champ would go on to inspire is near-endless - needless to say, without this game, "Street Fighter", and countless others like it, might never have happened. The only description that can truly do this game justice is seminal.

*Street Fighter 2* was a bold move by Capcom, especially after the relatively lacklustre showing of the original *Street Fighter* in 1987. Capcom faced stiff competition not only from the highly established Shmups genre, but from industry giants such as Sega, whose large scale attractions were wooing arcade audiences worldwide.

*Street Fighter 2* teaches us something notable about the majority of gamers. Unlike the Shmup formula, the one on one nature of the fighting genre and its subsequent popularity shows that the arcade audience patrons were more drawn to this style of competitive play. Either playing against a CPU controlled opponent or a real human opponent, the player was in direct competition with another player. The game gave audiences a chance to live out deeply suppressed narcissistic fantasies such as domination and admiration for their lack of empathy. More importantly, this was illustrated in a way that the player could relate to. The characters in *Street Fighter* were drawn with relative reality and the methods of attack (bar the hand thrown fireballs) were something that people could do in real life, without such ferocity and prowess. Compare this to the over the top antics demonstrated in Shmups, whereby the player took control of a small space ship more powerful than the combined military forces of the northern hemisphere, taking on an alien army, and one can see how players were more able to associate with the *Street Fighter* formula. The threat to the player was very real as the graphics depicted the player standing on screen being directly attacked by another human opponent.
The impact of *Street Fighter 2* triggered a tidal wave of other Fighters to be produced; SNK, Midway, Data East and many others clambered onto the bandwagon in the same way that the release of *Space Invaders* had stimulated numerous copies, all in an all too similar vein. This, however, was not the end of the Shmup in Western arcades, but it demonstrated the changing tastes of arcade patrons, a need that the traditional Shmup formula could not cater for due to its inherent definition.

Technology, rather than human need or social influences, was a main driving factor behind the emergence of games like *Street Fighter*. On screen enemies previously had been limited to small sprite tiles and limited colours, heavily impacting on the ability of realistic representation. Capcom’s CPS hardware was able to reproduce larger sprites with more colours, resulting in a more visually realistic representation of both players and aggressors. Shmups were also able to utilize such technologies however they were still inherently linked to 2D perspective. The arcade market was preparing for a revolution, one that would bring realism to the forefront of the arcade patron’s desires.

The height of Shmup development and consumption also coincided with the height of technologies that were better adapted to the medium. New technologies not suited to the traditional standardisations of the Shmups genre were about to emerge. These technologies were revolutionary; so too were the designs of the games developed to embrace them. Arcade patrons sought these new technologies to the detriment of the old, bringing about the demise of the reign of the Shmup genre.

**Z-Axis Movement**

In an ever-increasing endeavour to bolster graphic realism in games, developers such as Sega began working on some of the most powerful 2D arcade hardware ever created. During the late eighties, Sega had developed no less than six of these powerful 2D platforms, the first and most historically important of which was Sega’s *Space Harrier* (Sega, 1985) hardware.

One of the hardest technological leaps that video game technology had to make was creating the illusion of three-dimensional depths in the game world. Sega were by no

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100 Sprite tiles are essentially the canvas on which images are stored in raster 2D games. Older games had sprite tiles around sixteen by sixteen pixels but newer hardware was able to produce sprite tiles up to 128 by 128 pixels.

101 Capcom Play System, an arcade platform that used interchangeable “rom” boards.
means the first to achieve this. Some of the earliest examples of 3D game worlds such as *Death Race 98* (Exidy, 1976) and *Datsun 280 Zzzzap!* (Midway, 1976) were created in the mid-seventies using discreet logic processing. Although the concept was already in place, technology had not achieved a level by which it could easily reproduce complex graphical movement and scaling along the Z axis. The main barrier to achieve this lay in poor graphical resolution.

Using a monochrome graphical array of six by six pixels to scale a ball along the Z axis provides an extremely limited perception of realistic depth. In the case of this example, the ball may only be scaled three times. In a typical game where the image refresh rate is usually thirty or sixty times a second, if you want a ball to move towards the player along the Z axis in one second, then each frame would have to be held for ten or thirty refresh counts. Any perceived depth would take some imagination on the player’s behalf.

![Figure 134](image_url)

Compounding these difficulties faced by graphical resolution, moving a sprite along the Z axis was costly on CPU processing time as each pixel in the sprite needed to have its co-ordinates recalculated and then redrawn. Sega had developed a method of doing this that not only was fast, but capable of processing nearly 256 sprites at a time with minimal CPU usage. The result of this was first seen in *Space Harrier*. Although *Space Harrier* is not a Shmup by the above definition, it shares many similarities and possibly signifies the greatest turning point in gaming, a turning point that would eventually led to the downfall of Shmups as the number one gaming genre.

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102 The ball can also could also be depicted as a single pixel or 36 pixel unit.
The 3D revolution and the 2D demise; Video Killed the Radio Star

At the end of the 1980s, computer hardware was on the verge of a technological revolution. Intel’s ‘386’ processor and the Motorola 68030 were bringing more powerful computer game graphics into homes around the world. Larger arcade developers were beginning to see the potential of this technology to bring about a revolution in gaming, one that would give them an edge. In 1991, Sega began heavy research and development of their first truly 3D arcade board, the Model 1. So serious were they that “Sega went to General Electric Aerospace (who made the first 3D simulators for NASA in the 1960s) in 1991-92 for assistance to develop a CG platform architecture for their new experimental 3D system” (System 16, 2000).

The culmination of their work gave arcade attendees the first truly 3D video game, Virtual Fighter (Sega, 1993), the third game released for the Model 1 hardware. With it came a revolution that other manufacturers were quick to follow. But why this revolution? Atari had done 3D graphics ten years prior in I-Robot (Atari, 1983) but Model 1 changed the way in which the player could interact within the game world. No longer was the player restricted to only two planes of movement, now the game world could be viewed from an infinite number of perspectives, thanks to the transition to polygons rather than sprites.

Polygons and Sprites

Previously, 3D gaming worlds were constructed out of many 2D sprites such as can be seen in games like Wolfenstein 3D (ID Software, 1990). All of the items and enemies within the game are flat 2D sprites, which have been stored as individual pictures from all possible view perspectives (Figure 135). Depending on how the player is viewing the particular object, the game engine then plays those pictures or ‘frames’ from the side, or front etc.

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103 Figure 135: Sprite example from Wolfenstein 3D. Adapted from Wolfenstein 3D. Copyright by Id Software, 1990. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Figure 135

Figure 135 demonstrates the only ways in which the player can view the above character - there is no above and no below. Therefore, it is a limited 3D game world, that is, the player can only view objects within it from pre-defined perspectives. 3D models on the other hand are objects constructed from many smaller polygons to form primitive 3D objects like cones, spheres and cubes etc. These objects are viewable from any perspective, and hence truly 3D (Figure 136).  

Figure 136

In the early nineties, 3D gaming was the realm of large firms such as Sega and Namco and the emphasis on these technologies being used to depict realistic style games meant that neither developer made any Shmup for their initial stages of 3D arcade hardware. This is a crucial issue not only in the context of this study, but when looking at video games as a whole. The technology currently being utilized by console gaming unavoidably lends itself to one style of gaming over another and these technologies and their production and consumption is manipulated by a number of unseen machines. Around this time there were two main ways of storing data for home console use: the first was via ROMs and the second was via optical disc. ROMs being solid state meant that they could fetch data at a much higher rate than early optical data methods;

[Figure 136] Example of a polygon approach to game assets. [Online] Reprinted from web3Dservice. (Available) http://www.3dmd.net/forum/3d-discussion-56.html Copyright by web3Dservice (n.d) Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
however ROM was very expensive when compared to optical discs. Around this period, the largest ROM chips available were the 27c160 EPROMs which could hold sixteen megabits of data (16Mb). The cost of one of these EPROMs was excessive. Compare this now to CD style technology which could hold 5200 megabits of data (650MB) and cost only a fraction of one 27c160 EPROM chip. The only downside to this technology was that it was very slow to retrieve data.

Shmups, a genre of gaming highly dependent on the speed of game play and level loading was more suited to ROM style storage than the slower CD based methods. Not only this, but developers sought new methods of utilizing the full CD and these methods included things like storing FMV (Full Motion Video) and Redbook soundtracks. Although the latter could easily have been at home in Shmups, the former, FMV was not part of the Shmup formula and could be seen even as a detrimental feature, given the genre’s emphasis on relentless barrages of enemies.

Although 3D was still a long way from being applied to Shmups, technology had provided a mechanism for games to change the way that they were implemented and consumed. It would seem that the pursuit of realism would become a key element to gaming during this period. However, despite the technological and financial reasons for this change, the human need for this realistic depiction in gaming is seldom explained. The culmination of these three machines - psychological, scientific and artistic - may represent one of the most significant reasons in explaining why mainstream gamers began to move away from Shmups. To begin to explore this point, we must move our focus to the current trends in home console video game consumption and then work our way back.

I am Me, This is Me: FPS vs. Shmups

One only has to walk into a game store to notice the amount of shelf space dedicated to FPSs (First Person Shooters) rather than Shmups, and with FPSs such as *Half Life* (Valve, 1996) selling around eight million copies worldwide (Musgrove, 2004) one must seriously consider what the lure of this genre is? Although seemingly different genres, FPS and Shmups share common roots. FPS can be considered an evolutionary branch of the Shmup genre with bridging games such as Sega’s *Space Harrier* (Sega, 1985) making the transition from third person to first person perspective (Figure 47).
The FPS genre took the principle affects of Shmups but changed the player’s perspective and the rules of the game in a move to make more realistic gaming experiences. Instead of the player being represented in the third person on screen, they were now quite literally the player. When an aggressor shot at the player in a Shmup, the projectile was directed to the third person representation of the player on screen, but in an FPS, when an aggressor shoots at the player, the projectile is literally moving towards the person sitting behind the screen. Consider the difference from watching a person on TV in some sort of story to being the person actually in the story - such is the difference in immersion for the player.

The immersion that the FPS genre allows for has also put it into the middle of a larger moral debate about the impact of violence in video games. However, there has always been an overwhelming tendency for violence in video games. Provenzo (1991, pp. 106-109) noted that out of the forty-seven popular video games analysed, forty of those were violent in nature. Braun and Giroux (1989) studied the most popular arcade games in twenty-one Montreal video arcades and found that seventy-one percent of those were also violent in nature. What has changed, though, is the way in which the player perceives this violence. Most early video games were abstract in their portrayal of violence in the game world. During most of the eighties, the protagonist was represented as a ‘blip’ on the screen under the control of the player (Cooper & Mackie, 1986); as the blip evolved, so too did the ability to depict the violence more realistically. Ballard and Weist (1996, p. 717) described the action depicted in Mortal Kombat as
follows: “The game includes characters that can kill or be killed by electrocution, ripping out the heart, or decapitation with a quivering spinal cord attached”. However, in the above instances, the player was merely interacting with the game world using an onscreen avatar. No violence was directly orientated towards the player; it was orientated towards their onscreen avatar.

The FPS genre and technology facilitated the removal of this middle man and hence changed the player from being represented by avatar (Figure 48) to actually being the avatar (Figure 49). Once one considers the importance of perspective, one can see that gamers aren’t drawn to violent games: they are drawn to games that more successfully connect the game world to them. Think of those people who watch car races on television and lean side to side with the action. Play close attention to these people and you will notice their tendency to lean is directly related to the perspective of the picture they are viewing, that is, in-car cameras will cause them to move their body more than a third person perspective of that car moving around the track.

Figure 138
In a study of empirical literature on video game violence, Karen E. Dill and Jody C. Dill (1998) cited studies in which researchers noted the difference in the player’s physical state between players playing and players observing a Virtual Reality game. Another study by Calvert and Tan (1994) found that the player’s immersion level was directly related to the impact of real physical changes in their bodies.

To research this, two test groups were exposed to *Dactyl Nightmare*, an extremely realistic game for the time. The first test group was actively playing the game, while the second test group observed a live video feed of the action as it unfolded. Unsurprisingly, the group playing the game experienced significantly higher physiological responses than those merely watching. Another interesting aspect of the research is that post-test; subjects who played the game demonstrated significantly more aggressive types of thought.

In first person games, anxiety mechanisms are more likely to be triggered because of the blurred line between virtual reality and reality. Players participating in *Dactyl Nightmare* encountered very real feelings of nausea and dizziness as opposed to those merely observing the action. Based on this research one can immediately see that the player’s empowerment within the game world is related to the manner in which they experience the game world. Developmental psychologist Erik Erikson (1950) (1959) cites the importance of autonomy and control within humanity and the development of the psyche. When we punish someone, namely a criminal, we send them to gaol and we remove their autonomy and empowerment. The importance of one’s autonomy and empowerment is a strong enough human instinct to keep the majority of us out of gaol.
This instinctual need for empowerment has a follow on effect even into the virtual world as emphasized by Ryan et al. (2006) and Ryan & Deci (2002).

The empowerment felt in the genre in FPS is directly linked to the ability of the player to interact with the virtual environment in a manner similar, although embellished when compared to their own realities. In Shmups, there is no element of exploration as exploration infers a type of endless possibility, which is impossible when the world progression (scrolling) is always predefined. Additionally, as FPS games use a system of rules similar to that of reality (you can move with your feet, look with your head, and touch with your hands), it is much easier for players to understand the system of rules that dictate their ability to interact. Playing from a first person perspective also illuminates potential aspects of personification that might lead the player to not associate with their defined avatar. It is in the intuitive and faceless nature of FPS style games that the attraction lies.

**Rotational Mechanisms / Perspective Mechanisms in Shmups**

This issue of perspective also influences that way in which a game is played. In the case of a FPS, the player once faced by an aggressor knows that they are in danger and that threat must be eliminated. The player can employ a number of strategic manoeuvres to attack this threat; they can strafe, pivot, jump and even use the virtual world to gain the “high ground” or a defensive position. In most FPS the player knows that they are not going to dodge every bullet, and that a single bullet in most instances is unable to kill them, hence their primary goal is the removal of the aggressor whilst minimizing risk to themselves.

Now let’s consider Shmups. In aggressors (Blue Stars) are able to engage the player (Red Triangle) by changing their rotation and position, yet the player’s offensive battery is often limited to one axis of movement; their forward orientation.
If a player wished to engage the enemy on the far left of screen, they would have to change their position on screen (X & Y indicated by the black arrow) [Figure 141]. What this means on an affective level is that the player is less an offensive player and more of a defensive player. The main consideration of the Shmup player is the manoeuvring of their avatar safely to a position by which their projectiles can remove the aggressor’s threat. Additionally, once the aggressor has released their barrage, their projectiles maintain their initial course.
Also consider the issue of perspective and limited movement. The player is unable to
directly engage the aggressor, because they are unable to rotate their forward orientation
to meet the aggressor head-on. During Danmaku Shmups, the player is spending a lot of
time getting their avatar to avoid incoming barrages rather than focusing their attention
on the direction of their fire, therefore modern Danmaku Shmups have become more
about strategic movement that offensive power (Bullet Hell) [Figure 142].

If one was to take a leaf from the FPS genre and apply it to Shmups then there would be
two primary considerations:

1. Empowering the player through a larger ability to move within the game
   world.
2. Changing the player’s perspective so that aggressors in the game world
   have more of a connection to the person sitting behind the screen.

The trouble with applying the above to traditional Shmups is that they contradict the
principles on which the genre is defined, such as allowing more than two directions of
movement, and changing from a rigid ninety degree third person perspective. Yet there
have been games that have attempted both of these things in the past. Let us consider
the first point of freedom of movement.

We know that Shmups offer the player movement on both the X and Y axis and that
their primary firing axis is usually limited to their forward orientation. By introducing
rotational movement, we allow the player to directly engage enemy targets on a more
offensive level.

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[Figure 142] Example of a Danmaku game. [Online] Reprinted from Insomnia. (Available)
http://insomnia.ac/japan/mushihime-sama_futari/ Copyright by Cave, 2004. Reprinted under the terms of
“fair dealing” in the Australian Copyright Act, 1968, section 40.
In the above figure, the player is first able to move to a strategic position, then directly engage an aggressor. Such freedom of movement allows for highly aggressive play styles that empower the player. Despite this, mechanisms such as these were rarely utilized in Shmups, and those games that did employ them such as Capcom’s *Avengers*, did not allow the player any type of autonomy when it came to exploring the virtual world via freedom of scrolling. Capcom did however successfully implement this rotational mechanism for the first time in a traditional Shmup in the form of *Forgotten Worlds*, released in the United States in 1988.

**Forgotten Worlds**

*Forgotten Worlds* was the third and final game in Capcom's “Jet-Pack Hero” trilogy, with the first two games being 1985's *Section Z* and 1986's *Side Arms - Hyper Dyne*. These three games formed a trilogy due to their cast of “Jet Pack Heroes” and to their emphasis on allowing the player to adjust their direction of fire. Both Side Arms and
Figure 144)\textsuperscript{106} utilized a simple method of letting the player either change their line of fire from forward to reverse by simply pressing a button to change and also fire. Although \textit{Forgotten Worlds} is technically a game belonging to Period One, it did not make it to the Western home console market until 1990, when it was ported as a PAL release for the Sega Megadrive.

On the other hand, \textit{Forgotten Worlds} included the use of a ’spinner’ \textsuperscript{107} an optical device that allowed the player to rotate their line of fire through 360 degrees, whilst also being able to change their movements at the same time.
The resulting combination of tactical movement and ease of manipulation by the player led to a unique style of game play. Essential to the game’s success was the initial enemy pattern design by Capcom. Instead of promoting the need to use the spinner from the onset of the game, game designers Noritaka Funamizu (Poo), Akiman, Akira Nishitani (Nin) and Kihaji Okamoto chose to use a traditional style of enemy attack pattern for the initial waves. Clever manipulation of the scrolling movement provided by Miki Chan (Mik), Hanachan, Kuramoyan, Nouochan and “Black man” at later points in the game meant that the player had to utilize the spinner to be able to engage enemies entering and attacking from non-traditional vectors [Figure 146].108 The scroll designers had also been revolutionary in their implementation of the in-game scrolling. Although Forgotten Worlds is depicted in a traditional horizontal style, the scrolling axis could move in several directions. Upwards scrolling sections would cause the player to rotate their line of fire forwards, and diagonal fire methods were also necessitated in certain scenarios in the game.

![Image removed due to copyright](image)

Figure 146

Aside from Forgotten Worlds being one of the first Shmups bar proto-Shmups to empower the player through kinetic liberation, it also laid the framework for games such as U.N. Squadron and Carrier Airwing’s financial systems. Forgotten Worlds allowed the player to collect blue coins and use them to buy upgraded weapons as well as other miscellaneous items that bolstered their ability. These coins were awarded for destruction of enemies and were necessary to allow the player to complete the game. This method of game play not only influenced future Capcom Shmups, but ensured the game’s success in the home market realm where game mechanisms facilitating

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replayability were necessary. Despite the game’s success, this style of rotational play in a Shmup was never pseudo-individualized by other developers during this time. One reason for this was due to Capcom’s financial standing at the time. Their economic position was such that any pseudo-individualization of their product could have led to expensive litigation for those willing to give it a try. Rotational mechanisms did, however, get a second coming in the Shmup genre, but the issue of player perspective was tougher for Shmup developers at the time to pursue due to the technological requirements of such an endeavour.

**Pseudo 3D Shmups**

Around this period of time in Shmups, beside the two traditional styles of player perspective there were another two perspective mechanisms that were being explored by arcade developers. The first of these was a new technique for the time, which was based around the Z-Axis scrolling of games - *Space Harrier*, *After Burner* and *G-Loc* are examples of this new breed of game. The player was still represented on screen as an avatar, but their perspective allowed them to view the world “over the avatar’s shoulder”. As well as projectiles being aimed at their on screen avatar, the bullets were also moving closer to directly attacking the person sitting behind the screen. The second style of player perspective was an older method and focused on isometric depictions of the game world. The player perspective of the game world was skewed away from the traditional ninety-degree offset that Shmups utilized. These isometric game world implementation methods were designed to promote the feeling of 3D dimensional space, yet unlike the first example, made no attempt at depth scaling, such as seen in *Figure 134.*

![Image removed due to copyright](image.jpg)
Sega was the first company to introduce proper polygon-based 3D to arcade patrons, and were also the first to experiment with both of these Shmups perspective styles. Sega’s *Zaxxon*, released in 1982, was one of the very first Shmups to ever utilize an isometric style of scrolling akin to the second style of perspective explained above. *Zaxxon* was an amalgamation of the highly popular style of play seen in *Scramble*, combined with a revolutionary play perspective. Adding to this isometric perspective, Sega also gave the player the ability to raise and lower the height of their craft, which was very similar to *Mission X*, released by Taito that same year. However, due to the type of single flight yoke controller used this feature came at the loss of forward and reverse movement.

The unique play perspective utilized by *Zaxxon*, although giving an added sense of size and realistic 3D space to the game, was very difficult for the player to manoeuvre. Although this cannot be empirically proven, *Zaxxon* was the first and last arcade Shmup to try this. Although many more Shmups would eventually copy the graphical presentation and perspective of *Zaxxon*, the altitudinal movement was not part of these games, hence we can perceive it to be an ineffective means by which to empower the player in Shmups.

1982 was a significant year for Sega and revolutionary Shmups. Inspired by the earlier release of the Atari vector game *Tempest* in 1981, Sega released *Tac/Scan*, another vector-based Shmup in the same vein as *Tempest*, but more similar to the tradition Shmup formula. *Tac/Scan* was made of two different play perspectives. The first

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109 This style of perspective is also referred to as “three-quarters viewing perspective”.
110 [Figure 147] *Zaxxon*. Reprinted from *Zaxxon*. Copyright by Sega, 1982. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
perspective encountered by the player was a traditional vertical style, overhead perspective. The second perspective encountered first in the second level of the game was more similar to *Tempest* as it tilted the end of the screen down and placed the player at the bottom of the screen. This method also made the player feel that they were essentially looking over the shoulder of their onscreen avatars and connected them with the game world in a more realistic way.

As seen in Figure 134, scaling of enemies was very difficult due to the inherent technical limitations of the hardware at the time. However, as both *Tac/Scan* and *Tempest* used vector displays, this scaling was needed. Vector games do not use sprite tile as seen in the bulk of two-dimensional games; instead of the characters being made up of pixels, in vector games they were made up of rudimentary shapes, all of which were stored in memory as mathematical equations rather than sprites. This meant that vector based games could visualize Z axis depth more realistically than their sprite-based counterparts, as every minute scaling difference did not have to be stored in ROM as individual tiles.

What is curious about *Zaxxon, Forgotten World* and *Tac/Scan*, is that despite the revolutionary nature of their depictions of space and movement within the game world, the Shmups genre did not use either of these methods as an evolutionary step. Instead, these play perspectives fostered new styles of games, and as such Shmups can be seen as an evolutionary step towards different genres of Shoot-em-ups rather than an evolutionary step for the Shmup genre. What is even more curious about this is that this experimentation with 3D game worlds and movement began some eight years before other genres really began focusing on it in the early nineties. Compounding this is that despite the emphasis placed on 3D in the arcade industry at the time, there were no traditional style Shmups experimenting with the *Tac/Scan* and *Forgotten Worlds* styles of movement and perspective.

**Angles of Perspective and Reality**

Ryan and Deci’s 2002 study found that the player’s real physical connection to the game world was directly related to the perspective in which they viewed their game world. More specifically, the experiment found a direct correlation between the player’s ability to move and perceive the Z axis and their connection to real physiological responses. The results of the second test group, who were merely observing the players
from a third person perspective, also demonstrated that third person perspective is less realistic than first person perspective and as such induced less of a real world physiological response in this test group. The results of this experiment are relatively straight forward, but there are many perspectives in which a game world can be depicted as seen in the above examples of Tac/Scan and Zaxxon. An extension of the data displayed in Figure 48 and Figure 49 based on the results of Deci and Ryan’s study as well as a comprehensive study of Shmups and arcade games reveals the following models (Table 1).

<table>
<thead>
<tr>
<th>FPS Perspective, the game world is not filtered through an on screen avatar, and there is a direct connection into the game world.</th>
<th>Isometric or Third Person Behind view. Game world is still filtered to the player using an avatar but the game world is connected to the player as if they are looking over the avatar’s shoulder.</th>
<th>Shmup Perspective. The game is filtered through to the player through an on screen avatar. Perspective requires more imagination on the player’s behalf to immerse into the game world.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>180 Degrees</strong></td>
<td><strong>135 Degrees</strong></td>
<td><strong>90 Degrees</strong></td>
</tr>
<tr>
<td>Least Cognition</td>
<td>Less Cognition</td>
<td>Most Cognition</td>
</tr>
<tr>
<td>Most Realistic</td>
<td>More Realistic</td>
<td>Less Realistic</td>
</tr>
<tr>
<td>Most sense of 3D space</td>
<td>More sense of 3D space</td>
<td>Least sense of 3D space</td>
</tr>
</tbody>
</table>

These angles of reality directly relate to the empirical data of Ryan and Deci (2002). The first test group perceive their game world through their own eyes and in a direct line (180 degrees) (Table 1). We can see the second test group represented also in the same table, but as the 135 degree perspective filters the game world to the player through an onscreen avatar, hence it requires more imagination for the player to immerse themselves into this world. The 90 degree perception model is akin to what is utilized in the majority of Shmups, the game world filtered to the player through an
onscreen avatar at an angle of ninety degrees, requiring the most imagination on the player’s behalf to realistically immerse into the game world.

Put simply, the more obtuse this angle of perspective becomes, the more that depth is realistically depicted directly to the player. Perceiving the game world from a first or third person perspective also informs this reality, with the later being the less realistic of the two. The use of an onscreen avatar also has a lensing effect on the player’s perception of the game world. Having the avatar as close to the player as possible promotes three-dimensional space in front of the player, and subsequently having the avatar further from the player emphasizes 3D space between the two. (Table 2)
Table 2 shows the difference between these two perspectives. Both examples show the Z axis depicted at an obtuse and hence more realistic angle, yet both of these “lensing” methods have different affects and lend themselves to different uses. The example given in the Resident Evil 4 figure is probably the least useful to Shmups as it makes obstacles harder to negotiate due to a lack of vision both behind and to the sides of the avatar. However, the example demonstrated by the World of Warcraft figure in Table 2 is more useful to the Shmup world as the player can move freely within that space, and the camera positioning allows for them to be able to see the game world through a wider field of vision. The only blind spot in this method is directly in front of the player, but this can be countered with a less obtuse perspective angle.

Despite the ability of obtuse angles to be able to more realistically connect the player with the game world, and the emphasis being placed on such spatial depictions in arcade games of the early nineties, no commercial arcade Shmups ever attempted to utilize this, with one exception. The game in question is Silpheed, a home console only Shmup that connected proto Shmups such as Juno First to modern 3D graphics, on a rather curious gaming platform: the Sega Mega CD.

Zeitgeists: Silpheed (Mega CD)

Silpheed, from a game world depiction stand point, was not revolutionary. Earlier games such as Konami’s Juno First had depicted the Shmup world through 135 degree perspective methods in 1981. What makes Silpheed stand out, though, is that it was the only Shmup to be experimenting with this perspective style at the time, despite the high levels of consumer interest in Z axis movement. What is also problematic about Silpheed and why it is the only home console Shmups to be analysed here, is that it is a Shmup that re-kindled the interest of developers and helped bring the 2D genre into the 3D world. Japanese developers released the first Silpheed game in 1986 on the Japan only PC-8801. Many confuse the later Mega CD release of the game to be merely a port of the PC-8801 version, however they are completely separate games.

The 1993 version of Silpheed featured game play which can best be described as an update on the classic Laser Disc formula and which found its home on the Sega Mega CD, a system already synonymous with other traditional Laser Disc games. Just like
Laser Disc games such as *Mach 3, Silpheed* juxtaposed FMV backgrounds with foreground 3D objects and was one of the only Mega CD games to produce polygons. Importantly, and unlike the Laser Disc games of the eighties, the pre-rendered 3D backgrounds were done nearly as crudely as the low-poly foreground objects and to the untrained eye, the two melded together better than any Laser Disc game could.

*Silpheed* entered the market at a time in which the processing power of home consoles was not only sufficient to be able to represent other ships on screen as three dimensional entities, but also various backgrounds that imposed on the player. This was the first time that Shmups utilized three-dimensional graphics for compression and funnelling. The second level is especially focused on compression, as the player has to negotiate an asteroid field whilst also attacking enemy ships. An operator gives voice queues to the player, alerting them of various oncoming obstacles and such is the pace of these levels that the player would be doomed without these prompts.

Although *Silpheed* was a revolutionary game for the time, and one that offered significant advancement to the Shmup formula, its success was marred by its development for a largely unsuccessful hardware platform. On the other hand, subsequent games such as *Star Fox* for the Super Nintendo became highly successful, arguably because they drew inspiration from the game play of *Silpheed* and were released on far more successful hardware platforms. Although *Silpheed* had an indirect influence on the development of Shmups at the time, it is impossible to prove that it would have altered the course of events for Shmups had it been more commercially useful. Nevertheless, it remains as an important, yet largely unexplored variation of the Shmup genre. Despite the new, yet nostalgic viewing perspective that *Silpheed* on the Mega CD used, the game suffered from a distinct lack of characterization, a feature which was becoming more and more integral to gaming during Period One.

**The “Me” Generation**

Although games have always attempted to immerse the player in the game world, the methods utilized to do so have taken a seemingly “evolutionary” path from third person to first person, caused mainly by technological revolution. However, technology is not a conscious being, it is a machine manipulated by human need and informed by society. We can see how technology has aided in the provision of first person perspective and we have also seen how this has been promoted in part by the need for human
empowerment. However, there is more at play here than the scientific and human explanations given thus far. Society it would seem has had as much to do with gamers’ preference of the FPS genre over Shmups as any of the other afore-mentioned phenomena. The demographic research shown thus far corroborates an obvious fact that Shmups are played mainly by males belonging to the social generation often labelled generation X and to some extent, generation Y. However, the ideals that identify both of these groups stem from an older generation, and a generation least represented in gaming demographics, the baby boomer. So how could it be that a generation that doesn’t even play video games has shaped the technological progression of games in a manner that alienates Shmups?

Provenzo (1991, p. 38) states that “[video games] represent “micro worlds” complete unto themselves. The images they present are easy to fall in love with, often narcissistic in nature, allowing the player the potential to function within a self-selected and artificial micro world”. Narcissism is inherent to video games, a sentiment that is supported by many in the field including Manovich (2001) and Taylor (2003). In psychology, Narcissistic Personality Disorder (NPD) is defined as “a pattern of grandiosity (exaggerated claims to talents, importance, or specialness) in the patient’s private fantasies or outward behaviour; a need for constant admiration from others; and a lack of empathy for others” (Encyclopedia of Mental Disorders, 2010).

Taylor (2003) explains how perspective informs the level of narcissism endured by the player by comparing video games to the two dimensions of narcissism explored by Lacan (Lacan, 1977). Lacan (1977, p. 21) elaborates that there are two levels of narcissism endured by the individual, the first of which is “erotic” and causes the individual to perceive unity within themselves and their corporeal image. The second is the contradictory level by which tension is created through “disunity” and its threat of the erotic unity. Thus, narcissism, according to Lacan is always the “misunderstanding of this, structural integrity”. Utilising Lacan’s (ibid) definition of narcissism, Taylor (2003) puts this sentiment in the context of video games explaining that narcissistic identification must occur between the player and the avatar and that the player must also feel the sense of disunity in order to react to any virtual situation.

But do games create narcissism, or do players demand it from their games? A recent study conducted by Twenge, Konrath, Foster, Campbell, & Bushman (2008), examined
the responses given by 16,475 college students, between 1982 and 2006, on a written personality test called the Narcissistic Personality Inventory (NPI). The NPI consists of several hundred binary statements, one reflecting narcissistic traits and the other reflecting non-narcissistic traits. The subject then chooses one of these polarized options, and their score is tabulated. The authors of this study report that in 2006 two-thirds of subjects had “above average” narcissism scores, which was thirty percent more than in 1982. The results of this study indicated that there has been a dramatic increase in NPI scores between these two periods. What is interesting about this study and video games is that between these two periods (1982 & 2006), there has also been a trend towards first person player perspectives in video games over third person perspectives. This trend towards first person gaming, however, would not have been possible without the technology to achieve this. In our capitalist structure, this technology was not cheap to create, hence the social demand and possibility for profit was deemed great enough to invest in such technologies.

Warshawsky (2008) however believes that this trend towards narcissism is not linked just to generation X and Y but rather is a legacy of the baby boomers. Warshawsky (ibid) believes that the Cultural Revolution and “liberation” movements of the 1960s signalled a shift of thought that focused on the self, rather than the family or community. Warshawsky cites a number of concepts such as freedom; personal growth being solely associated with the hedonistic actions of promiscuous sex; use of perception-altering drugs; and rebellion of the self against the “bourgeois” lifestyle of family, work and patriotism. He summarises this approach to life as simply having no responsibility other than “doing what feels good” (Warshawsky, 2008). Finally, Warshawsky draws attention to the notion that narcissism wasn’t born in the mindsets of generation X but rather in the actions of their parents:

> It is easy for anyone not enamoured with "the Age of Aquarius" to see that today's youth merely reflect the shallow and selfish worldview bequeathed to them by their parents' generation. (para. 7)

As stated by Taylor (2003), the player’s perspective in the game world is directly related to the amount of narcissistic affect felt by the player, an affective quality synonymous with gamers today. Although Shmups from the early nineties could never be reproduced in the first person perspective, a number of design factors demonstrate that Shmups from this period were attempting to emulate the heightened narcissism
offered by their first person counterparts. To explore this point, we need to look at the
definition of narcissism and see what design aspects of Shmups from this period
demonstrate these affective qualities.

As mentioned earlier, funnelling and compression within Shmups are achieved using
two main methods: defensive funnelling, a process synonymous with vertical Shmups
from the late eighties that used impenetrable parts of scenery to force the player into a
defensive position, and offensive funnelling, whereby the player could overcome
various enemy blockades through offensive use of their weapons. The latter of these two
methods can be seen as more empowering, according to Erikson’s methods and can also
been seen as the more narcissistic of the two. Shmups have always embodied the
concept of narcissism, namely the lack of empathy towards anything else on screen, yet
in the later funnelling scenario the player is rewarded more so for showing this lack of
empathy than in the former funnelling scenario. In the funnelling and compression
scenarios employed in Zeitgeist Shmups of the late eighties, the player’s reward for
their successful negotiation of these passageways is as simple as maintaining their own
life. The later scenario of funnelling however, which is more synonymous with Shmups
of the early nineties, promotes a lack of empathy towards everything else on screen. To
successfully negotiate these passageways, the player must destroy anything that stands
in their way, and they are not only rewarded with their life, but their selfishness is
rewarded extrinsically by score and intrinsically with grandiose visual explosions,
hailing their skill.

**Personification of Shmups**

Proto Shmups and Shmups of the late eighties were the embodiment of the arcade
industry at the time, and until the early nineties Shmups were at the cutting edge of not
only arcade technology, but of gaming mechanics and art. However, the technological
and social push towards first person depiction of the game world did signal a changing
of the guard. Although Shmups were still highly popular, they were becoming less and
less associated with cutting edge graphical technology. This can be in part attributed to
the high costs associated with such technology at the time. What this meant for Shmups
was a period of “adaptation” during the early nineties. Instead of Shmups being the
main influencing factor on other genres, they had now started to become “students” of
other new emerging genres. Initially, this signalled massive experimentation within the
genre, the likes of which had not been seen since the proto-Shmup phase of the early
eighties. Besides experimentation with game world perspective and narcissistic elements of visual design, Shmups also began to explore visual styles and game world design elements from other burgeoning genres.

Shmup developers, when considering the successful design of Street Fighter II, believed that the method of more realistically attaching the player to the game world was through methods of personification. In Street Fighter II, personification was easily achievable: the player had the choice of several characters each with unique traits and visual appearances. Unlike Shmups, the player could select any character they desired, and was able to explore that character’s individual style and story line. Shmups rarely offered the player any choice over these two factors. Gradius had attempted something similar in its weapon selection method, yet the Vic Viper was never given a human face: it was always assumed that the pilot was the player and whenever that ship was destroyed another Vic Viper simply replaced it, implying that there was an infinite supply of these faceless ships, unlike the finite nature of human existence as depicted in Street Fighter and other similar games.\footnote{Figure 149} Not only this, but in Street Fighter II, the player had only one “life” and being defeated would result in the depiction of the player’s battered face at the end of the round.

In a video game-specific personification experiment, Koda and Maes (1996, p. 4), found that “…having a face is considered more likable, engaging, and comfortable to play against regardless of the subject’s opinion about personification. As described earlier, Takeuchi & Taketo (1995) and Walker et al. (1994) show similar results: that having a face is engaging for the player. It was also Capcom who began to introduce this
procedure of personification in Shmups with one of their earlier examples being in the aforementioned *U.N. Squadron*, where the player was able to choose one of three different pilots, each with their own unique look and skills [Figure 150].

Not only did Capcom utilize personification in the player’s choice of character, they implemented it in various places throughout the game, including the level selection screen and more importantly, in-game. When the player’s aircraft was damaged, the avatar of the pilot would reflect a human reaction to this event. Not only was it some mass produced piece of steel being damaged, it was a person being “hurt”. Interestingly, this is probably one of the first games to ever make this connection visually in the game world. Others may have depicted the player’s character being hurt after the fact, but *U.N. squadron* represents the first instance in where this is simultaneously depicted on screen [Figure 151].

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113 [Figure 150] *U.N. Squadron* level end screen. Adapted from *U.N. Squadron*. Copyright by Capcom, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

114 [Figure 151] *U.N. Squadron* level end screen. Adapted from *U.N. Squadron*. Copyright by Capcom, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Capcom continued this trend in the successors to *U.N. Squadron*. The subsequent release of *U.N. Squadron* on the Super Nintendo took this process one step further by allowing the player more customization techniques and choice in level selection. Other developers went down a slightly different route, such as Video Systems’ 1992 release *Aero Fighters*, which gave the player a choice of four nationalities (Figure 152), each with their own superfluous narrative which interjected between levels.
The subsequent release of *Aero Fighters 2* the next year did much to rectify this poor attempt at adding narrative to Shmups, by introducing another four characters to the roster, each with their own unique traits and weapons, and each with their own final objective. Unlike *Aero Fighters*, *Aero Fighters 2* linked the player’s fighter, nationality and avatar onto the selection screen hence promoting the bond between the pilot, avatar and ship (Figure 154). \(^{117}\)

*Aero Fighters 2* also benefited from a much more refined story line for each character. Whether by chance, the less serious plot of *Aero Fighters 2* complemented its superfluous dialogue interjections and contributed some of the best ‘Engrish’ phrases since *Zero Wing* (Figure 155). \(^{118}\) It could also be argued that the comical nature of these dialogues compelled the player to continue further into the game if only to hear more.

\(^{117}\) [Figure 154] *Aero Fighters 2* personification. Adapted from *Aero Fighters 2*. Copyright by Video System, 1994. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

\(^{118}\) [Figure 155] *Aero Fighters 2* Engrish. Adapted from *Aero Fighters 2*. Copyright by Video System, 1994. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Besides this personification of the player’s ship associating human features, *Street Fighters 2*’s one-on-one nature also caused the experimentation of Shmups to use more aggressive visual styling of enemy ships, along with harder and more emphasized boss encounters. What is vital to this stage of the analysis is considering the link between visual depiction of enemies and heroes, and the affect on the player.

**Are the invaders actually us? Are we trying to kill ourselves?**

Common to all Shmups is the archetype of ‘The Hero’, which is the role always controlled by the player. The archetype of the Hero is a common one, but archetypes can be coded differently depending on the culture being represented. As mentioned earlier, Japanese depictions of The Hero tend to involve a flawed character, and in many cases this character does not survive the narrative. Conversely, twentieth century American film culture has given us a more sanitized encoding of the hero archetype, probably best portrayed in characters such as Superman and Captain America.

In the case of *Space Invaders*, the hero follows the Japanese tradition of bringing ultimate salvation to the character through death. The phallic nature of the player’s avatar in *Space Invaders* is best interpreted through Freudian theory and in the interest of good taste does not need to be explained in detail here. This avatar is the representation of the player’s power within the game world: it is what they use in the process of sublimation and relaxation to take control of the game world. Although it is hard to infer whether a different type of depiction would have been as effective, a process of hypothetical substitution can go a long way to showing that these were indeed the best symbol choices for the game.

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119 Figure 156. *Space Invaders* phallic representation. Adapted from *Space Invaders*. Copyright by Taito, 1978. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
In the case of *Street Fighter 2*, one can see the lower level of cognition required interpreting the symbols on screen as the cast of *Street Fighter 2* are visually similar to Western and Eastern archetypes, unlike those depicted in Shmups. Therefore, it is harder for the player to identify aggressors in Shmups than it is in games like *Street Fighter 2*. At the core of Shmup enemy design, one can see the prevalence of the depiction of the phallus. Why does one see the phallus as threatening?

Although Freud and Jung are often distanced from each other, their theories, despite having different approaches, often intersect. Of importance to the visual implementation of Shmups and in correlation with Jung’s archetypal theory, is Freud’s principle of “castration anxiety”. The Phallic stage of psychosexual development is identified by Stevenson (1996) as being the most integral stating that “[the phallic stage is the] setting for the greatest, most crucial sexual conflict in Freud's model of development”. Within this stage of psychosexual development comes “castration anxiety.” Woolf (1955) as cited in Alexander, Eisenstein, & Grotjahn (1995, p. 206) defines castration anxiety as being based part in realistic anxiety, and partly in more metaphoric terms stating that “castration anxiety is separation anxiety displaced onto the penis.” The origin of this threat of castration according to Freud is the father and the developmental role held by the father, mother and child referred to as the Oedipus complex. Stevenson (1996) defines the Oedipus complex as the following:

In the young male, the Oedipus conflict stems from his natural love for his mother, a love which becomes sexual as his libidal energy transfers from the anal region to his genitals. Unfortunately for the boy, his father stands in the way of this love. The boy therefore feels aggression and envy towards this rival, his father, and also feels fear that the father will strike back at him. As the boy has noticed that women, his mother in particular, have no penises, he is struck by a great fear that his father will remove his penis, too. The anxiety is aggravated by the threats and discipline he incurs when caught masturbating by his parents. This castration anxiety outstrips his desire for his mother, so he represses the desire. Moreover, although the boy sees that though he cannot possess his mother, because his father does, he can possess her vicariously by identifying with his father and becoming as much like him as possible: this
identification indoctrinates the boy into his appropriate sexual role in life. A lasting trace of the oedipal conflict is the superego, the voice of the father within the boy. By thus resolving his incestuous conundrum, the boy passes into the latency period, a period of libidial dormancy. (para. 6)

We can easily apply this analogy to Shmups and video games in general: the player [the child] being repressed by the father figures [bosses particularly and other enemies]. Freud also mentions that in this stage of psychosexual development, the child sees the father as a rival, in a struggle for domination over the other. The similarities between both child and father on an anatomical level are very similar, yet the father is considered dominant or a threat by the child, very much akin to the principles displayed in Jung’s archetype of The Shadow where we project our own dark side onto others. How is this affect depicted visually in computer games?

For castration anxiety to be a factor in the visual design of enemies in games there must be two factors akin to Jung and Freud’s previous descriptions. For a start, both figures should be similar in physical appearance and one should visually be depicted as more dominant than the other. Not only this, but to prove the impact of Street Fighter 2’s visual design on Shmups, we must look at how these visual representations of “castration anxiety” have manifested themselves in popular culture at the time of Period Two.

Size Matters
“Pick on someone your own size” can be seen as the motto of most early Shmups. In many cases, the enemy’s size on screen was the same if not a little larger or smaller than that of the player. With the advent of better technologies also came the advent of bigger and “badder” enemies, none of which were as big or as Bad as the “Boss”. No other visual reference in Shmups is more indicative of the Father/Son struggle described in Freudian castration anxiety than the epic battle between player and boss. The importance of the end of level boss is such that nearly every genre of gaming regardless of culture or time will have some sort of depiction of the David vs. Goliath battle in their visual design. From Resident Evil to DDR there is always an “enemy” that is a reflection of ourselves. In the case of games like Myst and Riven, this boss can quite literally be ourselves, as our triumph over the game is a battle of our own intellect. The principle of the boss is not only indicative of Freud’s castration theory, but also highly indicative of Jung’s definition of the shadow archetype.
We also need to consider a highly literal implementation of this face off method. From the gamers’ literal perspective, enemies facing toward them are almost like looking into a subconscious mirror, especially when we consider Freud’s model of projection, Jung’s model of the shadow and Albert Ellis’s “ABC” model. However, instead of the player seeing oneself, they see a reflected image, with enough similarity to be reminiscent of themselves, and enough difference to see an “other” aggressively staring them down. If we consider Jung’s model of the shadow then we can see that in the design phase of any game, villains need to reflect the traits of the player so that they feel more compelled to act when confronted. This sentiment is also explored in the work of Sigmund Freud where he discusses the role of the genital stage in psycho-sexual development of males. Freud believed that the essential transition from boyhood to manhood is when the child sees his own destiny in the form of his father; a figure who had largely been seen as an oppressor of the child’s desire. The child tries to oppose the father until they realise that the father is who they must be. In games, the player is compelled to be the most powerful entity in it, but they can only do so by identifying with other, more powerful elements in the game. The player initially begins as disempowered and through identification of their oppressors eventually inherits their power just as they do in their normal psychological development. However, not only is visual similarity essential to this process of triggering anxiety mechanisms, but so too is the size of an aggressor.

We can see from this how the design of end of level bosses can have a significant impact on the triggering of anxiety mechanisms within the player, causing them to react. Let us now consider two contemporary examples within film that demonstrate the former point of Jung’s shadow archetype. The first such example can be seen in the movie Predator. One of the best examples of “face off” in the movie occurs towards the end where the Predator and Dutch come to face to face. Both Dutch (Arnold Schwarzenegger) and the Predator (Kevin Peter Hall) are strong, powerful, dominant and aggressive protagonists. Even when facing death, both are fierce in their resolve. Visually, there are also many similarities: both are bipedal and have exposed sections of flesh, showing a bold and powerful body type. Additionally, both display assertive body language throughout the movie. Aside from the superficial visual

\[\text{Figure 157}\]

\[\text{Dutch and the Predator. Adapted from Predator. Copyright by 20th Century Fox, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.}\]
differences, on an affective level both form nearly the same archetype, yet when placed in the same frame, dominance of one character over another is achieved through size.

![Image removed due to copyright](image1)

**Figure 157**

The actor playing the role of the predator, Kevin Peter Hall, measures in at a staggering 220cm, dwarfing the character of Dutch, played by Schwarzenegger. A second example of the relationship of size and its effect on power in a scenario between affectively similar characters can also be witnessed in the movie Aliens. The final section of the movie featuring Ripley (Sigourney Weaver) defending Newt (Carrie Henn) against the alien queen is very similar to the example seen in Predator. The motivation of both Ripley and the Alien queen is similar and the characters share many emotive traits. In the initial phases of this encounter, Ripley finds that she is no match for the alien queen by herself, as the mammoth character foils her every attempt. Ripley momentarily escapes, so that she can use one of the Sulaco’s Power Lifters to even the size difference ([Figure 158](image2)).

To see the similarity in the characters, we must consider them on an affective level. Both are powerful, strong and selfless characters and arguably both have equal right to defend not only themselves but their families.

![Image removed due to copyright](image1)

**Figure 158**

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\[\text{Figure 158} \] Ripley and the alien queen. Adapted from *Aliens*. Copyright by 20th Century Fox, 1986. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
On the other hand, we can see how contemporary film and media portray smaller aggressors such as Mini-me from Austin Powers and even small protagonists such as Gimli for The Lord of Rings in an almost comical sense. Considering the above factors, there are several design elements to successful boss design. First, the boss must represent some part of the visual design or affective quality of the player, as per Jung’s example of the Shadow archetype. Secondly, for the boss to actively trigger anxiety within the player, it must be orientated in a manner indicating it is taking an offensive stance. Last, the boss must also have some kind of physical size advantage to establish the balance of power within the scenario, to visually demonstrate Freud’s castrating father phenomenon.

In both scenarios, the protagonist was never able to outgun or match the firepower of their rival: instead they had to rely on careful manipulation of the scenario to overcome their shadow archetype. The very same can be said for Shmups. Smaller enemies form the plebes, whilst the largest most aggressive enemies are used as guardians, to prevent the player from progressing to the next level.


12 Metal Black Boss. Adapted from Metal Black. Copyright by Taito, 1991. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Although bosses are a recurrent theme throughout the history of Shmups, it was during the nineties where the boss not only became a staple of the genre, but the visual depictions of these bosses become highly phallic and also representative of the player. During the late eighties and early nineties, bosses in Shmups became the most synonymous symbol of power within the game. Their power is depicted not only through size and scale, but also in their ability to represent “father like” oppressors of the player. It is only when the player becomes equally as powerful as the boss that they are able to progress, hence the analogy to Freudian and Jungian theory. It is not only the iconic or symbolic nature of these bosses, but the relationships they create with the player that become important. One game to explore the emotion of player empowerment and how this affects the player relationship with the virtual world was Seibu Kaihatsu’s Raiden.

Zeitgeists: The Raiden Series

Japanese arcade developer Siebu Kaihatsu had already a long history of arcade development. Starting in 1983 under its former name, Seibu Denshi, the Japanese developer made two highly influential Shmups, the isometric side scroller Stinger (1983) and Scion (1984), the first Shmup to ever utilize a power up system. Under the name of Siebu Kaihatsu, Seibu moved away from the Shmup scene for a few years to develop different games, until moving towards Operation Wolf style clones in the form of Shot Rider and Dead Angle. It wasn’t until 1990 that Seibu returned to Shmup development and released one of their best-known games, Raiden. Raiden, whose literal translation is “Thunder and Lighting”, was an amalgamation of many successful Shmup elements: the relentless enemy assaults of games like Juno First and Defender; epic boss encounters (Xevious); weapon power up systems; and pattern-based enemy placement.
Raiden also had jaw dropping graphical presentation, and a retro-styled Japanese Epic Form (McMillan, 2003) soundtrack. The graphics, especially, were without peer when looking at other Shmups released in the same period, no doubt helped along by the expensive V30 based arcade hardware used by Seibu. The graphics of Raiden were drawn with such detail and moved with such fluidity that it stood out from games by larger companies such as Capcom, Namco and Konami [Figure 161].

The extension of identity is core component of Swink’s (2009) explanation of empowerment. One way of looking at the extension of identity is to consider the ability that the game gives the player to indulge the hedonistic urges of the id. Amid the fluidity of the graphics were relentless waves of enemies that continually faced off against the player, unleashing barrage after barrage of bullets. The player, depending on their levels of skill, could cut through these enemies with their sabre-like weaponry, inflicting hellish damage onto them by first setting them on fire then eventually turning them into fodder. The resultant visual reward for the player was large, all engulfing explosions. Later levels would result in screens of enemy fodder and subsequent avalanches of explosions both visually rewarding and, unlike other Shmups at the time, aurally rewarding.

Raiden employs a number of visually different explosion sprites throughout the game, of various sizes, shapes and lengths of animation. Unlike many other Shmups of the era, Raiden complements these different explosions with various different explosion sounds. The types of sounds employed for the explosions, although generated from more basic arrangements of “noise” waveforms, are highly satisfying, full-bodied explosion sounds.

124Figure 161 Raiden Graphics Example. Adapted from Raiden. Copyright by Seibu Kaihatsu, 1992. Reprinted under the terms of “Fair Dealing” in the Australia Copyright Act, 1968, Section 40.
A spectral analysis\(^{125}\) of these sounds objectively shows the presence of large amounts of bass and mid range frequencies in these samples.

![Figure 162](image1.png)

**Figure 162** as shown above is a linear spectral analysis of two explosions taken from the *Raiden II* OST.\(^{126}\) This linear analysis demonstrates the massive booming sound at the beginning of these samples followed by the liberal decay trails. Each one of the waveforms analyzed is over one second long, which is comparatively long when compared with other Shmups of the era and, due to the high cost associated with storing PCM waveforms in ROM, demonstrates the importance of these sounds to the game designers.

![Figure 163](image2.png)

**Figure 163**

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\(^{125}\) This analysis was performed in Cool Edit Pro 2 using explosion sounds taken from the official Raiden 2 OST. Raiden and Raiden 2 both feature the exact same explosion samples.

\(^{126}\) Official Sound Track (OST)
Figure 163 is a non-linear analysis of the above sounds in Figure 162 and displays the RMS energy levels of the waveform. Both waveforms have large amounts of energy around the low range, but importantly, they have a massive amount of energy at around 1000Hz. What this suggests is that the explosion sounds in *Raiden* are obtrusive to the human ear and hence stand out from the other sounds employed. This is not only a subjective observation, but an objective observation of the frequency response of *Raiden*’s background music.

Pictured below in Figure 164 is a non-linear histogram analysis of *Raiden*’s background music. What is interesting about this average RMS histogram is the lack of energy contained around the 1000HZ area in the background music. Every time an explosion is triggered in the game, it fills this 1000HZ area and hence “cuts through” all other sounds in-game. The correlation between these two histograms is no coincidence and also shows the importance of explosion samples to the game’s designers.

This frequency range of zero to 1000HZ is also significant from a human hearing perspective. Fletcher and Munson’s “Equal Loudness” curves [Figure 165](#).

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127 Various sections of the tracks “Weapons of Hope” were analyzed to produce the average values as seen in Figure 164.

demonstrate that the human ear becomes sensitive to this frequency range at louder volumes, particularly at a volume level at 100db or higher, a volume level needed in an arcade environment to simply be heard.

From an analysis of Shmups released in the same year, the explosion sounds utilised in *Raiden* do indeed stand out as one of the best implementations of the time. The need for so many individual explosion samples is directly related to the importance of this type of sound to *Raiden* and the sheer number of explosions that can be occurring at any one time, particularly in later levels. From a sound perspective, *Raiden* is made of three elements: the explosions and sounds associated with them, the back ground music, and the sound of the player’s own fire. The importance of these sounds based on volume and RMS energy levels alone also follows the same order: explosions are the loudest, followed by back ground music and then followed by the sound of the player’s own arsenal. This is curious because it infers that it is not the process of shooting that is important, but the end result. From a purely narcissistic point of view this relationship between the two loudness levels of these sounds can be seen as direct aural reward for the player’s aggression. A 2007 RNID study also affirms this point, finding empirical data that youth particularly find loud sounds appealing (RNID, 2007).
Comparing the explosion samples of *Raiden* to *Vimana*,\(^{129}\) released in the same year, demonstrates the difference in quality of sound explosions between the two. Not only does *Vimana* utilise fewer samples for explosions, but the frequency response is narrower, leading to a thinner and less hi-fidelity sound when compared to that of *Raiden*. The explosion sounds used in *Vimana* (Figure 166) have no real shape to them and when examined linearly constitute just a linear sequence of white noise.

\(^{129}\) Sample taken from Track 13 of the “Vimana and Teki Paki Original Soundtrack”, 230
Figure 167, taken from the same explosion sample in *Vimana* is the average RMS values of the same sample. Note the lack of energy around the 1000Hz region when compared to the rest of the frequencies. Although there is ample bass, the lack of energy from this region leads to a sound that is more subdued and less “in the face” of the gamer.

*Street Fighter 2* can also be seen as highly influential in this area. *Street Fighter 2* uses a number of individual sound effects, eight in total for offensive blows and two for blocked assaults. Depending on the force of the attack, the sound sample used will be longer, louder and contain more energy around the 3000-4000Hz range. An unsuccessful “blocked” attack will result in a sound with opposite characteristics; that is, it will be softer, shorter and contain less RMS energy. Figure 168 is based on the first of two “block” samples from *Street Fighter 2: The World Warrior*. The sample is 174 milliseconds in total with small amplitude. In the game, this sound effect is triggered when a player’s offensive barrage is blocked by the opponent.

![Frequency Analysis](image)

Figure 168

On the other hand, a successful blow will result in the triggering of a sample as pictured in Figure 169. Note the increase in energy at around 3.5 KHz, giving this particular sample much more presence than Figure 168. Also, this sample has much higher amplitude than Figure 168 and also is much longer with duration of 440 milliseconds.

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130 Samples taken from “Street Fighter 2 Super The New Challengers, Track 64: SE Collection”
As *Street Fighter 2* uses kicks and punches at three progressively harder velocities, it uses samples with less bass, amplitude and duration for the weaker attacks, and samples with more bass, amplitude and duration for the more fierce attacks.

Using the comparative material provided by *Street Fighter 2*, one can see how sound plays a vital role in providing gratification for the player upon completion of certain micro scenarios. A fuller, longer, louder sound is representative of success, whilst a softer, shorter sound with less energy in the mid range frequencies represents failure or that something was ineffective. The use of “block” samples can also be seen in Shmups during the same period of *Street Fighter*’s initial arcade success, found in, but not limited to, games such as *Aero Fighters 2*. In the case of *Aero Fighters 2*, samples resembling the high pitch sound of a ricochet and the dull resonant sounds of impacted metal are played in the interim before the player destroys an enemy. Not only is this represented aurally, but visually also as can be seen in Figure 170.131

131 [Figure 170](#) Example of Bullet Scratching. Adapted from *Aero Fighters 2*. Copyright by Video System, 1992. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Raiden & Epic Form

Another key aspect to the success of *Raiden* was the implementation of a Japanese Epic Form soundtrack that provided considerable energy and support to the onscreen action. This style of soundtrack as investigated in 2003 by the author of this thesis and Pidkameney in 2002. Both of these studies revealed that video game employing such soundtracks not only heavily influenced the non-diegetic factors of the narrative, but aided greatly in the continued recognition of games featuring such soundtracks, despite the length of time since the player last encountered that particular game.

The results of the 2003 study showed that Japanese Epic Form was one of the most prolific gaming musical genres of the late nineties and early nineties. The subsequent popularity of Shmups at the time also demonstrates the importance of this particular genre of music to the genre of Shmups. *Raiden* and its sequels use this form of music almost exclusively throughout their soundtracks. As sound is such an important aspect to all games, not only Shmups, it is important that it is covered in the contexts of this study as it is a significant design element of this genre of gaming. However, what is Japanese Epic Form and why is it so important to Shmups during this period?

“Weapons of Hope” Revisited

“Weapons of Hope” is featured in both *Raiden* and the subsequent *Raiden II*. As with nearly all songs falling into the category of Japanese Epic Form, “Weapons of Hope” is broken up into two main sections (A, bar 9-24 and B bar 37-52) with an interlude that separates the repeat of the B to the A section. Both melodies are based on a F minor scale with the exception of the use of the D natural in melody B (Score 4), unlike the A melody section (Score 5).

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The melodic contour of both the A and B sections can be likened to “Super Music”, a term coined by Shephard et al. (2003, p. 580) describes a type of melodic structure that
is emotionally powerful and confident. Super Music favors leaps of fourths, fifths and octaves, as is heard in the depiction of heroic type themes as heard in *Superman* and main theme music of *Star Wars*. The melody of section A could also be described as “terraced”, as it starts the bar on the tonic of the chord, then in the last beat of the bar there is a smooth section of passing notes before this pattern repeats again. The rising contour of both melodic sections, in particular section B, has a distinct impact on essentially “pumping up” the game player. This feeling of rising emotion is also reinforced by the accompaniment and fast driving tempo of the piece, which is set at around 160 beats per minutes.

The use of extended syncopation and triplet rhythmic feels that can be seen in the previous case studies are also used extensively within this piece. As with the previous two case studies, it has the same effect on the game play. First, the syncopated lines that are akin to a flowing vocal are the humanizing element of the music and they remind the game player that they are not a heartless machine like the aliens that they are fighting. This “humanized” nature of the melodic lines also shows the player what they are fighting for, which is the survival of all humankind. Secondly, the use of syncopation adds to the relentlessly forward driving nature of the piece, which is used to raise the alertness of the gamer and hence get them ready for battle.

This mood is further reinforced by the minor tonality which is intended to make the gamer feel like they still have so much left to do and that the path to the completion of the game unsure. However, there is a short melodic section of the piece that acts as a false modulation to a minor key (**Score 6** taken from bar 32). This presents the game player with a slight sense of hope as they can see the light through the otherwise dark clouds. Tamlyn (1991) states that this modulation or “block shift” imbues the music with “a greater sense of urgency and tension”. This reinforces the narrative of the game as there is a need for a feeling of urgency and tension as the hope of the world rests within the players ability to succeed in stopping the alien invasion that threaten humankind’s existence.
The timbre of the main melodic voices is designed to grab the attention of the player. The timbre of the lead voice is indicative of the type of sound usually used to imitate brass instruments. Technically the sound being produced is a variation of a saw-tooth wave. The sound of a saw tooth is very rough, yet controlled and is often used by PSG chips to imitate brass or lead guitar sounds. The function of using this sound from a compositional sense is that it brings the melody to the front of the piece and hence makes sure that the game player notices it. Additionally, through semiotic consideration we can perceive these brass sounds to be synonymous with notions of triumph, military power, royalty and hunting; all masculine and powerful affective traits.

In “Weapons of Hope”, as with the other case studies, the use of timbral elements is intentional. When the type of instruments that are being used as main melodic instruments is examined, it is clear that those instruments are usually at the forefront of the compositions common to the genre. Examples of this include the “Star Wars” main opening theme, where trumpets are at the forefront of the piece and songs like “November Rain” by Guns ‘n’ Roses where the guitar is just as important as the vocals. Also, these types of instruments are associated with very large and powerful sounds, whether they be an orchestra playing at fortissimo or a heavily amplified rock band.
Accompaniment

“Weapons of Hope” features little in the way of accompaniment voices, yet it still manages to convey its large, powerful and epic mood. “Weapons of Hope” manages this because all of the elements of the song work towards the same goal of pushing the game/action forward and raising the emotional level of the game player. The first instance where this occurs in the accompaniment is the first nine bars of the piece [Score 7]. In this section, a lone ostinato is heard, which plays a repeated, fast rhythmic pattern that moves up in contour as well as tone. Each repeat of this ostinato raises itself by one tone. The effect of this is that it raises the emotional height of the piece.

![Score 7]

As it is only heard at the start of the level, this ostinato also works as an episodic marker that moves the whole game forward. This is important when considering where this piece of music is occurring in the game. “Weapons of Hope” is the theme music for the second level of the game; hence the game is already starting to present the game player with more of a challenge than the first level. This ostinato section works to let the player/s now that more is still to come and it requires more focuses and determination than they have previously encountered. Additionally, in *Raiden II*, when the player defeats a Boss the music stops, giving the player a small sense of relief. As an episodic marker, this section is a message to the player to get ready for more.

“Weapons of Hope” also features the use of a brass section. Brass is often used in music to convey a sense of grandeur or “epic-ness” to the receiver. The same can be said about the effect of the brass lines in “Weapons of Hope”. During the main melodic sections, the brass section acts to thicken the chordal structure of the piece. It does this by playing chords with the root and third, hence emphasizing tonality, however, the brass line takes a lead role during the break between sections A and B. During this part of the piece, the
brass plays quick surface rhythms or “stabs” to maintain the intensity of the song.

\[
\begin{array}{c}
9\end{array}
\]

Score 8

Raiden’s visual intensity is only matched by the relentless intensity of both its soundtrack and its large and powerful explosion samples. Based on the analysis of “Weapons of Hope”, one can see how such a soundtrack is integral to the emotive state of the player and might be considered a stylistic marker of the Shmups genre around this period.

**Evaluating Period Two**

Table 3 represents the best selling console games from all worldwide markets during Period Two. This data is gathered from VGChartz (2010A) and is based on sales from publishers to distribution agents. The table reveals a distinct preference for platform-based games as opposed to home console ports of arcade titles. Another notable point is the dominance of Nintendo’s market share when looking at the developer portion of

<table>
<thead>
<tr>
<th>Rank</th>
<th>Game</th>
<th>Developer</th>
<th>Platform</th>
<th>Release</th>
<th>Unit Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Super Mario World</td>
<td>Nintendo</td>
<td>SNES</td>
<td>Nov-90</td>
<td>20.61m</td>
</tr>
<tr>
<td>2</td>
<td>Super Mario Land 2</td>
<td>Nintendo</td>
<td>GB</td>
<td>Oct-92</td>
<td>11.18m</td>
</tr>
<tr>
<td>3</td>
<td>Super Mario All Stars</td>
<td>Nintendo</td>
<td>SNES</td>
<td>Jul-93</td>
<td>10.55m</td>
</tr>
<tr>
<td>4</td>
<td>Donkey Kong Country</td>
<td>Nintendo</td>
<td>SNES</td>
<td>Nov-94</td>
<td>9.30m</td>
</tr>
<tr>
<td>5</td>
<td>Super Mario Kart</td>
<td>Nintendo</td>
<td>SNES</td>
<td>Aug-92</td>
<td>8.76m</td>
</tr>
<tr>
<td>6</td>
<td>Street Fighter II</td>
<td>Capcom</td>
<td>SNES</td>
<td>Jun-92</td>
<td>6.30m</td>
</tr>
<tr>
<td>7</td>
<td>Sonic the Hedgehog 2</td>
<td>Sega</td>
<td>Gen</td>
<td>Nov-92</td>
<td>6.03m</td>
</tr>
<tr>
<td>8</td>
<td>Dr. Mario</td>
<td>Nintendo</td>
<td>GB</td>
<td>Sep-90</td>
<td>5.34m</td>
</tr>
<tr>
<td>9</td>
<td>Super Mario Land 3</td>
<td>Nintendo</td>
<td>GB</td>
<td>Jan-94</td>
<td>5.19m</td>
</tr>
<tr>
<td>10</td>
<td>Kirby’s Dreamland</td>
<td>Nintendo</td>
<td>GB</td>
<td>Apr-92</td>
<td>5.13m</td>
</tr>
</tbody>
</table>
The first four titles on the list are examples of hub and spoke type titles. A hub and spoke approach to design is where an interactive environment acts as an interactive menu for level selection. Although this approach had been used in some Shmups during this period, it is notable how all of the most popular console games of this period used this approach.

Despite Table 3 representing the most commercially successful games during this period, it does not account for the arcade or computer market, nor does it necessarily count for games which would be considered singular, or important to the development of consumer desire. The following evaluation will address titles as presented by VGChartz (2010A) as well as other singular titles during this period of time in relation to the design heuristics.

**Period Two: Empowerment**

Offering the player choice was a key element of Shmups analysed during this period. Elements such as rhizomatic level selection and purchasable power-ups in the Shmup genre were a direct means of empowering the player through giving them choice. Figure 172 and Figure 173 demonstrate how Shmups developed in Period Two attempted to give higher levels of empowerment through the ability of gamers to customize their game experience.
The uptake in rhizomatic level selection and purchasable power-ups once again can be largely attributed to the influence of the home console and PC market, where the RPG genre (Role Playing Game) was beginning to dominate sales charts. One of the most powerful design elements of the RPG is the concept of wealth and accumulation, whereby the player can acquire items in-game to improve their probability of success in the game environment. Shmups had long since used the power-up system to embellish the player, however the addition of in-game currency systems created the first Shmups with specific RPG elements, as well as clearing combined with wealth and accumulation. *U.N. Squadron* and *Raptor: Call of the Shadows* (1994) are the most appropriate examples of this concept and how it could strengthen the genre, particularly when it was ported for the home console market. However, apart from a brief uptake in 1998, 1992 was the last year that this system was employed in Shmups. This Shmup
design detracted from the frantic pacing the genre was so known for. Elements of macro management were good for the home console and PC market, but not appropriate for the arcade, as it required either significantly extended play periods or save game technology that was not available in arcade games of the time.

Of course, macro management is not an element applicable to all genres of gaming, however Period Two offered types of player experience customization to nearly all of its singular games. Fighting games allowed for a wide and varied selection of characters, first person shooters allowed the player to choose which weapons they used and games such as Sim City (1993) made extensive, open ended macro management ‘fun’. 133

**Period Two: Flow**

From a technological standpoint, arcade games once again had the technical advantage in terms of creating a sense of flow via quickly accessible memory and an absence of loading times when compared with CD-Rom based home consoles in Period Two. However, one of the key points of difference in Period Two in regards to flow is the element of a “challenging but tractable task”. With the advent of cheaper and larger storage came Shmups with longer and longer game play time. This extended, overall game length also translated to longer individual levels within the game. In many other genres, extended level length is not an issue as the player has control over the way they progress through the level environment. In Shmups, where the player is continually compressed whether they like it or not, this extended level length translates to extended periods of player anxiety. Whilst adding challenge, extended level length can seem monotonous and importantly in regard to the above element of flow, often does not offer enough safe points should the player die. Darius Gaiden (1994) Eliminate Down (1993) and R-Type 3 (1993) were especially notorious for this, often giving the player a limited amount of lives and few specific points where they could continue from.

On the other hand, games such as Mortal Kombat and Street Fighter II were all promoting micro-encounter type experiences where the game experiences were broken down into smaller and more incremental milestones. Although the games were difficult

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133 Sim City initially struggled to find a publisher as it was one of the first game to not actually have a “win condition”. The game was largely open-ended and focused entirely on macro management.
like Shmups, they offered far more incremental steps to the player, allowing for shorter bursts of anxiety and more “tractability”.

One element of flow where fighting games were not as successful was in perfect concentration, where an end-user requires only small amounts of cognition to decipher a game’s control mechanism and subsequently transform intent to action, using the game’s systems. While nearly all Shmups offered intuitive and reduced amounts of input mechanisms, fighting games during Period Two used anywhere from four to six attack buttons, with numerous batched commands requiring significant cognition of behalf of the player.

Period Two: Bring the Player to Action
The personification of games during Period Two is a contributing element that brings the player to action. As with Period One, this heuristic is fuelled by technological improvement and its ability to bring higher fidelity graphics and sound to end-users. Undeniably, the Shmup genre was lacking in this regard when compared to its counterparts. Games such as *Wolfenstein 3D* (1992) and *Ridge Racer* (1993) made the gaming experience “personal” by removing the player’s avatar from the screen and instead placing the player in the action. This first person approach to gaming led to an improved chance that the player could identify with the game world by removing the filtering element of the player avatar.

The removal of the avatar from the game world in some of the more cutting edge games of Period Two allowed for the player to be directly engaged by an on-screen aggressor for one of the first times in video game history. This led to a type of easily relatable

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134[Figure 174] *Ridge Racer*. Adapted from *Ridge Racer*. Copyright by Namco, 1993. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
experience as games began to match normal real world conventions: the gamer is themself, not an abstract avatar to be viewed from the third person. Although for the most part avatars were still a common element in games, those which did not use them and instead relied on first person perspectives put the player in the centre of all kinetic relationships, rather than simply being an observer of a third-person scenario. What first person perspectives allowed for was an easier transmission sensation to the player. As sensation is a process which precedes conscious thought, the cognition required to associate with an avatar meant that sensation directly aimed at the player via the avatar was difficult, especially the sensation associated with one entity “looking” at another. As seen in the popularity of games such as *Wolfenstein 3D* and *Ridge Racer*, the first person experience became a more desirable means of achieving this heuristic.

**Period Two: Education**

Standardizations were an important factor in player education during Period Two. Arcade relied on instruction cards [*Figure 175*] to convey very clear and concise instructions on both how to play the game, as well as a simplistic overview of the goals and sometimes even narrative context. Considering that most arcade games relied on “easy to pick-up, difficult to master” design traits, this type of player education was extremely effective. Standardizations made it easy for game developers to give clear instructions on how to play their titles as it was assumed that players would already be familiar with that type of game.

![Image removed due to copyright](image.png)

*Figure 175*

Within the games themselves, semiotics, both visual and kinetic, also played a large role in conveying what relationships the player had with certain on screen elements.

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Generally speaking, objects whose movements were completely arbitrary to the player were elements in game designed to be picked up, whilst objects that had more purposeful and player-focused movement were usually elements to be avoided. A good example of this standardization can be seen in a wide variety of games from this era. *Forgotten Worlds*, as discussed earlier, used a currency system so that the player could purchase certain pickups. [Figure 176][136] is an example of how kinetic viseme standardization was used for player education. The yellow arrows indicated the movement pattern of the currency pickups and the red lines depict the movement lines of all enemies and projectiles. In this example, the lack of purposefulness of the pickups and arbitrary nature of their movement suggest to the player that they are safe to pick up. Additionally, the fact that the pickups do not move towards the player, but instead intentionally move at a ninety-degree angle to the player’s position, indicates to the player that they are no threat.

![Image removed due to copyright](image-url)

**Figure 176**

[Figure 177][137] taken from *Aero Fighters 2* is another example of how this kinetic standardization was used for player education. Hostile entities move directly towards the player’s primary axis, whilst pick-ups intentionally move at an angle usually offset ninety degrees from the player’s primary axis. Other games used different approaches to teaching the player what was ‘good’ and ‘bad’ in the virtual world. Another common type of kinetic behaviour was to have pick-ups that moved in a pattern, completely arbitrary to the player, forcing them to chase the reward down and often take substantial risk whilst doing so.


Symbolic and iconic modalities were also integral to player education during this period, particularly the depiction of gold objects to show the player reward elements. The use of eight bit and sixteen bit colour palettes meant that game developers were able to use a wide array of colours to help communicate safe and dangerous elements in the game world. Extended colour ability was also used well to increase graphic fidelity and make objects stand out from their environments. Sonic the Hedgehog and Wolfenstein 3D all used this approach well, with colour being an important element to provide player interaction. In Wolfenstein 3D, tones of gold and silver were used to suggest ‘safe’ and useful objects for the player, whilst tones of blue, black and brown were only really used for enemies.

Aside from kinetic and visual semiotic elements, game level design during this period generally offered the player safe environments in which the player could quickly learn new skills and be tested on them before they became essential for survival. Wolfenstein 3D used a safe room at the start, barricaded by a door to help the player familiarize themselves with the game before moving on in their own time. Ridge Racer had a number of screens before the game started in which the player needed to use the controls before being able to enter the main-game mode, and even then, the player was able to test the throttle and gears in the seconds before the race began. These “safe zones” were also part of Shmup design, however as Shmups had automated scrolling, it meant that the player was forced to move on whether they were ready or not.

**Period Two: Challenge & Reward**

As an extension from Period One, it is possible to see the role that the home console and PC market played in shifting the desires of gamers away from indirect and directly competitive games towards narrative experience. Although competitive games during this period of time were still highly popular, the home console and PC market began to explore the concept of wealth and accumulation, combined with sweeping and clearing
to a greater extent. These two types of game mechanics are better known as the basis of the RPG genre. According to one of the key developers of *Doom* (1993): John Romero, co-founder of id software, surmises that (2010), when combined, clearing and sweeping and wealth and accumulation form one of the most powerful and addictive types of gaming experiences.

What these mechanics give the player in terms of emotion is a sense of immersion which is created as the game follows real world conventions (you exchange cash for objects), measureable achievement, and entertainingly a healthy sense of mystery as players are left to wonder what these rare and expensive elements in the game worlds will give them. Some of the more well known games during this period of time to capitalize on this mechanic were *Rock ’n’ Roll Racing* (1993) which also had an effective PvP mode, and *Secret of Mana* (1993), one of the better known J-RPGs. Rock and Roll Racing is unique in that the player was motivated to accumulate and do well as a result of direct competition (schadenfreude). On the other hand, *Secret of Mana* used sweeping and clearing and wealth and accumulation to promote exploration and the subsequent emotions of awe, mystery and excitement.

*Raptor: Call of the Shadows*, *Forgotten Worlds*, *Silpheed* and *U.N. Squadron* are all examples of Shmups which attempted to use this type of approach to game design. Based on the analysis, all used them quite well. This however begs the questions of what separates games such as *Secret of Mana* and *U.N. Squadron* in terms of having optimal representation of player desire. In terms of sweeping and clearing, what sets Shmups apart from their rivals is the linear style of level flow used as opposed to RPGs, which are more open ended in terms of player choice. In games such as *Secret of Mana*, the player must not only sweep and clear, but discover the most optimal places to do so. This approach embellishes the emotion associated with sweeping and clearing as it gives the player more of a sense of ownership over their experience: “I found this” as opposed to “I had to get this”.

How this translates to risk and reward is quite interesting as we can see one of the first attempts at a “grind mechanic”. A grind mechanic is one that rewards players for time spent rather than skills acquired and is popularized in the contemporary market by

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138 “Japanese Role Playing Games”
games such as *World of Warcraft* (2004). A sweeping and wealth and accumulation game such as *U.N. Squadron* still requires skill to beat the game, although you can buy very powerful avatar upgrades. However, RPGs of this period allowed the player to continuously “harvest” sources in order to purchase avatar upgrades. This approach to game design meant that cunning players could spend extensive amounts of time in low-risk areas of the game, accumulating “loot” so they could buy powerful upgrades earlier in the game than what was deemed optimal by the designers. This would ultimately skew the difficulty curve of the game and allow the player to have a disproportionately easy play experience, requiring a less skill-based approach to completion.

**Period Two: Immersion**

Arguably the greatest contribution to this heuristic stems from the new availability of cheap and readily available 3D technologies. Although 3D game technology had existed for some time, Period Two is unique as it represents the first widespread, mass adoption of the technology. Games such as *Wolfenstein 3D* (1992) and *Ridge Racer* (1993) demonstrated the ability of 3D technologies to place the gamer in the action, by removing often cliché game avatars. Technology, however, also significantly benefited games that used the more traditional approach of having on screen avatars, by allowing for higher levels of fidelity, which resulted in larger and more realistic sprites. Games such as *Street Fighter 2* (1991) and *Mortal Kombat* (1992) had highly fleshed out characters with a large and life-like list of animations which was previously unseen in games preceding this era. In comparison, Shmups such as *Forgotten Worlds* attempted to personify the genre, but in these games the player’s avatar was small and not the point of focus in games such as *Street fighter 2* and *Mortal Kombat*.

The dominance of fighting games during this period of time also leads to another important facet of immersion: challenge based immersion. Although score had long since been an effective competitive system, until the advent of highly technical and graphically effective fighting games such as *Street Fighter 2* and *Mortal Kombat*, there had been no widespread use of direct PvP games. No longer was your rival a faceless set of three initials in a high score table, rather it was the person you were playing on screen, the person standing right beside you at the arcade machine.
Shmups attempted to capitalize on this personification of gaming by associating human avatars with their onscreen depictions of their craft in order to increase the sense of human identity. Figure 178 demonstrates the sudden and significant uptake of player personification in Shmups that began during this period. It is interesting that player desire demanded more human representations of their virtual identities. In terms of sensation and affect, one could read this information as being evidence that players find it easier to identify with the experiences that a game has to offer if those experiences are relatable in a human sense.

**Period Two: Immediate Feedback**

One of the problems associated with the transition to first person games and the subsequent emphasis on realism in both aesthetics and mechanics was that there were no existing examples by which this problem had previously been addressed in games. A game depicted from a third person perspective gives the player a sense of the space that they are playing in, as well as a way to identify telegraphing, even if it is not in their direct line of sight. Telegraphing is when an onscreen entity gives a clue as to what its next move might be before it executes it. In the case of first person shooters such as *Wolfenstein* and *Doom*, excessive telegraphing is unrealistic and breaks the sense of immersion the graphical representation is intending to achieve. Telegraphing is essential
in all games to make the play experience fair and equitable for the player and is an essential feedback mechanism that developers of first person games initially struggled with.

In games of this period, nearly all telegraphing could be considered “diegetic telegraphing”, a system in which the telegraphing action is being generated within the visible game world, by the entity about to attack or execute some type of move. “Non-diegetic telegraphing” is a system by which a telegraph cue is given for an on screen entity, however, the telegraph is not directly attached to its on screen entity. One game that promoted realism, yet had very good telegraphing was Ridge Racer. The non-diegetic telegraphing cues came from an off-screen commentator. These cues warned the player of when they were about to be passed, and when they were catching up to enemies that they could not yet see.

One of the reasons why FPS games struggled with effective telegraphing systems was due to the limited animations available. Technology and even game design was not at a point where it could adequately convey telegraphing in a FPS environment during Period Two. This problem was later rectified via games such as Quake, which used more advanced technologies to create more complex animations. Developers also began embellishing enemy attack animations in an unrealistic manner to give the player these essential feedback cues. The Shambler from Quake is a good example of this approach. The Shambler emits a large lighting charge along its primary axis, but only after an embellished, handclap gesture. Developers found there was a fine line between giving telegraphing cues which were seen to be natural, and those which were seen to be over-stylized and hence not real.

Telegraphing in Shmups during this period was achieved by pattern-based behaviours. That is, all game entities operate in a consistent (and hence predictable) manner. Telegraphing cues were quite short, but repetition in the enemy design allowed for these to remain fair and equitable for the player. Pattern-based behaviours, although being good for player feedback, were contradictory to realism. One Shmup that moved away from telegraphing to more of an AI approach was Nebulas Ray, released by Namco in 1994. Nebulas Ray moved away from scripted enemy behaviours and used more AI elements. Problematically, telegraphing was not always consistent and considering Shmups are “one-hit, one-kill” games, non-telegraphing enemies were awkward.
Perhaps unsurprisingly, *Nebulas Ray* was a one off in Shmup development. Despite the focus on realism, the concept never took off within the Shmup genre, but became an essential element in many other games to come.

In promoting more simulated human versus human type interactions such as those seen in *Street Fighter 2*, telegraphing was challenging, especially considering that not only did the game’s AI need to have adequate telegraphing, but telegraphing when a human versus human fight was underway needed to be intuitive and unobtrusive. *Street Fighter 2* did use some minor telegraphing, however, to balance the above problem, developers added in significant trade offs for the more powerful moves. Although Ryu’s uppercut move had little to no telegraphing, it could be countered by one of the most simplistic moves in the game if the player was able to pre-empt that particular attack. Later, in Period Three, fighting games added in extensive telegraphing, especially for the “Super Moves” to help keep the game fair and equitable for players.

One further element of player feedback that makes Period Two unique is the introduction of multiple, strategic viewports in the players window. Mini-maps, situational awareness and enemy status elements all make up unique player feedback devices, which were pioneered during this time. Although Shmups used elements such as enemy status and situational awareness during this period, none used alternative viewports to help give the player progression feedback. *Defender* and its sequel *Stargate* were some of the only Shmups (albeit proto-Shmups) to use the feedback mechanism of multiple viewports.

**Period Two: Contemporary Coding**

The advent of cheaper memory components during Period Two allowed for greater storage capacity, especially in regards to game audio. One of the more successful games to use examples of popular music to its advantage was *Ridge Racer*. Composers Nobuyoshi Sano, Ayako Saso and Shinji Hosoe managed to create a soundtrack for the game epitomizing the then popular forms of electronic music such as hardcore and techno. Tracks from the game such as *Rotterdam Nation* drew much inspiration from the electro hardcore music scene emerging from Europe. Many other Shmups, though, provided more nostalgic forms of music derived from existing styles such as Japanese Epic Form.
The first Gulf War was also topical for game developers during this period, particularly Shmup developers. One of the key elements that define Shmups of this era was a tendency to move away from the more traditional Sci-Fi elements that had dominated the genre. Figure 179 demonstrates the breakdown of protagonist visemes used in the Shmup genre between the end of Period One and the start of Period Two. Although the Sci-Fi theme remains strong in terms of player avatar visemes, there was an uptake in more traditional aircraft depiction during Period Two, when compared to Period One. *Carrier Air Wing, Strike Gunner STG, Fighter and Attacker* and *Twin Eagle II* (amongst others) were all Shmups that attempted to capitalize on the Gulf War through both their aesthetics and narrative elements.

![Figure 179](image)

One contemporary element that Shmups failed to utilize in their design during Period Two was the public interest for Virtual Reality (VR) type products and the associated phenomenon of telepresence. Telepresence is the combination of immersion and interactivity and in the mindset of the public during Period Two was probably best embodied in the concept of the Head Mounted Display or HMD for short. Figure 180. Although HMDs and other types of telepresence devices had existed for many years, they had not gained significant interest until the Gulf War.

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years in military projects such as the Sword of Damocles and SimNet, public awareness of these technologies was driven by popular culture, especially individuals such as Jaron Lanier and the 1992 film, The Lawnmower Man, which popularized the concept.

One of the reasons why the Shmup genre could not capitalize on the VR and telepresence market was largely due to the genre being defined as being a third person type of experience with only two axes of freedom. This obviously did not work in telepresence environments where freedom of movement and first person perspective were essential elements, however, this did not mean that concepts taken from Shmups weren’t usable in telepresence environments.

During the mid-eighties, Namco had acquired a majority stake in Atari. This relationship led to the sharing of technologies, which would later be combined with those of military contractor Evans and Sutherland to create Namco’s Medium Scale Attraction Hardware. Namco’s Medium Scale Attractions were attempts at combining games with high fidelity displays and realistic control mechanisms to create a sense of telepresence never before achieved. Galaxian 3 (1990) drew heavily from the Shmup genre for its game mechanics and aesthetics, but instead of sitting the player in front of an arcade machine, it placed them inside a building with a fully moving, hydraulic floor, 360 degree wrap around screens and twenty-eight players at any given time. \[\text{Figure 181}\]  

\[\text{Figure 181} \] Galaxian 3. [Online] Reprinted from System16. (Available)  
**Galaxian 3** took the frantic, fast-paced style of game play from Shmups and the aesthetic themes from games such as *Grad*ius and *Darius* and combined them with some of the most advanced technologies of the time to create an immersive and almost overwhelming gaming experience. So popular was the phenomenally expensive, one-off *Galaxian 3* that two additional sequels were made and mass produced for the arcade market, *Galaxian 3 Theatre 6: Project Dragoon* and *Galaxian 3 Theatre 6 J2: Attack of the Zolgear*.

The addition of telepresence to gaming meant that sensation was much more easily achieved, as gaming experiences were no longer filtered and mediated via the use of an avatar acting as middleman between the player and game world. Games such as *Ridge Racer* that utilized popular culture themes provided a milieu for experience that was attractive to non-gamers and gamers alike.

**Period Two: Familiarity**

As discussed in the education heuristic section, there were a number of familiar standardizations used in games during Period Two that aided in player education. Two particular game mechanics of the Shmups surveyed: purchasable power-ups [Figure 172] and rhizomatic levels [Figure 173], although standardizations synonymous with Period Two are also nostalgic references to early RPG and Multi-User-Dungeon (MUD) games. One of the most notable of these games was *Elite*, released in 1984 by Acornsoft. *Elite* was a space adventure game that combined combat as well as more traditional RPG elements such as sweeping, wealth and accumulation. Rhizomatic levels and purchasable power-ups used in Shmups of this time are indicative of this

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141 *Galaxian 3* was so large that had its own building at Namco land in Japan. Only one was ever produced. Although an exact price was not available for the original *Galaxian 3*, System 16 states that other Namco Medium Scale Attractions such as the Magic Edge F-18 had an initial upfront cost of $750,000USD and an annual service agreement fee of $100,000USD per year.
popular and familiar mechanic and were also seen in other games of the period such as the *Secret of Mana* (1993) and *Ultima VII* (1992). *Elite* also saw a revival during Period Two, with an updated version of the original being released in 1992 called *Elite Plus*. Although standardizations from the arcade market played a large part in the games of Period Two, the move to more empowering player experiences such as those mentioned above was a distinct reaction against the rigidly linear design of many arcade games of the 1980s.

Although rhizomatic level selection and purchasable power-ups were partly intended to give Shmups a higher factor or replayability on the home console market, the introduction of these factors also served a more nostalgic purchase other than that discussed above. The arcade genre as a whole had been the dominating medium of gaming during the 1980s due in part to the lack of the quality control measures in the home and computer gaming mediums. Arcades then and now were designed for “fast play experience,” where the game experience was designed to operate in short bursts. The introduction of purchasable power-ups and rhizomatic level selection is more of a reference to older, existing console and computer game design, than any particular reference to the arcade. Where the arcade market focused on micromanagement, the computer gaming market focused on macro management. This divergent approach to game design was a consequence of differing graphical capabilities. Text heavy games were easier to produce on the home computer medium and also more suited to the play styles of those at home: an environment which did not require fast play experience to create revenue. The important emotional relationship here is that by introducing these elements to Shmups, freedom, achievement, ownership and mystery emotions could all be embellished in a way that was not so achievable in the traditional Shmup formula.

Familiarity also allowed for developers of the time to make contemporary games from already popular intellectual properties. One of the best examples of this is the adaptation of the original *Castle Wolfenstein* [*Figure 182*] which, when combined with newer technologies, became *Wolfenstein 3D*. *Wolfenstein* was initially released in 1981 and was a third person action / adventure in which the player had to escape a German prison, and then in the sequel, attempt to kill Adolf Hitler. The narrative of *Castle

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142[Figure 182] *Castle Wolfenstein*. Adapted from *Castle Wolfenstein*. Copyright by Muse, 1991. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
*Wolfenstein* is very similar to *Wolfenstein 3D*, however it is the technology and subsequent view perspective which is different. *Wolfenstein 3D* used the already popular *Castle Wolfenstein* intellectual property as a basis for a technologically driven re-invention of the original intellectual property.

**Figure 182**

**Period Two in Summary**

Period Two is notable within the history of video games due to the amount of technological innovations that happened during this time. Virtual Reality, Multimedia Computers, CD-ROMs, 3D technology and networked gaming, although being available in some form prior to 1990, had never been widely available to the public. All of these new technologies provided diversity in the types of games being made during this time. In the eyes of the consumer, realism in both the aesthetic and control sense was “just around the corner”. The media hype surrounding Virtual Reality and the subsequent uptake of consumer level Virtual Reality, despite its shortcomings, is testament to this. Consumer desire shifted towards newer technology and the realism in gaming experience that this could provide. This desire is embodied in the sheer amount of home consoles released during this period, which is second only to the Pong clones of the late 1970s. Consoles such as the 3Do, Atari Jaguar and CD-i are all examples of this attempt to cash in on changing game desires by offering technology to consumers quicker, albeit with a substantial price tag and no stand-out software titles to market them.

This push to visual realism is also explored in the case studies. Personification and first person perspectives all played a valuable part in shifting games desire. These new technologies did not allow for any different types of emotions, but rather provided a more relatable means for these emotions to be communicated via representation. Emotion is more easily transmitted when there is a relatable human figure and relatable
human context on screen to depict those emotions. Although the computer entities are not human, there is similarity between this notion and those of psychologist Carl R. Rogers. Rogers & Roethlisberger (1991, p. 109), claims that for communication to be effective, both parties need a sense of empathy as to put yourself in someone else’s shoes gives context to communication. In making games more visually realistic and adding the conventions of the real world (physics etc), the player can relate to the game on a human, empathetic level. Furthermore, the player is better able to project themselves into the game experience and subsequently find greater personal relevance, as there are fewer layers of “abstraction” at play and identification becomes easier.

Despite Virtual Reality being a pioneering technology and certainly the most realistic type of game experience available during Period Two, its development failed to match the rising expectations of consumers, especially after failed consumer level ventures such as the Nintendo Virtual Boy and the Atari Jaguar V.R. headset. Indeed, visual realism was still a significant desire for gamers, however the concept of telepresence as embodied in Virtual Reality was considered a failed experiment. Although Period Two had ushered in the development of many new technologies and game hardware and software developers, it was also a time of extremely high risk, as the market could not support so many different hardware sets. In a way, Period Three is a step backwards from the diversity of Period Two. In order to maintain the consumer market it was a necessary step.

**Period Three (1995-1999)**

Although many home consoles during Period Two were capable of producing reasonable three-dimensional games, it wasn’t until Period Three that the home console market would focus predominantly on 3D gaming consoles. The Sega Saturn was the first next generation console to be released, signalling an end to the predominantly 2D era of 16Bit home consoles. Although 32Bit machines had existed in the form of the CD-32, 3DO and Jaguar, Sega’s 32-Bit console, the Saturn was the first of the big brand 32bit consoles to enter the market. The Sony Playstation was released the following year in 1995, and signalled the beginning of Sony Computer Entertainment (SCE). Nintendo chose not meet Sega and Sony head to head, but rather to wait and perfect its next generation console.
The home PC market, which for a long time was the entertainment inferior to the home and arcade mediums, gained an important technological leg-up in the form of dedicated 3D accelerators such as the 3DFX Voodoo, which was released in 1996. These 3D accelerators also brought with them a dedicated API for graphics development, which created important standardisations to the PC game market. The absence of development standardizations had meant that the PC, although technologically superior to the home consoles of the time, never received attention from large-scale developers because it was nearly impossible to develop games for such a wide and diverse spread of hardware and software sets. The introduction of Glide by 3DFX can be seen as an early precursor to present standardisations such as DirectX and OpenGL.

The arcade medium was still at the forefront of 3D game development as it had the most powerful (and most expensive) hardware at its disposal. As earlier mentioned, civil military defence contractor Evans and Sutherland had joined with Namco to develop their arcade hardware, and Sega had recently formed a partnership with Lockheed Martin, another military contractor, to help develop their arcade graphics hardware. Thus, Period Three signals the release of some of the most iconic and visually stunning games ever released, starting with *Rave Racer* (1995), *Sega Rally* (1995) through to games such as *Virtua Fighter 3* (1996) and *Soul Calibur* (1998) [Figure 183](#).

Despite the graphical prowess of the arcade and home consoles of the time, there was a significant problem: how do we make truly 3D games? It was this problem that made Nintendo re-evaluate the way that they were going to approach the new generation of home consoles. The problem was that 3D games always offered the possibility of six axes of freedom, however the current generation of home console control devices only...
permitted two axes to be used at any given time \[\text{Figure 184}\]. Even the new generation of consoles, the Saturn and Playstation, which were based around bringing 3D games to the public, had controllers incapable of manipulating more than two axes at once.

Nintendo had begun planning a 3D successor to their widely popular Super Mario franchise as early as 1991. Originally intended for the Super Nintendo and to be named Super Mario FX, Nintendo had planned to use the same technology behind Star Fox to take the platforming game Mario into the third dimension. What Nintendo found was that although Mario could be easily recreated in 3D from an aesthetics standpoint, there was no easy and intuitive way to control the avatar in this environment using current standards of console control interfaces. Goddard, one of the developers of Mario 64, as cited in Green (2010) stated that:

One of the programmers had quite a hard time of it, and two of them decided not to make games anymore because of Mario 64. Not because they didn't enjoy it, but because they'd burned them out. (Gilles Goddard) (para. 38)

Shigeru Miyamoto was so intent on creating an intuitive 3D game experience that it took nearly five years for the first version of a 3D Mario game to become available. The reason why was directly related to the design problems inherent with creating a 3D controller that consumers would be comfortable with. The end result was the Nintendo 64 controller, which incorporated analogue and digital movement controls, a first for any console. \[\text{Figure 185}\]

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144 \[\text{Figure 184}\] Megadrive Control Pad. Adapted from Sega Megadrive. Copyright by Sega, 1989. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

145 \[\text{Figure 185}\] Nintendo 64 Controller. Adapted from [online] Games4Gamer. (Available) Figure taken from http://games4gamersonline.com/zencart/images/products/services/n64_controller.jpg copyright by
The Nintendo 64 controller was a double edged sword though: on the one hand it was the most effective console controller at the time for the new generation of 3D games, whilst at the same time it was the most difficult to use on traditional 2D games that were still being either developed or ported for home consoles. The arcade and PC games markets did not have the same issues that the home console market had in terms of finding effective control solutions for 3D games; however, the transition to 3D, combined with the dominance of the home console market during Period Three meant that the traditionally 2D medium of the Shmup was at risk of becoming undesirable.

Shmups, specifically those designed primarily for the home console market, also aimed to use the new technologies available to them to create games which emphasized all three axes and made them relevant to the strategy and game play of the genre. One of the better examples of Shmups in Period Three to explore 3D space, and still adhere to the tradition Shmup formula was *Layer Section (Ray Storm)* (1996) (Figure 186).\(^\text{146}\)

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\(^{146}\) Figure 186. *Ray Storm*. Adapted from *Ray Storm*. Copyright by Taito, 1996. Reprinted under the terms of "fair dealing" in the Australian Copyright Act, 1968, section 40.
What *Layer Section* did was use the traditional, two axis Shmup formula, but adds a secondary playfield beneath the primary playfield. The player was unable to move into this secondary play-field, but was able to target enemies within this playfield using a specialized type of weapon (Figure 187). Although this type of approach had been done much earlier in Shmups such as *Xevious* and *Mission X* (1982), it was an old approach to a new design problem.

![Diagram of Layer Section playfields](image)

**Figure 187**

This approach to Shmup design stemmed from *Silpheed* on the Mega CD, released in 1993, which used 3D graphics to establish a depth bias playfield, initially copied from a proto-Shmup by the name of *Juno First* (1983). Figure 188 is a graphical representation of the history of Shmups to use 3D technologies to promote a sense of space via depth bias techniques. *Juno First* is the first Shmup to utilize the technique which later led to games such as *Silpheed* and even *Star Fox.*
Zeitgeists: Zero Gunner

Depth bias and multiple playfields constituted an attempt by Shmup developers to not only make the genre more contemporary, but also to embellish emotions such as wonder, awe, excitement, anxiety, ownership, fantasy / exploration, schadenfreude, ownership, freedom and, most importantly, empowerment. Depth bias was a means to better create these emotions, partly to make the virtual world feel more similar to the real world, and also to make the experience of playing Shmups similar to the contemporary games of the time, which promoted extended line of sight, into the playfield Figure 189.
What had been missing from Shmups, even those which did promote 3D space, was the ability to move freely along more than two axes. Figure 188 illustrates one particular Shmup - *Zero Gunner* - that took both of the concepts of depth bias and freedom of movement to create a Shmup which not only capitalized on contemporary trends, but also used new mechanisms of game design to help promote a sense of flow and empowerment.

*Zero Gunner* was released late in the life span of Period Three, but it represents one of the more effective attempts of Shmup developers to create a cutting edge Shmup in every sense. Technological factors also heavily influenced the design of *Zero Gunner*, as it was designed on the very same hardware platform that *Sega Rally*, *Daytona*, *Virtua Fighter* and *The House of the Dead* were developed for: the Sega Model 2. The Model 2 platform had several revisions, but all were initially designed in a joint venture between Sega and Martin Marietta, which later went on to be owned by Lockheed Martin. Model 2 was a 3D only hardware platform that had little third party development, primarily due to the large development costs associated with the technology. Despite this, third party developer and long term Shmup developer, Psikyo created *Zero Gunner* as an experiment in 3D Shmup design.
Psikyo acknowledged the limitations of the traditional Shmup formula and sought to bring higher levels of player emotion by giving the player more freedom of movement, a less abstracted view port and (for the time) more realistic graphics. The resulting game was a combination of a simple rotational mechanism, contemporary, realistic 3D style graphics, depth bias and importantly, the familiar element: a selection of Shmup standardisations.

Zero Gunner also stood out as one of very few Shmups to use helicopters for the main protagonists. Nostalgic references to the widely recognized Twin Cobra (1997) are easily identified when comparing the two titles. This nostalgic point of reference is also important when looking at the occurrence of certain protagonist themes over time. Figure 191 is a graph of the number of instances in Shmups where a helicopter was used to represent the main protagonist. What this data shows is that although there is a steady usage of this avatar viseme, it is definitely a nostalgic throw back to the helicopter style Shmups of the late nineteen eighties.

Figure 190

14 Figure 190 Twin Cobra & Zero Gunner. Adapted respectively from Twin Cobra and Zero Gunner. Copyright by 1987 by Toaplan and Copyright by Psikyo, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
The helicopter theme also served a specific game play purpose, inferring to the player that they are able to freely move and strafe around the environment. *Zero Gunner* used a simplistic rotational mechanism that allowed the player to rotate their craft, and importantly strafe around the battlefield. The game utilized the traditional arcade, Shmup control mechanism, but had an extra button that when held, enabled a function shift of the joystick, which changed it from directional movement to rotational movement. What this did was allow gamers to have a variable axis strafing mechanism that had become a standard in the widely popular FPS genre. Circle strafing and variable angle strafing allow the player to be strategic and clever in the way they engage enemies. As demonstrated in Figure 192 the player (in blue) is able to draw enemy fire before moving strategically into their blind spot and engaging them. Although this strategy was popularized by the FPS genre, it was also criticized, as players who were engaging in large, sustained amounts of variable and circle strafing often lost perspective in their environment and often fell off large edges or walkways, usually to their demise (Obeso, 2009). As Shmups third person perspective allows the player to evaluate their position in the virtual world, this was not an issue and subsequently worked very well in *Zero Gunner*. Circle and variable angel strafing also allowed the
player to dominate and invade their enemy’s space, demonstrating power kinetic viseme relationships of dominance.

The Raiden Face Off
The kinetic semiotic affect caused by “facing off” alone, leads to a sense of aggressiveness when considering the onscreen entities that use this approach. Although Zero Gunner was influenced by Forgotten Worlds, the idea of using the face off in Shmups to embellish certain types of negative emotion was also explored in the well known Shmup series, Raiden. One interesting factor of Raiden and its subsequent sequels and spin-offs is that every single enemy in the game actually faces the player at all times, tracking their movement and aligning to face them. One can liken this phenomenon to being an equivalent to “eye contact”. Putting this assumption into a more literal and game specific context, we can use the example of Wolfenstein 3D: enemies within Wolfenstein do not engage the player unless they have spotted them. In the case of Wolfenstein 3D and real life, one can discern whether they have been spotted by simply observing whether or not an aggressor is facing them and making eye contact. In the case of Wolfenstein 3D, whether the player has or has not been spotted has a direct impact on their actions. Depending on the type of player, they may chose to move strategically and remain unnoticed or boldly move to an assertive position and become noticed. Although both scenarios can be defined as being tense, the latter scenario in which the player has been spotted is the most tense, as the player no longer has the element of surprise (akin to the kinetic semiotic relationship of hunter and prey), nor the option to not react. Now let us focus on Raiden and its sequels, which span both Periods Two and Three. The player is constantly kept in this high emotional state as all enemies turn to face the player and track their position, semiotically inferring that they have noticed the player and are ready to engage.
The relationship between the face off scenario as described in *Wolfenstein 3D* and *Raiden* is akin to a number of real life social instances where such behaviour is used for aggression. Primates use eye contact as a means to transmit aggression and humans boldly face their torsos towards another in hostile situations, despite the fact that it is strategically more sensible to give your opponent a smaller target on which to concentrate.

Michael Argyle, a psychologist and expert in the field of non-verbal communication conducted a number of experiments into the impact of non-verbal communication compared with text and speech. Argyle as cited in (Beatie, 2004, p. 29) found that non-verbal communication was twelve and a half times more powerful in the communication of interpersonal attitudes, specifically on the friendliness/hostility dimension and over ten times more powerful in the communication of a different interpersonal attitude, namely superiority/inferiority.

![Figure 193](image_url) demonstrates this scenario in the PC version of *Raiden II*. Each aggressor, bar the tank pictured to the right of screen, distinctly turns to face the player before releasing its barrage. These aggressors then continue to face the player until they are either destroyed or leave the screen. Semiotically, the face-off scenario as depicted in Figure 193 differentiates *Raiden* from many of its peers as each enemy shows ‘intent’ and does not simply follow some blind pre-determined course as in *1943* etc. We must also consider how the impact of this non-verbal communication affects the balance of power within *Raiden*, especially considering that the player is one of the only entities within the game world not being able to face-off against their attacker.

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149 Figure 193 *Raiden* Face Off. Adapted from *Raiden II*. Copyright, 1994 by Seibu Kaihatsu. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Based on discourse thus far, we can see that the player’s inability to directly face an aggressor does impair the player’s ability to directly assert their power on those who would oppose them. However, in the case of Shmups, perspective plays an important role in alleviating this disability. To put this into context, let us reconsider the examples as outlined in Figure 48 and Figure 49. The player in Shmups, although visually embodied as an onscreen avatar, is able to make visual contact with aggressors despite the orientation of their onscreen avatar, which does not. First Person Shooters, on the other hand, require that the player be able to change their orientation to successfully navigate the game space. If the player were not able to do this, then it would be akin to having to play a FPS solely via use of the strafe keys.\footnote{Strafing is a common element in all Shmups. In a traditional WSAD setup, A and D allow the player to strafe left and right respectively, while the mouse is responsible for changing the player’s orientation.}

Ergo, we can consider Figure 194 an updated model of Figure 48 with the additional blue arrow depicting the player’s ability to indirectly face an opponent on screen. It has been demonstrated through the proliferation of the FPS genre that gamers gravitate towards games that allow them to directly face an aggressor in a realistic manner. Even though Figure 194 demonstrates that this can occur within the third person perspective of Shmups, contemporary Shmups discourage this. An interesting experiment conducted...
by Shmups.com contributor “iatneH” (2007), tracks the player’s eye movement through the first level of *DoDonPachi*. What the experiment shows is that the player’s eye movement focuses on aggressors more when there are no imminent barrages near their immediate location. When heavy barrages approach the player, their eyes are immediately drawn to the area surrounding their on screen avatar.
Figure 195

Figure 195 demonstrates the trend of the eye to be drawn more towards the player’s avatar when incoming barrage becomes overwhelming. The blue dot represents where the player’s eye is focused whilst the diameter of the circle increases based on the duration of the player’s gaze at any one fixed point. Based on this information, we can further refine Figure 194 to the model as seen in Figure 196, where the red section depicts the angle of deviation between where the player is focusing on their avatar, and where they are focusing on the enemies. This deviation between these two lines of site becomes narrower the more the player has to focus on their own avatar. As a consequence, the player is able to focus less on enemies and instead is forced into a position of submission, where they have to continuously dodge and weave.

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15 Figure 195 Eye glaze test. Adapted from iatneH. Copyright by iatneH, 2006. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
*Raiden* is one of the only Shmups to still be widely recognised by regular Western gamers. The reason for this may be that *Raiden* allows gamers to increase their lines of sight and directly view aggressors more than any of its contemporaries. *Raiden* and its subsequent sequels utilise an enemy sniping system. Instead of enemies releasing indiscriminate, screen-filling barrages, many of *Raiden*’s aggressors instead fire a sole, high-speed projectile from a long distance. The usual strategy employed by the game is that it will introduce an enemy at the top section of the screen. That enemy will then orientate towards the player, and after a few moments it will release a carefully aimed high-speed projectile towards the player’s position. The player will still need to move their gaze towards their avatar in order to avoid the projectile, however in *Raiden*, the player is rewarded for focusing at enemies a large distance away from their onscreen avatar. This is in stark contrast to Danmaku Shmups, where the player is nearly always inundated with enemy barrages around their avatar, and hence their line of sight is drawn away from the aggressors. “Icarus” from Shmups.com also highlights the difference between traditional style Shmups and *Raiden*. Icarus devised a small, partly comical diagram which addresses the contentious subject of “where do you look when playing a Shmup”, an extremely common question on Shmups.com. The image shown in Figure 197 (IatneH, 2007), taken from the Shmups forum, makes direct reference to how *Raiden* differs from traditional contemporary Shmups.

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152 This is a recurrent question often raised by novices on the Shmups.com board. In addition to iatneH’s post, further discussion on the subject can be found at: http://Shmups.system11.org/viewtopic.php?t=13921

It can be argued that the deviation between these two different styles of enemy barrages has a direct consequence on the appeal of Shmups in different demographics. Ergo, we still see *Raiden* in Western arcades, despite being over a decade old, whilst at the same time there are nearly no contemporary Danmaku Shmups in the West.\(^{154}\) The player’s ability to directly engage and subsequently assert power over enemies in the game world can be viewed as an essential aspect of Western gaming, particularly when looking at the prevalence of the FPS genre. From a design perspective, one can see how the above examples allude to this fact, and it is definitely an area requiring further consideration.

Moving back to *Zero Gunner*, although the game utilized many contemporary and well-executed design techniques, *Zero Gunner* is not widely known outside of hardcore Shmup player groups, nor can it really be considered a financial success. There were two main reasons behind this: first the Model 2 hardware was extremely expensive compared to other Shmup arcade platforms. When Shmups in the arcade weren’t as popular as they used to be, arcade operators, particularly those in the West, found it difficult to justify the cost. Availability of the game was also made more problematic as the Model 2 hardware platform was extremely difficult to port to home consoles. Further, the only console capable of handling a port of a Model 2 game was the Sega Saturn. By the time of the game’s release, the Sega Saturn was being phased out by Sega, due to diminishing returns resulting from massive competition from the Sony Playstation. The follow on effect of this was that the game lacked any real culture of indirect score based competition. As the game was designed to be a fast paced, score based game, a lack of community support ultimately spelt the commercial demise of the first *Zero Gunner* game. The second reason behind the commercial failure of *Zero Gunner* was the fact that the game was incredibly difficult. This was not just a problem with *Zero Gunner*, but with all Shmups developed in Period Three.

Shmups had become a genre of gaming, distilled and refined for the hardcore enthusiast. To play a contemporary Shmup during Period Three often meant that you were already familiar with the genre and followed the incremental updates to existing standardizations. Shmups entered a period of pseudo individualisation that would cause

\(^{154}\) Replay in Brisbane is one such arcade to still have a dedicated *Raiden II* machine, despite the number of more contemporary Shmup releases in recent years.
a schism in the genre, which would later be the cause for its demise as a commercial genre in the West. However, this is part of a larger problem where nearly all arcade games were becoming increasingly more difficult. No longer was the arcade an environment for novice players during Period Three: it was becoming a haven for the elite.

**The Downfall of the Arcade**

Common scapegoats for the demise of the arcade include MAME\(^{155}\) and the ever-expanding home market. However, there are a number of factors contributing to the demise in popularity of the local arcade. Although some arcade games have gone on to make many times their purchase price, others have gone on to make less than stellar incomes. A report from the Australian Office of Film and Literature Classification (OFLC), conducted by (Aisbett & Dirkin, 1999, p. 75) noted some elements showing the demise of the arcade. In section 3.4.14 of the OFLC document, survey participants are asked a number of questions about playing games in arcades as opposed to the home environment. One of the main reasons why survey participants avoided the arcade was because of how hard some of the games could be. This is in stark contrast to the proto-Shmups that dominated arcade floor spaces in the early eighties. This is exemplified in the following quote from Chiucchi, (2007):

> Know how to fight as someone besides Ryu? Congrats: you might make it past Round 3.  
> This is how to play Space Invaders: Move left and right, press the shoot button.  
> This is how to play Pac-Man: Tilt the joystick in the direction you want to go.  
> This is how to play Marvel vs. Capcom: Press MP + MK to call a striker, press D-DF-F HK + HP to do a tag team super, press D-DB-B HK+HP to use both characters at once, and then to do a combo for a character...yeah, see where this is going? (para. 5)

This statement provided by Chiucchi is also backed up by results from a 1999 Australian study by researchers; Aisbett and Dirkin, who found arcades a daunting environment for many patrons. Controls and rules were difficult, and there was nothing worse than making mistakes in such a public space. What was missing from arcades in Period Three was the Shmup: simple to learn, difficult to master. Still, Shmups too went down a similar path to 3D fighting games during Period Three. Shmup development was divided into two fronts after the mass introduction of 3D into arcades and the home

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\(^{155}\) MAME is the “Multiple Arcade Machine Emulator.” A piece of software that is able to execute code written for another platform (specifically arcade hardware) on personal computers.
market (in the form of the Sega Saturn and Sony Playstation). The first style of Neo-Shmup development attempted to adapt Shmups 2D gaming style to 3D by replacing sprites with polygons, while at the same time retaining a traditional Shmup feel, being 2D in perspective, and thus retaining a ‘traditional’ ambience. This has already been discussed in relation to *Layer Section* and its derivatives. The second style of Neo-Shmup was developed for a more ‘hardcore’ audience. The Shmup formula was distilled and the most unique elements of the genre were bolstered in an attempt to tailor the game for a more focused and hardcore demographic. This style of Shmup development was pioneered and developed by one main company in particular - Cave.

Cave introduced a style of Shmup game play that emphasized speed and complexity of enemy and bullet patterns known as Danmaku\(^\text{156}\) in Japan and Manic Shooter’s in the West. Cave’s first entry into the arcade market was *DonPachi* (Cave, 1995). Rather than being a drastic revolution of the Shmup genre, the game play and artistic style of *DonPachi* was derived from three former Toaplan games: *Truxton II* (Toaplan, 1992), *Dogyuun* (Toaplan, 1992) and *Out Zone* (Toaplan, 1990) (Sheep, 2005). The resemblance between these Toaplan games and *DonPachi* is no coincidence: heading up the formation of Cave after the collapse of Toaplan were former Toaplan employees. The game play style of *DonPachi* was further expanded upon by Cave during the years following and resulted in the creation of a new Shmup sub-genre during Period Three: the Manic Shmup.

Manic Shmups feature heavy usage of predefined bullet patterns which consume the screen at most times:

- Manic Shmup often use a play system that rewards the player for creating “chains” of enemy destruction;
- As Manic Shmups are pioneered and developed by only one company, the 2D artwork is consistent between games; and
- Manic Shmups are short, fast and difficult.

\(^{156}\) Referenced in French Shmup Documentary – See Electronic Appendix. English transcript can be found at [http://Shmup.canalblog.com/](http://Shmup.canalblog.com/)
Manic Shmups do not necessarily represent a schism in the genre. Danmaku Shmups have more in common with early Shmups and proto Shmups then they do with Shmups epitomized in the mid-eighties to early nineties. A quick reflection on the Shmup family tree [Figure 198] brings to mind two highly influential games that represent a genesis of the Danmaku age: Defender and the poor man’s Defender, Juno First. Defender, already talked about in length and Juno First are both some of the earliest incarnations on the Danmaku theme. Both games, especially in later levels overwhelm the player with fast moving bullets and relentless swarms of enemies. What was lacking in comparison to contemporary Danmaku was the emphasis on predetermined patterns of enemy fire.

Both Defender and to a lesser extent Juno First were regarded as a “real man’s game”, especially in the case of Defender which utilized a complex control mechanism which took much practice to master [Figure 199]. With the divergent needs of home console gamers, it was as if the Danmaku genre was put on hold until those who played them grew up and started making them for themselves.

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Toaplan was formed largely from members of the recently demised Orca and Crux in 1984/1985. Both developers had already had much experience with the Shmup formula in games such as *Gyrodine* (1984) and *Espial* (1982). The amalgamation of the two developers into Toaplan saw the release of several games licensed and distributed under the Taito banner, until which time the company had established themselves enough to begin their own publishing operations. Incognoscente (2007) talks about the early stages of Toaplan:

> There were company-wide meetings (I do not know with what frequency) in which game design ideas or balance suggestions would be brought up. These were often manic, high-energy affairs which could devolve into a pie in the face/food thrown at someone giving a bad idea or shouting matches over if a game is fair enough or if it would be too easy and lose. (para. 8)

Incognoscente talks of the demise of Toaplan, specifically citing Yuge’s more and more difficult Shmups.

> Toaplan, particularly Yuge’s shooting game branch, was making notoriously difficult shooters that were turning off many players from the games. Some of the balance / hit box sensibilities being shouted about kept the feeling of the games in the 80s. (Incognoscente, 2007, para. 9)

The pseudo-Danmaku formula that epitomized some of the toughest early arcade proto-Shmups found its way back into the mainstream, but the mainstream was not ready to re-adopt the formula.

With the change in emphasis towards making Shmups more home console friendly during Period Two, a number of elements were changed. The brutal speed and difficulty of *Defender* and *Juno First* were ditched in favor of a Shmup style that was slightly slower and to some extent rewarded the player for long bouts of pattern memorization. At first, the pattern memorization was not as overwhelming as contemporary Danmaku.
Instead each enemy craft had an associated pattern of fire. This trait is probably best demonstrated by Capcom’s iconic *1943* [Figure 200].

*1943* utilized a pattern system for both enemy fire and formation movement. This was not new: earlier games such as *Gplus* utilized formulaic enemy movements. What made *1943* different was that the player could identify what type of enemy arsenal was needed simply by looking at its image, and thus prepare for the barrage as needed.

Although *1943* is a hard game and not without its “unfair” points, its play system was a combination of reward for memorization and reward for twitch reflexes, a fusion of the two divergent paths of Shmups. Old players felt at home with the twitchy nature of enemy-aimed fire and were made to feel confident with the enemy’s routine and easily identifiable barrages, hence making the Danmaku Shmups of Period Three nostalgic throw backs to the Proto-Shmups of the early eighties.

**Zeitgeists: DoDonPachi (Atlus/Cave, 1997)**

The aesthetic and game play techniques that became synonymous with the Shmups developed by Toaplan in the early nineties had a significant impact not only on the Shmups of Period One, but also those periods following. A focal point of this Toaplan influence can be seen in a zeitgeist of Period Four: *DoDonPachi*. Voted five times Shmups.com #1 Shmup of the year, (Shmups.com, 2007) *DoDonPachi* is a title that defines the Danmaku Shmups of Period Three. *DoDonPachi* took the initial formula introduced by *DoDonPachi* (Cave, 1995) and added more of everything: more enemies, more explosions and even more bullets. Cave also kept the chaining system of *DoDonPachi*, a mechanism by which the player could “chain”

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158*Figure 200* 1943. Adapted from 1943. Copyright by Capcom, 1987. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
together enemy kills to multiply the score, allowing for a game which could be chained from start to finish by expert players. Although 1997 was a strong year for Shmups, *DoDonPachi* stands out from some otherwise tough competition.

Also released in arcades in the same year were *Raiden Fighters 2* (Seibu Kaihatsu),\(^{159}\) *Sengeki Striker* (Kaneko / Warashi), *Shienryu* (Warashi) (Error! Reference source not found.),\(^{160}\) *Strikers 1945 II* (Psikyo) and *Zero Gunner* (examined earlier). Despite the presence of many other highly rated Shmups during the year, *DoDonPachi* stands out above the rest and has maintained its positions as a singular Shmup ever since the Shmups.com top twenty-five began.

Graphically, not much separates the Shmups of 1997, except for *Zero Gunner*’s \(^{161}\) 3D graphics powered by the Sega Model 2 hardware. However, *DoDonPachi*

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\(^{159}\) *Raiden Fighters 2*. Adapted from *Raiden Fighters 2*. Copyright by Seibu Kaihatsu, 1997. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.

\(^{160}\) Error! Reference source not found. *Shienryu*. Adapted from *Shienryu*. Copyright by Warashi, 1997. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.

\(^{161}\) *Figure 202*. *Zero Gunner*. Adapted from *Zero Gunner*. Copyright by Psikyo, 1997. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.
Still manages to stand out, not because of its visuals, but because of its intuitive and contemporary play system.

**DoDonPachi, Visual Semiotics & Kinetic Semiotics**

As demonstrated earlier, Danmaku Shmups have become more of an exercise in evasion rather than offence for the average player. Strikers 1945 (Error! Reference source not found.)\(^{162}\) and Sengeki Striker\(^{163}\) partially followed in the footsteps that Toaplan and Cave had been establishing with their Danmaku formula, but had made an error in the process, one that DoDonPachi did not. In Sengeki Striker, the amount of enemies on screen more often than not causes the player to constantly evade rather than attack. The problem for the player is the more they evade, the more enemies enter the screen and subsequently the more projectiles are being fired at them, putting them on the back foot and leaving them feeling disempowered and dominated. Although this style of game play could be rectified with practice and memorization, it was not a good first impression for the player and caused significant high entry barrier.

DoDonPachi varied greatly from Strikers 1945 and Sengeki Striker in its placement of enemies and their engagement patterns. Ordinarily, traditional Shmups tried to maintain

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\(^{162}\) Error! Reference source not found.. Strikers 1945 II. Adapted from Strikers 1945 II. Copyright by Psikyo, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.

\(^{163}\) Sengeki Striker. Adapted from Sengeki Striker. Copyright by Warashi, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
the player’s position in the middle of the screen for the first few enemy waves, allowing the player the ability to wait for the enemies to come to them before engaging, a kinetic practice exemplified in *Xevious* [Figure 203], *Gradius* and *Ikaruga*. However, *DoDonPachi* gives the player a step by step user manual to the game in the first few waves through the use of kinetic semiotics, a system in which meaning is imparted through indexical symbolism and player / enemy movement. The placement of the first few enemy waves in *DoDonPachi* forces the player to aggressively strafe and engage the enemy hence empowering the player and putting them quickly into an offensive position.

![Figure 203](image)

These kinetic semiotics were used to transmit function to the player, that is: they showed the player how the rest of the game was to be played. The placement of the first few enemy waves also demonstrates to the player how to maintain their offensive position by first drawing enemy fire towards themselves then strafing to the opposite side of screen whilst engaging enemies in a long sustain burst [Figure 204].\(^{164}\) This movement would then be repeated throughout the game: draw enemy fire then strafe to engage at a safe position.

\(^{164}\) *DoDonPachi* Strafe Example. Adapted from *DoDonPachi*. Copyright by Atlus / Cave, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
As demonstrated above, the method of playing *DoDonPachi* is not so subtly implied by the visual depictions of a stone bridge in the foreground layer. After the strategy is implied through visuals and kinetic visemes, the path of enemies becomes more and more complex, and rewards players who can identify these more cryptic paths with lack of such non-subtle visual clues in the background or foreground. Once the player has identified these paths, one might assume that they have mastered the game, however the score mechanics of *DoDonPachi* will further reward those players who can not only manage to identify the strafing paths, but string them together into continuous flowing chains of enemy kills through careful manipulation and control over the game world.

*DoDonPachi* also utilises enemy bullet patterns to direct the player around the screen. The patterns, highly geometric and repetitive, can “herd” the player through safe gaps in the enemy assault so long as the player is astute enough to recognize these “helpful”
bullet patterns (Figure 205). As vertical Shmups did not use background objects to funnel or compress the player in the same way that horizontal Shmups could, the use of excessive amounts of bullets can almost be viewed as a hither to the extreme funnelling techniques of horizontal Shmups from the late eighties and early nineties.

Further empowering the player is *DoDonPachi*’s unique weapon system, which allows the player to manipulate chaining time. The player’s ship is equipped with two modes of fire, one for a spray type offence and the other for a highly directional offence (Figure 205). *DoDonPachi*. Adapted from *DoDonPachi*. Copyright by Atlus / Cave, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
Using the spray attack, the player is quickly able to engage small, easy to destroy targets, but because it can destroy so many small enemies at a time, the spray offence requires the player to often hold back until there are sufficient enemies on screen to utilise the weapon without breaking the chain. The spray type offence also only gives the player a short time before they need to engage the next target. However, the directional offence momentarily halts the chain countdown timer when engaging larger targets. The directional offence also slows the player’s movement considerably and allows for further manipulation of the game world by the player.
Semiotically, the directional offensive weapon is a highly powerful, iconic symbol. The long, directed beam steamrolls even the largest enemies with its power and its phallic nature would impress any Freudian thinker. Releasing a bomb at the same time as the directional weapon increases its yield further, cancelling enemy projectiles and increasing in size as it forms a vertical wall of fury in front of the player (Figure 208). 

Despite the hardcore nature of Danmaku Shmups, they ushered in a new desire for score based games and indirect PvP by introducing complex score systems, which often focused on creating a sense of Zen like flow by utilizing mechanisms such as chaining. Figure 209 demonstrates the occurrence of complex score systems, including chaining in Shmups over time. With the introduction of Danmaku Shmups, the genre as a whole was heavily influenced, as were a large number of non-Shmup games in Period Three reliant on indirect PvP score competition such as puzzle games and single player arcade games.

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168 Figure 208 DoDonPachi Weapon Example 2. Adapted from DoDonPachi. Copyright by Atlus / Cave, 1997. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
After reviewing the case studies, a few things become apparent. Firstly, the home console demographic had mandated its own type of game design: no longer were home console games solely ports of the more “superior” arcade titles, but rather large, narrative driven experiences that promoted emotions such as awe, wonder, exploration and mystery. Secondly, the arcade market had also become the domain of the hardcore, elite, fan-boys of particular genres. Finally, 3D technology drove consumer demand and subsequently informed their desires. Developers were aware of these consumer desires during this period of time. One of the only Shmups to attempt to satisfy all of these diverse desires came from a developer who had never developed a Shmup at all.

Zeitgeists: Radiant Silvergun

*Radiant Silvergun* (Treasure, 1998) is regarded in many fan circles as one of the greatest, if not the greatest Shmup ever created. The game was released near the end of the Sega Saturn Japanese life span and had a print run of around 20,000 copies, which was very common for the later Saturn games. Even though the game is not rare, it still commands a very high price. The price of the home console version, which was released in Japan only for the Sega Saturn, varies from around $140USD for a used copy in poor condition, to a new and sealed copy which can sell for upwards of $250USD on eBay.

Even though the game was never released outside of Japan, its influence was felt throughout the world. Sega Saturn Magazine Europe even dedicated a ten-page article to *Radiant Silvergun* when it came out, despite the game never officially being available
in either the European arcades or as a PAL release for the Sega Saturn. Interestingly, *Radiant Silvergun* was the first ever Shmup to be created by Treasure and it was also their first ever arcade game. However, the cult success of *Radiant Silvergun* comes as no surprise when looking at the history of Treasure and the former credits of *Radiant Silvergun* producer Hiroshi Iuchi.

Treasure was formed in 1992 after Masato Maegawa quit from his job at Konami in April of that year. Maegawa left Konami with the intention of starting up a new video game company by the name of Treasure. Tired of Konami’s focus on the creation of sequels, other employees followed Maegawa into his new company. Treasure’s focus was to create a company that innovated game play and avoided making tired sequels of old games.

In this point of video game history the arcade market was nearly at its peak and the home console market was booming with no less than nine different home consoles and four different handheld machines being marketed with more on the horizon. Although the market for video game was large, so too was the failure rate of new developers. However Treasure managed to break the mould by releasing their first game *Gunstar Heroes* (1993). The game was released for Sega’s Megadrive on the ninth of September 1993 and instantly became a hit in both the West and the East. *Gunstar Heroes* was the first game that Iuchi had worked on for Treasure. His role for *Gunstar Heroes* was the background designer, a role which he had similar experience in from former games such as *Kyuukouka Bakugekiittai* (Unknown), *Aliens* (1990), *Escape Kids* (/1991), *The Simpsons* (1991) and *Bucky O’Hare* (1992).

Before the release of *Radiant Silvergun*, Iuchi worked on three more games for Treasure before leaving the company for two years to work for Time Warner Interactive as a background designer. However Time Warner Interactive folded shortly after the release of their one and only game: *Shinrei Jusatsushi Taromaru* (1997). Iuchi worked on both background design and boss design for the game, however the game was not a success and the print run was cut short when Time Warner Interactive folded. The few remaining copies of the game left on the market have become the Sega Saturn’s most expensive game above *Radiant Silvergun*.

With the demise of Time Warner Interactive and the failure of *Shinrei Jusatsushi Taromaru*, Iuchi moved back to Treasure where he was given his first project as
producer: Radiant Silvergun. Radiant Silvergun is based on a screenplay that Iuchi wrote before returning to Treasure in 1997 and went into full production for the Sega Saturn and Sega ST-V arcade system at the same time in 1997. The game was released in Japanese arcades on May 28th, 1998 with the Sega Saturn version following one month later on July 23rd, 1998. Contrary to popular belief, the Saturn version was actually in production before the arcade version; however the Saturn version was delayed partly to give amusement machine operators time to make money from the arcade version.

Narrative Meets Shmups
Arguably, what set Radiant Silvergun apart from other Shmups was the creation of a unique and well-scripted story line that is at the forefront of the game. So integral is the story to the game that Radiant Silvergun was delayed169 so that Studio Gonzo, the same people responsible for anime movies such as Wings of Honneamise, Hellsing, Full Metal Panic and Last Exile, could add a FMV anime introduction and ending, something seldom seen in the genre. The introduction and ending were necessary to help explain the complex story that Iuchi had written for Radiant Silvergun. In an interview conducted with Iuchi in the Official Radiant Silvergun Guidebook he stated

I think anyone that has seen that movie [Wings of Honneamise] will understand that Studio Gonzo delivers a quality product that you can rely on. I thought Mr. Maeda's work on the [Radiant Silvergun’s] script was fantastic, and Mr. Mizushima chose just the right voice actors. I thought they both understood us. I would be glad to ask them to work for us again (Iuchi, 2004).

The story of Radiant Silvergun was told in such a way that it not only complemented the inherent needs of the Shmups genre, but also compelled the player to move forward into the game world and explore - something that is absent from most Shmups. Sega Saturn Magazine (Treasure - Radiant Silvergun, 1998) talked to Masato Maegawa about the storyline of Radiant Silvergun170 and discussed the differences between the arcade and the Saturn versions. Maegawa stated

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169 Many internet sources claim that the home console version of Radiant Silvergun was the only version to feature the Studio Gonzo FMV sequence. However, the arcade version does still feature an introduction sequence using stills from the FMV sequence of the Sega Saturn version.

170 Interview with Masato Maegawa, Sega Saturn Magazine. (Issue 34 August 1998)
The biggest difference is that we've [Treasure] included an opening movie and made the scenario element a lot more interesting and deeper. There's only so much you can put into an arcade version because no matter what you do, the game has to be fast. Arcade players don't like waiting and they hate these kinds of intro demos. All these movie sequences were cut from the arcade version. (p. 25)

The introduction video sequence, which only plays during the game’s “attract” mode, set the story for *Radiant Silvergun* and set the scene for the game, however its absence from the arcade version does not impede the story.

*Radiant Silvergun* is set in a future where the world is waiting in anticipation for the analysis of a mysterious ancient object of unknown origin [Figure 210][171] [Figure 211][172]. What makes this object even more mysterious is that despite its age, uncovered alongside was a robot, identical to ones manufactured during the game’s present time.

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The news of this discovery is of little concern to the crew of the Light Space Cruiser “Tetra” [Figure 213] until all contact is lost with the military research station examining this ancient object. The Tetra is then informed of an imminent attack on their earth headquarters shortly after losing contact with the base. The “Silverguns”, futuristic aircraft piloted by Guy, Tengai, Reana and Buster, are scrambled immediately to investigate what has happened. After encountering stiff opposition, the pilots of the experimental “Silvergun” class fighters abandon their campaign and return to the orbiting Tetra as the last survivors of mankind.

The Tetra, low on supplies, decides to return to earth one year later and encounter the hordes of unknown aggressors that wait. This is the point at which the game starts a furious battle for survival with the odds stacked heavily against them.

The story of Radiant Silvergun, instead of being told as one long linear narrative that spans the gaps between the FMV introduction and ending, is instead told in non-linear

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segments. The first stage when the player enters the game is set one year after the cataclysmic events that destroyed the population of earth. This is the point at both which the Saturn and Arcade versions enter the player into the game world. A brief section of in-game dialogue, accompanied by the corresponding avatars, is juxtaposed over the cinematically moving background [Figure 214]. The tension is high and this is reflected in the brief interjections of voice heard by the player.

The narrative of Radiant Silvergun follows these conventions throughout the game and despite the Saturn version relying on CD-Rom technology, there is no noticeable loading time in the game, bar three points where the loading is extremely brief and goes
largely unnoticed thanks to the continuing soundtrack. *Radiant Silvergun*’s narrative is original within the context of the genre, but contains philosophies of cyclic renewal and honourable death that epitomize Japanese narrative conventions and beliefs. The stone like object that engulfed the planet was not of alien origin, but in fact was the life force of the earth or ‘Gaia’. What is not apparent to the player during the initial stages of the game is that what is happening now has happened before in a never-ending cycle of death and rebirth. This is why alongside the stone, a contemporary robot was found, albeit over 100,000 years old. The usual Shmup narrative conventions of alien aggressors from far off universes could never match the ultimate goal of *Radiant Silvergun*: the defeat of god itself.

This tale is told through a highly symbolic interface interpolated with an emotionally charged soundtrack and endearing visuals. *Radiant Silvergun* is an example of how an
extremely complex narrative can be told within the genre without detriment to either the action or flow of the game. From the moment that the player sets “virtual” foot into the world of Radiant Silvergun, they are presented with a massive sense of scale and proportion. The swivelling camera inspects the expansive three-dimensional landscapes to give the player a sense of perspective, utilizing the 3D game technology in way that Shmups had never done before. As the camera pans around the player’s own Silverygun, interjections of voice are heard with the accompanying emotive avatars. What is most important about the way Radiant Silvergun’s story is told is that at no point in the game is the flow impeded by either technological or narrative procedures.

Radiant Silvergun Mechanics

In the case of Radiant Silvergun, enemies form one of three different colours: Red, Yellow and Blue. Destroying like-coloured enemies in groups of three results in a chain bonus. The more consecutive chains that the player is able to link together, the higher the chain bonus becomes. The first few waves on Radiant Silvergun are easily decipherable, however, the more the game progresses the harder “chaining” becomes. Ng (2005) make a note of this in the case of Ikaruga, stating that although such chaining systems do enable good players to ‘enter the zone’ the difficulty associated with later patterns can cause the player’s concentration to lapse outside of the zone as the objective becomes more and more frustrating. Although in some ways the earlier levels of each game fit with Csikszentmihalyi’s “challenging but tractable task” the seemingly impossible nature of later levels may in fact work against this hypothesis. However, this is where Radiant Silvergun differs from the other three examples. Despite nearly all Shmups having some sort of story line, the emphasis is usually placed on the in-game action rather than compelling the player to explore the narrative to its conclusion. Radiant Silvergun’s emphasis on story line means that whether the player is able to achieve “flow” through game action or not, there is always the underlying narrative providing “flow” also.

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The concept of flow in narrative is unfortunately one area where Ng’s work is lacking. Ng focuses heavily on the in-game action, which comes as a welcome change to futurist discourse like Manovich’s\(^{178}\) (2001). Ng’s paper, although giving clear-cut examples of how to create a sense of flow in action game, really doesn’t go into the same amount of depth when discussing how flow is achieved in action game narratives. Ng alludes that flow can actually be impeded by overly emphasized narrative, a point which might be genuine given the large amount of anecdotal evidence. However, one needs to consider that narrative in video games goes beyond traditional text and dialogue based methods and relies heavily on visual and aural semiotic elements.

Pino (1998) discusses the importance of “flow” to music and making it interesting for the audience. More importantly, his discourse is focused on instructing the player how to make their own performances flow in order to appeal to the audience. We can see how this dynamic can be related back to the world of video games where we have the audience in the form of the player, and the game developer forms the role of the instrumentalist. Pino (Pino, 1998, p. 108) states that “Music must never lose its flow and direction. Even in the music of the romantic era, the basic metric flow must be maintained throughout. Otherwise the beautiful, added subtleties that should be put into a performance at strategic points in time lose all potential effectiveness”. In many ways, music can be seen as having the most stringent rules for creating flow in its many genres. These rules dictate the progression of scalar melody and even rhythm to promote flow akin to Csikszentmihalyi’s seven examples of flow. Listening to successful pop songs reveals that they all have elements of continuity and flow; they engulf the listener into the world of the song and never let their concentration lapse outside of this “zone”. This is something achieved in composition not only by repetition of ‘hooks’, but by creating variation around an underlying theme. Pino (1998) explains:

> Think of it this way: If you look out from the shore upon a great expanse of ocean, you may become very quickly bored. If however the ocean is enlivened by the sudden appearance of an interesting ship, the view is more likely to hold your attention. Similarly, if your view is suddenly filled with hundreds of ships, not any single one of them will hold interest for very long. The same principle holds for the performance of music: If the listener perceives no subtleties he becomes bored; if he detects nothing

\(^{178}\) Manovich’s “The Language of New Media” is one such discourse that focuses heavily on narrative but fails to really explain in-game action and movement and especially lacks any real insight into the importance of music on early video games.
but subtleties he becomes disorientated and bored…. the most important element in any piece of music is its rhythmic flow. (p. 108)

We can see a similar dichotomy of rhythm and melody in video games. As music is integral to the gaming experience, yet not its focus, we can consider the rhythmical flow of the video game to be implied partly by the movement of various visual assets on screen. The flow of this visual symphony must remain constant to enable good flow and “zone-like” nirvana for the player. Similarly, the music must complement this visual flow and not detract from it through excessive ornamentation. The soundtrack of Radiant Silvergun is a prime example of how this can be successfully achieved within the realm of video games using music specific to the inherent needs of the medium.

**Radiant Silvergun: Semiotic Analysis**

“Evasion” is the third level of Radiant Silvergun and fits into the narrative as the fourth temporal section. This level sees our protagonists on a blitzkrieg to their headquarters (Figure 219). Unlike the previous levels of Radiant Silvergun, where the narrative has placed the player in a defensive position, this level thrusts them onto the offensive for the first time. The music complements this effect and for the first time in the Radiant Silvergun narrative there is power and a sense of “certainty” to the music.

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179 The transcription of the Radiant Silvergun narrative is authored by Pierre 'Saffran' Bancov and can be found at http://www.emuxhaven.net/%7Esilver/Main%20Story.html

The track “Evasion” follows the steady, yet fast movement of the visuals via use of consistent surface rhythm and predictable fifth movements. The meter and rhythm of the piece is precise and powerful and brings with it connotations of martial and militaristic themes. The onscreen action and music maintain an exacting tempo with no breaks in either. The upbeat tempo of this particular piece makes it hard to find comparative material in the classical repertoire; however the definite leaps in melody and their relation to creating a powerful “super music” effect can be seen in Bruckner’s seventh symphony in the “Allegro moderato”, a tribute to Wagner’s powerful nationalistic music. Further comparison can be made between other examples of super music such as those used in the introduction of Star Wars and the Superman theme.

Further forward propulsion is provided by the usage of an arpeggiated xylophone line, contributing a definite pulse to the music.

Despite the assured nature of the melodic lines, occasional dissonance and minor movement can be heard from time to time. This fits with the model of Japanese Epic Form, as rarely will Japanese narrative not use a “flawed hero”. These flaws are represented musically in these uncertain minor movements. Brass lines provide a powerful voice to melodic lines used within Evasion. Contrasting the brass and adding to the uncertainty of the initial two sections played by brass voices, comes the third section featuring heavy emphasis on string like timbre. This string section is more lyrical and less angular than the fifth movements of the previous two sections, yet despite the more subdued nature of the string timbre and lack of super music intervals, this section maintains the pace of the visuals whilst adding a more melancholic and uncertain feel to the song. This is an important aspect when considering what the player knows of the story thus far. They believe that although they have encountered stiff opposition, that their enemy can be defeated. We hear this in the bold brashness of the brass lines in the first two sections of the piece. However the uncertainty of exactly
what has happened and what they are up against is reflected in the later string section, featuring more lyrical movement and more emphasis on minor tonality. It isn’t until much later in the game that the player is told that they are in fact fighting “God” and it is at this point the music takes a different direction.

Evasion culminates in the destruction of the Tetra as it tries to ram the object in the hope of saving the remaining Silverguns. This however comes at the loss of the captain, who bravely sacrifices himself in the process. The destruction of the Tetra as illustrated in [Figure 220] brings an abrupt cut off point to the narrative: the screen goes blank and all sound is abruptly halted. This signifies a massive emotional pinnacle in the narrative and represents one of the only pauses in the game’s flow. After a few moments pause, six sequential captions appear on screen [Figure 221].

The “Creator” which is the robot of the Tetra’s crew speaks to Reana and Baster from inside the ruins of the now destroyed headquarters…

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Creator: (seemingly concerned) "ARE YOU GOING?"
Reana: (gives a defeated sigh) "......".
Baster: "Maybe we...maybe we can't win?"
Creator: "DON'T EVER GIVE UP., NOT EVEN AT THE LAST MOMENT.
...THOSE WERE CAPTAIN, TENGAI'S LAST WORDS".
Reana: (implying that he might be lying) "Did the Captain...REALLY say that?"
Creator: "I THINK I HEARD HIM SAY SO".

After this interchange of dialogue, Reana and Baster feel that they have nothing left but to face the un-faceable and pursue the stone like object until it results in their likely death. With the Tetra now gone as well as the other two Silverguns, Reana and Baster are the only human souls left. Yet, instead of fleeing they lay in a suicidal pursuit course for the stone object. This pursuit is the final chapter in Radiant Silvergun. Gone is the bravado that was seen in the earlier chapters, replaced by a humbled and solemn mood, for they are about to encounter God. The music changes significantly to reflect this. Gone are the surface rhythms and emphasis on rhythm that dominated the soundtrack earlier on, replaced instead by solemn choir samples playing long sustained chords. Tension is also added by the inclusion of the five-four metric pattern which is also used to similar effect in the theme to “Mission Impossible”. Tension is also reflected in the use of dynamic range, a facet not utilized in the earlier, bolder music tracks.

The chords move slowly against each other, adding layer after layer of voice, mainly focusing on the angelic soprano lines and alto lines. Despite the sinister nature of Baster and Reana’s predicament, the usual inclusion of sinister bass notes is avoided throughout the piece. For the first time in the game, the “stone-like object” begins to engage with the player.[Figure 222]183

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It becomes obvious now that this is more than just an object - this is actually God. Even though the intensity of the in-game action is at its highest during these last encounters, the music still maintains this mood. This is because the last few sections of the game are not focused on the stone-like object’s need to destroy the player, but rather are intended as a series of divine trials to establish if humanity deserves another chance. These trials are visualized in a succession of “boss” encounters where the stone-like object takes on various semi-biological forms. The culmination of these barrages is the personification of the stone-like object in the form of “Xiga” [Figure 223].

The basic layered chordal structure continues underneath this relentless barrage and its repetitive nature dissolves into the background as the player focuses on the relentless barrages of Xiga. The text “be praying” in the engagement strategy sections signifies the monolithic nature of this encounter. Yet, the music continues in the same, humbling, divine way. It is also important to note that the Red-Book track of this on the actual CD features heavy usage of reverb, to give an emphasis of space. One can also note the connotations of reverb and choir, suggesting the space of a cathedral or other “hallowed” ground.

The destruction of Xiga exposes the stone-like object for the last time and unleashes the final divine trial: to survive for 60 seconds as the stone like object unleashes the most furious and complex barrages in the entire game [Figure 225]. The player is thrust back 100,000 years as if the stone-like object had already made up his mind: humanity

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was not worthy. The soundtrack changes again to the track “Karma”. Utilizing the same juxtaposition as explored in the previous section, the player is made to feel humbled by the music. The melody’s slow, predictable movement provides the pulse for the player’s own “Zen-like” state. To defeat this last divine trial requires the player to flow like water between its barrages and most importantly remain calm, a sentiment embodied in the affect of this piece of music.

The calm nature of “Karma” is reflected in its smooth, melodic lines, played by a section of violins. This melodic line accompanied by a sparse chordal section is very smooth in contour and follows an ascending motion as it progresses through the phrase. The melody is beautiful yet sad, as if preparing the player for what is about to happen. During this final trial, Japanese voices are heard in the background. A male and a female voice have the following interchange of dialogue.

**Man**: “This world's 11th born son holds silver guns and shoots the souls of the people”.

(A moment after this is said, a gunshot is heard)

**Woman**: “Please, don't give up”.

**Man**: “You stupid bastard…”

**Man**: “People stand up! This world is something that God has given us”.

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Footnote:

Man: "Are you crazy? Do you understand what you're doing?"
Man: "Wha, what are you doing?"
Man: "Let's hold on to our dreams, our day will certainly come".
Man: "Just look at this wasted Earth. It's our punishment from the heavens".
Man: "Kill!! Exterminate them!!"
Man: "We can't stop war. War is what's right for both of us..".
Woman: "Please, don't give up".
Man: "There are no hopes or dreams here..."
Man: "The vegetation of the past is gone".
Woman: "Don't give up".
Man: "Just look at this wasted Earth. It's our punishment from the heavens".
Man: "Let's hold on to our dreams, our day will certainly come"
Woman: "Don't go up".
Man: "I had a dream, but I wonder why".
Man: "From now on, politics cantered on people will be necessary..."
Man: "Large scale world war has become something we can't avoid".
Man: "We have to reconsider this one more time. Everyone should understand".
Man: "The dice has been thrown. Now no one can stop it".
Man: "Society is undergoing changes...but there's one thing that won't change".
Woman: "Don't give up".
Man: "My dream is...in space".
Woman: "Do you, love me?"

If the player manages to survive this final trial the womanly voice asks “do you love me?”, and as these words are heard the stone-like object begins to explode (Figure 226).
The Silvergun is engulfed in a field of white light, until the screen completely becomes saturated. The game then seamlessly moves to an FMV action sequence, depicting Baster and Reana trying to outrun the shockwave (Figure 226).

Amidst the chaos, there is a brief section of dialogue between the two, which can only be found in the “Omake” (Figure 227).

The white light of the explosion eventually engulfs both Reana and Baster in an epic ending. There is a similar juxtaposition in sound and visuals also as the same sparse choir lines accompany hectic visuals. This section of FMV ends just as quickly as it (Figure 227).

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189 Many Sega Saturn discs contained a folder entitled “Omake” or “Extra”. These files can be read in a regular PC-CD Rom drive. In the case of Radiant Silvergun, the original Japanese script can be found.
began leaving the player once again to momentarily face a blank screen. The momentary blackness is alleviated by music and one solitary screen [Figure 228].

Panning around the horizon, a green luscious earth is depicted. Amidst the greenery are the decaying ruins of the world that Baster and Reana belonged to. The stone-like object is also seen, serenely depicted with moss and earth upon it [Figure 229]. It is at this point in time that the player realises that Baster and Reana did not survive their final encounter with God, yet there is hope. The third melodic theme from the track “Evasion” is played again in the accompanying music “Feel Visible Matter”. The agitato lines of the original melody are replaced with a more legato feel as this melody is repeated by French horns at a much slower tempo.

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After the camera pans around the horizon, it finds the entrance to a tunnel way (Figure 230). The camera moves slowly along this derelict tunnel way until we are presented with an image of the Creator, weathered by time and sitting in front of battle and time worn computer. The Creator, its voice quivering and verging on failure says the following lines, each word halted by an abrupt pause.

\[\text{The Creator: THIS. FATE. HAS. BEEN. SEALED. FROM. THE. BEGINNING....} \]
\[\text{SO., IT. HAS. BEEN. REPEATED. OVER. AND. OVER. A. COUNTLESS. NUMBER. OF. TIMES. ...THE. ONLY. THING. I. CAN. DO. IS. REVIVE. HUMANKIND., EXACTLY. LIKE. IT. HAS. BEEN. DONE. SO. MANY. TIMES. BEFORE....} \]

The music begins to swell in volume as the situation become apparent: the Creator has selflessly used its remaining power to save mankind. Using DNA taken from Baster and
Reana, the aptly named Creator creates two clones in their image. Sequences of a human egg being fertilized are seen as the derelict computer system, on the verge of breaking down, forms the clones. More layers of instruments are added and the volume begins to swell further. String lines swell in the background as the origins of the stone-like object are explained. The tension induced in the middle of the song via staccato string rhythms and subtle dissonance is resolved by a brief silence, then the choir lines of “Karma” also make a return in this section, forming the “holy” theme for the stone like object. The creator is heard narrating this sequence:

THE. STONE-LIKE. IS. THE. GUARDIAN. OF. PLANET. EARTH. IT. IS. THE. PLANET. EARTH. IT. IS. THE. ONE. THAT. GUIDES. EVERY. LIVING. BEING. IN. THIS. WORLD....

IT. WILL. SOONLY. TAKE. A. LONG. TIME. BEFORE. HUMANKIND. EVOLVES. ONCE. AGAIN., LEADING. THE. SAME. LIVES. WITHOUT. CONSIDERING. THE. CONSEQUENCES....

The creator, clearly at the end of its life, oversees the final moments of the cloning process. As it speaks its final words, its voice becomes slower and more erratic. Its once luminous green eyes are full of noise and faint, its body tattered and rusted slumps in front of the cloning machine. Its final words are spoken:

...BUT. I. PRAY. THAT. HUMANKIND. WILL. SOMEDAY. REALIZE. THIS. BEFORE. THEY. COMMIT. THE. SAME. MISTAKES. O.N...C.E... A...G.A...I.N...

As these final words are spoken, the Creator’s eyes fade into blackness and its body comes crashing to the ground where it breaks apart (Figure 229). The theme taken from “Karma” is then replaced again with the melodic section of “Evasion”. The music however is not sad; this is a moment of beauty and promise. The lyrical melody continues to swell in intensity as yet more layers thicken this once doubtful and delicate

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melody. There is due reason for this: as the Creator passes, the clones of Reana and Baster in their tubes awaken for the first time; the cycle is complete, humankind gets another chance. 

It is at this point in time that the music reaches its final crescendo, which it has been consistently building towards for the entire three minutes of this final FMV sequence. Bold timpani hits and cymbal crashes add light and certainty to the melody; no words need be spoken, the imagery and music form culturally transcendent meaning for the player and herein lays the success of Radiant Silvergun. At the time of Radiant Silvergun’s release, both reviewers in the West and Japan praised the game. Despite the
game relying heavily on narrative, it managed to transcend time and culture. The subsequent listing of this game on the Shmups.com top twenty and the prices the game demands in the Western marketplace are evidence of this and testament to what well-developed visuals and music can achieve. The player is left feeling rewarded and given a sense of achievement after conquering Radiant Silvergun. Not only this, but an exemplary narrative is nothing without having gameplay that compels the player to explore and develop their skills. It is with this in mind, that one must evaluate the mechanics of Radiant Silvergun with consideration to flow, and contrast it with its contemporary peers in Period Three.

**Radiant Silvergun Mechanics: Fighting Games**

Radiant Silvergun’s release in 1998 comes amidst some of the most recognizable fighting games to be released. *Jojo’s Bizarre Adventure* (Capcom), *King of Fighters 98* (SNK), *Marvel vs. Capcom* (Capcom), *Street Fighter Zero 3* (Capcom) and *Soul Calibur* (Namco) are some of the most iconic names in the fighting genre and all were released into arcades in the same year as Radiant Silvergun. 1998 was the year when the mix of fighters and Shmups in the arcade reached parity, with twelve fighting games released as opposed to eleven Shmups.

Although 1998 was host to a number of different types of fighting games, there were a few common elements across all. Extensive theming in aesthetics and core game mechanics, is a unifying feature of all fighting games released in 1998. Unlike earlier games in the genre, nearly all fighting titles released in 1998 emphasised a particular core mechanic. *Street Fighter Alpha 3* focused on adaptive input customisation via the X-ism, V-ism, A-ism’s. *Soul Calibur* emphasised weapons based combat. Even the unlikely combination of *Marvel vs. Capcom* had a highly coherent and well balanced brawl mechanic, which seamlessly combined two unlikely franchises.

Another commonality across all the fighting games of 1998 was the emphasis on chain mechanics as discussed in relation to DoDonPachi and the Danmaku sub-genre of Shmups. Chaining is a system which emphasis game flow by rewarding the player for stringing together a number of complimentary inputs. In fact, this era of fighting games laid the ground work for the famous parrying and juggling systems which were later used in the zeitgeist fighting game *Street Fighter 3: Third Strike* and have become a standardisation of the genre.
Despite the obvious differences between the two genres, fighting games had drawn many influences from Shmups, particular when considering the type of ADSR curves employed by the control schemes in both genres. Both Shmups and fighters use tight, precise and responsive ADSR curves. In both genres, small bursts of precise, well-timed movement are required and this type of ADSR curve offers twitch-based movement over the slower, lag movement that is characterised by slower attack and release times.

Although there are some clear commonalities, fighters differ greatly from Shmups in player input because of the way in which joystick movements are often punctuated by button presses. An example of this is the Iconic ‘Haduken’ of Ryu from *Street Fighter*, which is a quarter circle motion, punctuated at the end by pressing the punch button.

![Figure 233](http://technabob.com/blog/wp-content/uploads/2009/08/street_fighter_4_strapya_moves.jpg)

A quick glance at most fighters indicates the same usage of joystick movement, punctuated by button presses. This varies greatly from Shmups, where the button input is always used at the same time as the joystick movement giving the

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mood of a continuously flowing interaction between player and software. On the surface, this may sound like an effective way to allow for player empowerment via freedom of movement, however it often comes at the expense of player education.

Figure 234

Ryu’s ‘Haduken’ is an example of a batched command. In Cook’s (2005) explanation of player skill atoms, for the player to be able to perform this move, they would need to “batch” or combine previously learnt skills – movement and punch. Continuing this line of thought, the ‘Metsu – Haduken’ [Figure 234] is a batched command that combines the skills learnt in the Haduken into a more complex form. In the majority of fighters, a batched command triggers an individual on-screen sequence, but only after a number of commands are successfully completed by the player. The vast majority of Shmups do not use batched commands, however Radiant Silvergun was the first to use batched button inputs for weapon control [Figure 235] is taken from the tutorial screen of Radiant Silvergun and demonstrates how batched commands are used in the game to account for lack of independent buttons. Not only do the batched commands in Radiant Silvergun work as a means of control optimisation, but they also serve the same game play mechanism that super moves do. In both Fighters and Radiant Silvergun, the batched commands must be applied at specific times, under specific circumstances to be effective. In both Radiant Silvergun and fighters, when used correctly, strong powerful movements can be employed by the player, which acts as a sign of domination and mastery of the virtual space.

196 [Figure 235] Radiant Silvergun Tutorial Screen. Adapted from Radiant Silvergun. Copyright by Treasure, 1999. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
There is, however, a downside to the freedom of movement offered in not just *Radiant Silvergun* but all Shmups. In a fighting game, a batched command such as Ryu’s Haduken is a marker of player skill. The player knows that no matter what, if they perform that combination of input then it will always result in a predictable movement by their on-screen avatar. Batched commands as used in fighters offer novice players small incremental steps on which they can gain incremental feedback and subsequently use these as skill check points (or Atoms) to help move to more powerful batched commands. Shmups offer no incremental checkpoints for player input other than figuring out what buttons do what action. Although a Shmup player may be presented by an on-screen enemy, there is no real right or wrong way in terms of player input on how to deal with that situation, nor is there a guarantee that if the player encounters the same situation again, the previously used controller input will have the same effect. The same analogy can be made to game development itself; a product which receives incremental testing and feedback is far more likely to succeed than a game which is tested as a whole at the end of production.

Another analogy stems from player psychology. People like rules and boundaries as they offer valuable feedback that informs an individual’s reality principle – the construct of right and wrong which acts to provide appropriate levels of behaviour. The batched commands as used in Fighters offer immediate feedback for very small, micro sections of gameplay, quickly telling the player if their chosen approach is effective or not. In Shmups, where considerable time can go by between batched command and feedback, it becomes hard for the player to trace back to the ineffective steps that they might have taken.

**Radiant Silvergun Mechanics: The Puzzle-em-up**

The puzzle elements, level geometry and compressive elements in *Radiant Silvergun* are all designed to complement the complex weaponry system. As seen earlier, the sheer
number of weapons used in *Radiant Silvergun* might initially seem as overkill, however when we consider that one aspect of *Radiant Silvergun* is about mastery of batched commands, then we can see that these weapons allow for enemy engagement on all vectors, not just the primary vector that is so common in other Shmups. What this means for the player is that if they have mastered the use of these batched commands, then they can make long, powerful, sweeping movements over the playfield as each different type of weapon in *Radiant Silvergun* will help to clear any vectors around the ship that the player may wish to move along.

![Diagram](image)

*Figure 236*

*Figure 237* demonstrates the impact that multiple player attack vectors have on the way a level can be designed and implemented. *Radiant Silvergun* was one of the first games to allow enemy placement and subsequent attacks to occur at 90 and 270 degrees respectively, opposite to the player’s primary axis. What is also interesting about *Radiant Silvergun*’s batched commands is how weapon ability relates to the complexity of the batch command. For example, primary fire along the primary axis only requires one button. For the player to fire in the opposite direction of the primary axis (Vulcan 2,
Figure 236 requires a more complex batched command as enemies approaching along this axis are less frequent, but more of a threat to the player.

**Radiant Silvergun Flow Analysis**

Further comparison can be drawn between *Radiant Silvergun*’s design and Csikszentmihalyi’s models of flow as discussed in the methodology. The following section looks at each of Csikszentmihalyi’s seven characteristics of flow in the context of the game.

As the player has such an arsenal available to them, it takes some time before they become familiar with how these weapons work and to what that they are best suited. *Radiant Silvergun* presents a challenging but tractable task, through staggering the enemies in such a way as to coach the player on how to use the weapons in progressively harder scenarios. Initially, enemies only attack from the front, hence only requiring the most basic of button combinations. As the game progresses, enemies

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19 [Figure 236] *Radiant Silvergun* Tutorial Screen. Adapted from *Radiant Silvergun*. Copyright by Treasure, 1999. Reprinted under the terms of “fair dealing” in the Australian Copyright Act, 1968, section 40.
begin to attack from obscure vectors, requiring the progressive use of different weapons and strategies.

Perfect concentration is partly invoked through the way in which the narrative is told. Instead of the player merely observing the action, they are involved directly in the narrative. They have orders screamed at them and they are forced to react to both visual and aural stimulus. That Radiant Silvergun never halts to load also helps to promote this illusion of immersion as the player must remain focused on the screen at all times.

Shmups provide immediate feedback in a number of ways, explosions and the sound of explosions appeal to our id, and subsequently the gamers’ narcissistic impulses and score mechanisms give an almost monetary reward for this behavior. More so, Radiant Silvergun gives the player more and more clues as to the story the more that they are able to progress into the game. It is important to remember in this regard that the narrative of Radiant Silvergun follows the Japanese tradition of “Scientific Deduction”, whereby the story is told as a mystery needing to be solved.

Full immersion in the task is very much the domain of the technology and programming behind Radiant Silvergun. Despite the game relying on the slow CD-Rom media platform, it is programmed in such a way that they action is never broken by loading times. Not only this, but there are no gaps in the narrative where the player can lose focus with the game world. The game is paced in such a way that if the player were to remove their gaze for just a few moments they would either be dead or have missed some visual stimulus. Music also plays a large role in this element of flow. In the case of Radiant Silvergun, the music is complementary to the visuals and does not draw the player’s focus solely towards the music through obtrusive melodies or rhythms.

Erikson’s theories of empowerment fit well with Csikszentmihalyi’s own explanation of the role of control in encouraging flow. Radiant Silvergun was one of the few Shmups of this particular era to not utilize power-ups, instead granting the player full access to the “ship’s” arsenal from the onset. Although the characters are portrayed as flawed heroes the Silverguns are not, representing the pinnacle of humankind’s scientific knowledge. Not only does Radiant Silvergun promote empowerment, but it also promotes the notion that without the player’s skill, the world will end. Although this can be seen as the premise for a great many Shmups, the importance of Radiant
Silvergun’s narrative brings this aspect to the forefront, hence making the player feel as if they are really making a difference.

This characteristic of loss of self-conscious is closely linked to “Full Immersion in the Task”, as the player must feel that they are totally immersed in the activity. This is harder to trace on an objective level in the contexts of Radiant Silvergun, however, the successful application of not only visual, but aural and tactile sensory information creates this phenomenon. The tactile interface of the Sega Saturn’s controller and the typical arcade control scheme is one that emphasizes accuracy of movement and connection with the game world. It is important that the control utilized by any game, whether it be Shmup or not, is intuitive and precise and an extension of the player’s body. Although Radiant Silvergun uses a myriad of weapons, its scheme of control is intuitive and requires minimal cognition from the player once learnt.

Transformation of time is also a tough criterion to address in words, but can be described as the successful culmination of various sensory inputs, an aspect which was discussed previously in some length. As this is a result of being in ‘the zone’ one might argue that as Radiant Silvergun successfully addresses all of Csikszentmihalyi’s previous criteria then the transformation of time is to be expected. From this analysis it might be inferred that Radiant Silvergun changes the perception of time in the gamer.

One of the main aspects that set Radiant Silvergun apart from other Shmups that focus on story line is the speed of delivery of the narrative. Music, visual and textual elements are seamlessly integrated, with no unintentional gaps induced by either poor storyboarding or technical factors. This is the embodiment of exemplary “flow” on a solely mechanical level and a considerable design challenge, considering that home consoles were restricted by the slow transfer rates of CD-Rom based storage. Radiant Silvergun is also a return to “retro”, and featured many of the design elements of Shmups from the late eighties and early nineties as opposed to more recent Shmups. These retro elements manifest themselves through several design factors. First, there is a return to defensive funnelling and background object compression. This is seen in the many tunnel-like levels within Radiant Silvergun and considering that vertical Shmups do not often use this mechanism, it is one of the many unique aspects of the game. Also making a return in Radiant Silvergun were futuristic and Western sci-fi themes. The years preceding the release of Radiant Silvergun had seen a change in emphasis with other Zeitgeist games.
such as *Raiden Fighters, Strikes 1945* and *19XX* all being focused on themes of “super war.” Studio Gonzo’s FMV sequences can also be attributed to having significant nostalgic value when one considers that their last major work to be translated into English was the acclaimed “Wings of Honneamise”, released in the West alongside venerable titles such as *Akira* and *Fist of the North Star.*

Another factor that sets *Radiant Silvergun* apart from its peers in Periods Three and Four is how it went against the Danmaku trend that Cave had instigated. This can be seen in the types of barrages used in *Radiant Silvergun* where a great many were still aimed fire rather than pattern based barrages. This is also a factor that causes a schism within the Shmups community, often dividing those who like Cave games against those who like *Radiant Silvergun* and the latter *Ikaruga*. The debate that surrounds this issue, whether for or against, is no doubt the reason why *Radiant Silvergun* maintains such a high presence not only within the Shmup community but also within the wider gaming community. Although highly contentious, this schism away from Danmaku and subsequent widespread popularity of *Radiant Silvergun* outside of conventional Shmup communities when compared to other Danmaku titles leads one to the opinion that *Radiant Silvergun* demonstrates some of the most culturally transcendent design features.

**Evaluating Period Three**

Table 4 contains sales data derived from VGChartz (2010B) and represents the highest selling games during Period Three. As with the data presented from VGChartz (2010A) as part of the Period Two evaluation, the data in Table 4 offers some valuable insight into the desires of the home console market. Unlike the data from Period Two, Period Three has much more diversity in terms of the software that consumers were drawn to. There is still an emphasis on narrative-driven or exploration type games, however two arcade fighters made it into this chart, which is testament to the increased popularity in the genre during Period Two.

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198 “Super War” is a theme utilized in Shmups that heavily embellishes real world conflicts with over the top enemies, villains and technology. Many of the visemes seen within these type of Shmup feature indefinable avatars, but with offensive capabilities far outstripping the era in which they were made.

199 To prove this point is highly troublesome, but through observation of many gaming forums, not only those concerned with Shmups, it does seem that *Radiant Silvergun* is one of the most known games of the genre. A quick experiment entering the key words “Radiant Silvergun” into Google turned up 238,000 hits, whilst the highly popular Danmaku Shmup DoDonPachi when entered into Google only brought up 30,900 hits.
Games such as *Metal Gear Solid*, *Resident Evil*, *Gran Turismo* and *Goldeneye* in this sales chart also seems to suggest that the gamers who played the likes of the more pre-teen focused Nintendo games from Period Two are now beginning to grow up with games and play more adult-like titles. This table also demonstrates that developers are also developing games for an aging gaming population, thus demonstrating how changing end user desire eventually informs development trends.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Game</th>
<th>Developer</th>
<th>Platform</th>
<th>Release</th>
<th>Unit Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pokemon Red/Green/Blue</td>
<td>Nintendo</td>
<td>GB</td>
<td>Feb-96</td>
<td>~23.50m</td>
</tr>
<tr>
<td>2</td>
<td>Super Mario 64</td>
<td>Nintendo</td>
<td>N64</td>
<td>Jun-96</td>
<td>10.70m</td>
</tr>
<tr>
<td>3</td>
<td>Final Fantasy VII</td>
<td>Square</td>
<td>PS1</td>
<td>Jan-97</td>
<td>9.25m</td>
</tr>
<tr>
<td>4</td>
<td>Gran Turismo</td>
<td>Sony</td>
<td>PS1</td>
<td>Dec-97</td>
<td>8.60m</td>
</tr>
<tr>
<td>5</td>
<td>Mario Kart 64</td>
<td>Nintendo</td>
<td>N64</td>
<td>Dec-96</td>
<td>8.50m</td>
</tr>
<tr>
<td>6</td>
<td>The Legend of Zelda: OoT</td>
<td>Nintendo</td>
<td>N64</td>
<td>Nov-98</td>
<td>7.10m</td>
</tr>
<tr>
<td>7</td>
<td>Crash Bandicoot 2</td>
<td>Sony</td>
<td>PS1</td>
<td>Oct-97</td>
<td>7.00m</td>
</tr>
<tr>
<td>8</td>
<td>Crash Bandicoot</td>
<td>Sony</td>
<td>PS1</td>
<td>Sep-96</td>
<td>6.80m</td>
</tr>
<tr>
<td>9</td>
<td>Goldeneye 007</td>
<td>Nintendo</td>
<td>N64</td>
<td>Aug-97</td>
<td>6.75m</td>
</tr>
<tr>
<td>10</td>
<td>Final Fantasy VIII</td>
<td>Square</td>
<td>PS1</td>
<td>Feb-99</td>
<td>6.00m</td>
</tr>
<tr>
<td>11</td>
<td>Tekken 3</td>
<td>Namco</td>
<td>PS1</td>
<td>Mar-98</td>
<td>5.70m</td>
</tr>
<tr>
<td>12</td>
<td>Crash Bandicoot 3</td>
<td>Sony</td>
<td>PS1</td>
<td>Oct-98</td>
<td>5.50m</td>
</tr>
<tr>
<td>13</td>
<td>Tekken 2</td>
<td>Namco</td>
<td>PS1</td>
<td>Mar-96</td>
<td>5.45m</td>
</tr>
<tr>
<td>14</td>
<td>Donkey Kong Country 2</td>
<td>Nintendo</td>
<td>SNES</td>
<td>Nov-95</td>
<td>5.15m</td>
</tr>
<tr>
<td>15</td>
<td>Pokemon Gold/Silver</td>
<td>Nintendo</td>
<td>GB</td>
<td>Nov-99</td>
<td>5.09m</td>
</tr>
<tr>
<td>16</td>
<td>Resident Evil</td>
<td>Capcom</td>
<td>PS1</td>
<td>Mar-96</td>
<td>5.05m</td>
</tr>
<tr>
<td>17</td>
<td>Metal Gear Solid</td>
<td>Konami</td>
<td>PS1</td>
<td>Sep-98</td>
<td>5.00m</td>
</tr>
<tr>
<td>18</td>
<td>Spyro the Dragon</td>
<td>Sony</td>
<td>PS1</td>
<td>Sep-98</td>
<td>4.65m</td>
</tr>
<tr>
<td>19</td>
<td>Gran Turismo 2</td>
<td>Sony</td>
<td>PS1</td>
<td>Jan-99</td>
<td>4.50m</td>
</tr>
<tr>
<td>20</td>
<td>Diddy Kong Racing</td>
<td>Nintendo</td>
<td>N64</td>
<td>Nov-97</td>
<td>4.50m</td>
</tr>
</tbody>
</table>

Table 4

As per Table 3, which is presented in the evaluation of Period Two, the above table does not represent all of the singular and influential games of Period Three. Other notable titles that did not make it into this list as generated by VGChartz (2010B) due to multiplatform release are *Tomb Raider II* (1997), *Half Life* (1998), *Tomb Raider* (1996)
and *Star Craft* (1998). The following summary of the design heuristics will attempt to cover more of these titles in relation to the Shmup case studies.

**Period Three: Empowerment**

A “sand box” environment is a term for a type of game in which the player is able to roam the game world freely and choose their own play experience, with little or no linear structure. The best examples of games with a sandbox approach are some RPGs and Japanese RPGs (JRPGs), however a linear narrative structure often meant that the player did not truly have free choice, but rather the illusion of free choice. *Grand Theft Auto* (1997) was one of the first games to bring the sand box design approach into a more contemporary, popular culture context. Although sandbox games had existed for quite some time, *Grand Theft Auto* is unique as it had a non-linear structure and no real hardcoded narrative that the player was forced to play though. This type of environment led to emotions of ownership and empowerment and it also had very strong exploration and mystery component, as there were so many Easter-eggs in the game.

Non-linear game experiences, particularly hub and spoke type games, were popular during Period Three as seen in the sales figures from Table 4 although many linear, narrative-based games such as *Metal Gear Solid* also proved popular. In all games in Table 4 there was a strong emphasis on allowing empowerment via macro and micro management, or empowerment which stems from the game world having similarities to the real world. In this regard, these games fit with Swink’s (2009) model of empowerment, specifically, the aesthetic sensation of control and extension of identity.

It is in this definition of empowerment that Shmups of Period Three do not offer a suitable experience for the player. Although elements of macro management had been popular for Shmups in Period Two, they were strangely lacking from those in Period Three, despite these systems being popular in the other effective games of the time. One aspect of empowerment that Shmups of this era did well with was in appealing to the hedonistic desires of the player’s id. As an extension on the hedonistic style of game

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200 Although VGChartz (2010A) offers no explanation for the omission of these titles, it can be assumed that the fact that these titles were multi-platform which meant that they did not make it into the console only statistics for VGChartz (2010). *Tomb Raider* sold 7m units, *Tomb Raider II*, 8m units, *Star Craft*, 9.5m units and *Half Life* with 8m units.

201 Easter-eggs are hidden, in-game elements made by the games developers, such as hidden messages or items which would not normally be found in the game. Easter-eggs generally surv no game play purpose. Some Easter-eggs are even hidden during production process and only later found by gamers.
play that was introduced by *Raiden* in Period One, the games successors in Period Three *Raiden DX, Raiden Fighters*, all put the player on the offensive by putting them up against hordes of plebe type enemies, which offer minimal resistance.

*Raiden Fighters* uses a careful interplay between risk and reward to make the player seem as if they are under significant threat, however due to the over-powerful nature of the player’s avatar, the risk was actually negligible. This sets *Raiden Fighters* apart from its peers by making the game less about survival and more about score-based domination modes, which is quite empowering for the player as they are in control of what is essentially a one man army. As per its predecessors, *Raiden Fighters* also uses the same embellished explosion systems that make the game world look as if the player is wreaking absolute havoc. This style of play mode is similar to the score attack modes used in the 1990 release of *Super Star Soldier*, in which the game was less about survival and more about score domination [*Figure 238*].

This type of score-based domination mode was not really seen in many other games from this period of time. One reason was due to the emphasis on more narrative-driven games, with slower game mechanics more suited to the home console and computer markets. It is here where *Raiden Fighters* stands out.

**Period Three: Flow**

For the home console market especially, creating a sense of flow was always going to be hampered by the optical storage mediums that where preferred by Sega and Sony. The home PC market also suffered from this issue but to a lesser degree due to their

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All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

superior (and more expensive) technologies. For this reason, creating a seamless flow of narrative and game play experience proved quite problematic, especially when considering the emphasis placed on FMV events, which needed to be displayed and loaded separately to the regular game play. FMV was also problematic as it created a level of visual fidelity contrast that was distracting for the player. FMV was always noticeably better than the in-game graphics and hence the transition from game play to FMV was far more obvious.

Radiant Silvergun was quite effective at being able to create a well-implemented sense of flow and generated much discussion about how it achieved this end result. What isn’t as obvious from this discussion is that for this sense of flow to work, the player needs to demonstrate an ever-increasing level of skill and mastery as the game progresses. It is naive to think that all gamers could achieve this state, therefore the method of creating flow as seen in Radiant Silvergun is not applicable to all gamers. Although Radiant Silvergun, DoDonPachi, Raiden and Street Fighter 3: Third Strike are skill intensive games, devoid of any type of grind mechanic, there exists a potential for strong feeling of flow, particularly for skilled players.

One of the more notable concepts encountered during this period in relation to flow is what I believe to be a unique and currently unexplored facet of flow. This type of flow is created by a logical series of inter-related emotional responses, usually driven forward by an underlying emotion of tension. Players had become so used to the standardisations used in games that they were used to a series of normal emotional responses that followed each other: tension is followed by elements of relief, and risk is followed by a sense of reward. Metal Gear Solid, Resident Evil and the Zelda: OOT are all games relying on some type of linear structure, or extended set pieces in the narrative and game play, which are used to convey dramatic tension. As these games have large portions of pre-scripted content, the designers have been mindful about creating tense scenarios, as to the player, tension leads to the emotion of relief, and in relief, they are rewarded. What is fascinating about this emotional flow state is nearly all players will endure these excessively tense moments simply on the expectation (through existing standardization) that they will be rewarded for their actions. Shmups other than Radiant Silvergun did not achieve effective emotional flow as the play experience can be described mostly as tense, with relief only coming via death or very small interludes.
between levels. On an emotional level, Shmups during this period were found to be poorly paced.

**Period Three: Instant feedback**

For the purposes of the evaluation of Period Three, instant feedback will be discussed in relation to the next heuristic “Bring the Player to Action”. The reason for this is that during Period Three, feedback became essential in order to bring the player to action, more than had been seen in any previous period of analysis. One of the key reasons for this combined approach is that technology allowed for more adaptive play experiences, hence feedback became an important facet of causing the player to act in certain ways.

**Period Three: Bring the Player to Action**

Following the emphasis on personification and creating relatable experiences that epitomized Period Two, Period Three developed an approach to game design that addressed some of the issues previously encountered in regards to the feedback heuristic during Period Two. Discussed at length in regard to Period Two was the concept of telegraphing. To recap the earlier discussion, telegraphing during Period Two was avoided in “realistic” games as developers, in an attempt to embellish the sense of realism, did not use the technique as telegraphing doesn’t happen in real life. The problem with this approach is that real life is not fun, real life is not designed to be beaten or to be fair. Despite this, nearly all developers during this period utilized extensive and sometime “unrealistic” telegraphing systems into their games, even though for many, realism was a concern.

Telegraphing techniques commonly employed during this period included the use of extensive animation in human like-NPCs, motion capture techniques to create easily recognizable body language and even over the top, graphical embellishments such as those seen in *Street Fighter 3: Third Strike*. Telegraphing was an important element in bringing the player to action during Period Three as many games during this period can be described as adaptive experiences. An adaptive experience in the contexts of gaming is one that relies less on predefined events and scenarios, and more on creating the sense of realistic intelligence and malleability on the behalf of the software. Not only did this approach create better feedback systems and also compel the player to act, it also gave the player ownership of their experience and allowed them find identity within the game as they could now see games more as a relatable, real life type of experience. Game
elements in realistic games began to show adaptive behaviours similar to that seen in real life.

Non-diegetic telegraphing also became popular during this period and was popularized by games such as *Metal Gear Solid* [Figure 239](#) which used extensive situational awareness and a cinematic approach to game aesthetics and player viewpoint, all of which intended to create strong, relatable aesthetic themes which could be used not only to help telegraphing but also to bring the player to action.

![Image removed due to copyright](image)

*Figure 239*

Narrative during Period Three was also an important part of compelling the player to act, as seen in *Radiant Silvergun*. As narrative had become an important element in compelling the player to act, the player’s actions needed to be embodied in the narrative. As mentioned earlier, a characteristic of this period was adaptive feedback, and this was also extended to the hard-coded narrative. Games such as *Resident Evil* and *Silent Hill* used this adaptive approach to compel the player to act in certain ways. Morality and skillfulness in these games were all rewarded with a different ending that compelled the player to explore different emotional pathways through the game. This approach to adaptive narrative compelling the player to act was first seen in *Chrono Trigger* (1995), which was released late in the Super Nintendo’s life span. This mechanism of compelling the player to act in different ways and hence, experience different emotional relationships with the software is something that Shmups were never able to achieve, then or now. The mechanism would later go on to become a significant contribution to game mechanics as it promoted replayability without the need for developers to add significant amounts of extra content to the game.

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20*Figure 239* *Metal Gear Solid*. Adapted from *Metal Gear Solid*. Copyright by Konami, 1998. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Period Three: Education

Kinetic visemes were found to be a highly effective means of training certain players, especially the kinetic visemes used in the case of DoDonPachi. The issue with this covert system is that it does not use any type of blocker to prohibit the player from continuing if they do not successfully decipher the intuitive player education system. Although this system, when correctly understood by the player, can result in high levels of ownership and empowerment, it is not guaranteed to work in all cases, as there is no blocking mechanism in place.

Other games of the time also use kinetic visemes, coupled with more traditional visemes to aid in player education. Games such as Half Life used the player’s relationship with the virtual space to help develop the player’s skill set. A good example of this is in the opening sequence of the game where the player is prohibited from moving their body whilst in the sky car, instead forced to use the mouse controls to figure out the cause and effect relationship before being allowed to move their body. The environment acts as a logical blocker which gives the control restriction imposed a logical reason for existing: “the sky car is too small to move in, but I can look around”. This approach to player education gives the player ownership over their play experience, just as in the example of DoDonPachi, however there is a distinction between the two. In DoDonPachi, the player is taught not the control scheme, but rather the means by which to strategically approach the game. Half Life’s approach is initially purely a movement-based system. The player’s desire to be taught in a covert way is apparent in both examples, however, the player’s expectations based on past experience is the point of difference: players had come to expect education systems which first cover movement, not movement and strategy. In the case of Cook’s 2005 skill atom system, the approach used by DoDonPachi is trying to teach too many things, too soon. Although it can be easily argued that under specific play experiences it does in fact teach base skills first, as there are no logical blockers at play, there is no way to guarantee that gamers will be educated from this particular experience. Another facet that this comparison demonstrates is that players carry certain expectations with them in regards to the way that games should teach them, whether they are conscious of this or not.

Period Three: Challenge and Reward

As narrative had become an important factor of many console and computer games of this time, it was used extensively as a player reward system: complete the task and then
be presented more of the story. In this regard, narrative can be seen as reward, due to the emotional stimulus that it provides the player. As narrative is reward, it must be counterbalanced by more negative emotions such as tension, fear, frustration, and fiero. What can be observed from this relationship is a duality in emotional game design whereby the game portions (interactive sections) act to convey mainly negative emotions, whilst the narrative interludes act to counterbalance this by providing more positive emotions. In games such as Resident Evil, awe and mystery is conveyed in the game play sections and also in the narrative interludes. These interludes often bring resolution as reward for the player’s actions, before then introducing some new mysterious element, which then causes the player to act further. This also demonstrates the difficulty in portraying tension through narrative alone. Resident Evil provides highly tense moments for the player, but these only occur during the game play portions of the game. This seems to suggest that tension is an emotion which needs to be experienced rather than observed in order to be most effective. Another point that this demonstrates is the need for tension in games, as it acts as a way of adding more perceived value to the narrative interludes.

Shmups are an interesting conundrum when the same approach is applied. Shmups during the period rarely used extensive narrative interludes, yet the tension level during game play can be described as extremely high. This therefore begs the question of where does the reward, ergo emotional counterbalance lie? The answer to this is that tension in Shmups during this period could only really be alleviated by expert players, who were able to create their own relief in the game play sections. The emotional reward offered by these Shmups to expert players was found to be similar to other periods studied – indulging the hedonistic urges of the id. Although considered negative type emotions, schadenfreude, fiero, naches, rebelliousness and immorality were all offered to experienced players via the Shmups studied during this period. These emotional responses can be evaluated based on kinetic viseme analysis of super-play videos of the time. Expert players can be observed to dominate the on-screen object relationships which can result in strong subconscious sensations, in line with the examples discussed in Chapter Three.

**Period Three: Immersion**
When considering the methodological approach for evaluating this heuristic as developed by Ermi and Mäyrä (2005), it is difficult to find a better example than Valve’s 1998 game Half Life. Half Life was a mixture of adventure, narrative and FPS
that had never been successfully implemented by its predecessors such as *Hexen* (1997) and *Heretic* (1994). Whereas *Hexen* and *Heretic* used fantasy settings, *Half Life* placed the game narrative within the realms of possibility, putting the player into a world reminiscent of the present day and with a protagonist who was meek and humble, thus giving the game the possibility to match existing conventions and expectations in a way that the fantasy games could not.

Further to this, *Half Life* gave the gamer the impression that they were not simply undertaking a progression of structured, linear levels but rather partaking in an adventure of their own choosing in a seemingly, open-ended and massive world. Due to the similarities between *Half Life* and the contemporary world, and the richness of its graphical and aural presentation, *Half Life* presented a gaming experience that was high in immersive qualities. In a way, *Half Life* was almost a nostalgic throwback to the seemingly open-ended text adventure genre and even the graphic adventure games of Sierra such as *Police Quest*. Although *Half Life* was primarily narrative-driven, it did not lack a sense of competition based immersion as the AI presented in the game not only looked like that of another human opponent, but also acted like another human player, allowing for emotions such as frustration, empowerment and importantly schadenfreude.

Competition-based immersion, however, was more troublesome for players during this period, especially when evaluating arcade games. In particular, the Shmup and Fighting genres had become more of a hardcore gaming experience and subsequently favoured this demographic, creating a significantly high entry barrier which could only be avoided if you had been following the genres for a long period of time. The indirect PvP created by *DoDonPachi* is a good example of this. Despite the game having a very effective kinetic training system, later levels of the game were so incredibly difficult that only the most seasoned players could finish the game. Although twitch mechanics were favoured by *DoDonPachi*, significant memorization of enemy barrages and movement patterns was a requirement in order to finish the game. The Danmaku genre shifted Shmups away from twitch mechanics to memorization mechanics and subsequently created a different type of gaming experience.

Direct PvP as seen in games such as *Street Fighter 3 Third Strike* were also hampered by high entry barriers that appealed the hardcore minority, rather than the casual
majority. Although this type of approach to game design was the best at creating challenge based immersion, it was deficient in the other areas as outlined by Ermi and Mäyrä (2005) partly due to the abstraction in both graphics and input mechanisms, when compared to the more ‘realistic’ experiences as offered by the FPS genre, namely *Half Life*.

**Period Three: Contemporary Coding**
3D technology had created a significant impact on the desires of gamers during Period Two and Three and as such had become a highly desirable means of representing the game world. When considering the importance of the 3D representations of game worlds, it is important to consider the significance of this technology at the time. 3D technology had been available for years preceding Period Three, but never widely available in the home market. Marketing campaigns of the time were also to blame as the battle for home console supremacy was fought primarily on the basis of who had the most powerful hardware set. (Figure 240)²⁰⁴

![Image removed due to copyright](image.png)

**Figure 240**

**Period Three: Familiarity**
One of the characteristics of Period Three was a trend by developers to adapt existing intellectual properties for the new line of 3D home consoles. *Super Mario 64* is one of the best examples of this trend and one of the few “old” games to successfully make the transition and still remain true to the expectations of its user base. *Street Fighter, Sonic, Castlevania, Darius* and *R-Type* were but a few to make this transition with varying levels of success. The adaptation of old, familiar intellectual properties to the new wave of 3D consoles and game engines was a means of providing a familiar context, for a

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new and different type of visual representation style. *Castle Wolfenstein* as discussed in Period Two was one of the first games to be contemporized using this approach and was highly popular with gamers.

**Period Three: In Summary**

The predominance of CD-Rom based technology in the home and console markets and the weakening of the main-stream arcade market in the West is indicative of changing consumer desire during Period Three. Narrative was found to be an essential part of the desires of contemporary gamers as well as the presentation of well fleshed out secondary worlds. Despite the desire for narrative, game mechanics such as sweeping and clearing and wealth and accumulation were primary motivating factors, with narrative interludes being offered as reward for periods of anxiety. The games of Period Three are similar to their predecessors from a mechanical perspective, however the desire for highly developed secondary worlds was found to be a defining factor.

Despite the downturn in the arcade market, home consoles and computers enjoyed a diverse range of software with a number of notable arcade ports to these formats. Although consoles had developed a set of design expectations, native to themselves, there still existed a space for ports from other mediums to occupy. Although diversity was available in the market, it is apparent from the success of narrative-based games that the desires of the average player were beginning to shift away from the “mechanics-focused” arcade medium. One of the reasons behind this shift was the inaccessibility of the arcade medium, especially in relation to ever increasing levels of game difficulty that novice gamers felt intimidated by. Nevertheless, the arcade games of Period Three, both Shmups and other games, would later go on to be the ‘founding fathers’ of future demographics of hardcore gamers.
**Period Four: 2000-2005**

In Period Four, 3D technologies which were pioneered throughout the nineties had come of age. A new generation of powerful consoles was about to enter the market in the form of the Sony PS2 (1999), Microsoft Xbox (2002) and the Nintendo Gamecube (2001). As with every successive generation of home console gaming, this generation promised extensive graphical upgrades when compared to their aging siblings. The home computer market was also enjoying more advanced gaming technologies during this period. Ironically, the company that had created the 3D gaming boom in the home PC market: 3DFX, went into receivership in mid 2000, however it was quickly replaced by companies such as ATi and Nvidia, all of which offering significantly more powerful 3D accelerators than the 3DFX cards of the 1990s.

The arcade market proves very interesting in comparison. Arcade markets in the West went into what can only be referred to as the “Daytona recession”. *Daytona USA* (1993) set the measuring stick for all other arcade games to follow. In the eyes of arcade operators, *Daytona USA* was a guaranteed money earner and has been cited as being “the most profitable arcade racing series of all time” by Game Heroes (2008). What this created was a mentality by arcade operators that all future purchases needed to be evaluated on the basis of whether or not it could earn more money than *Daytona USA* and if it couldn’t they would just purchase another *Daytona USA* machine instead.

Where the arcade had always been a technological leader, Period Four represents a time of caution for arcade game developers. No longer did we see the costly and visually impressive machines of the early nineties, but instead arcade hardware developers like Sega made lower cost, adaptable systems and even moved away from solid state memory to optical mediums in order to make arcade development attractive for third parties. For the first time, Sega’s arcade hardware the Naomi was being developed on by old rivals such as Capcom and even Namco. With the introduction of the Naomi GD-Rom system in 2001, the Naomi platform became even more affordable for third party developers, which meant that smaller Shmup developers could finally make arcade games and be profitable at the same time. Unfortunately, the majority of these small Shmup developers were Japanese, which meant the majority of arcade Shmups during this time were not seen in Western arcades as these developers could not justify the expensive localization costs. Period Four also represents a period in time for Shmup
development where companies such as Cave created some of the most hardcore Danmaku style Shmups ever seen, boasting extreme levels of difficulty.

One clear distinction between the games seen in Period Three from those of Period Four is the level of graphical fidelity that the new generation of consoles offered. Graphical updates had always been significant between generations of consoles, however the introduction of real-time dynamic lighting created a distinctly more realistic type of gaming experience. One way to objective analyse this transition is by looking at simple colour histograms.

**Period Four: Colour Saturation and Reality**

Shmup development during the nineties was not only split into three dimensional and two- dimensional experimentation, but colour experimentation also. Shmups during this period can be defined by examining two traits of colour: Saturation and Hue. Despite its colour, normal light will have components of all spectrums of light mixed in with it. As such, natural light will be less intense throughout the colour range and as a consequence can seem washed out when compared to the high intensity of saturated light. Saturated light is a highly pure type of light. Unlike realistic light, saturated light will contain less surrounding spectrums of light. Figure 241 is a spectral analysis of a blue light under natural conditions. As such, this blue light is composed not only of wavelengths of blue light, but to a lesser extent wavelengths of the surrounding colours.

![Figure 241](image)

Figure 241

Figure 242 on the other hand is an example of unnatural saturated blue light. This is a highly pure form of blue light and as such contains only wavelengths of blue light.
Table 5 demonstrates saturation and its affect on the appearance of images. On the left hand side of Table 5 is the un-modified image. However, the figure on the right of Table 5 is the same image with maximum saturation applied. Viewing the associated histograms of both images reveals some interesting facts. The saturated image, which appears to be less realistic when compared to its original, has its RGB color components spread across a larger wavelength range. Not only this, but the Red and Green components have been boosted to higher levels. Compare this to the histogram associated with the original, more realistic image and one can see that the images RGB components are spread over a lot narrower section of the total light spectrum. Therefore it is not only the saturation of various wavelengths of light that makes an image appear more realistic, but the spread of an image’s individual RGB components.
The smoother the gradient of light available, the more natural the transition between these shades becomes. Sixteen-bit color will appear less realistic than 24 bit color because there are less graduations of light in its color gradient etc. Therefore, if a game has fewer colors available to it, then its ability to realistically depict scenarios will be less than a game that has more colors available to it in its palette. Alternatively, the introduction of dynamically light environments created more realistic colour gradients.
due to the inherent blending of colour that is created by the colour of the light itself. In a gaming market where the battle for the consumer dollar is waged on a battlefield of realism, color, and the implementation of realistic color, plays a significant role in consumer choice.

Of the many games released in the modern era of Shmups (2000 to 2007) few have made the transition from the arcades of Japan to the console markets of the West. Fewer still have gone on to have any sort of significant financial success in the Western console market. Could the reason for a Shmups success in the Western console market be attributed to something as seemingly insignificant as its color palette? Obviously there is much more at play than the colors used by a certain game, but there may actually be more to this than meets the eye.

The Shmup genre has been the basis for much experimentation in gaming, even in regards to the use of color and its affect on the gamer. [Figure 243] Battle Chopper and [Figure 244] Air Duel are both games developed and released by Irem on the M-72 hardware platform. The M-72 hardware is capable of 512 color palettes, yet despite both games having similar levels of “power” available to them, the color palettes used are very different and directly correlate to the theme of the game in question. Battle Chopper, a ‘Cute-Em-Up’, has fewer gradients between its colors when examined as a histogram. Air Duel however, a more serious Sci-Fi type Shmup, has more of a gradient between the colors it uses.

Although both types of display can be described as heavily saturated due to the use of an inhibiting digital palette, Air Duel, which uses less of a spread of colors, can be
semiotically described as being more realistic or serious, a direct consequence of the theme used in this game.

As demonstrated earlier, it is not only the perspective and way in which the gamer views the game world which dictates their perception of ‘reality’, but also the type of colorization utilised. Various types of colorization are also representative of certain styles of game development over time and locale.

We can split the Shmups released during Period Four into three successive categories: Commercial Releases, Commercially Released Shmups to Receive Western Console Ports, and Financially Successful Westernised Console Shmup Ports. Of the latter category, only one Shmup filters through: Treasure’s *Ikaruga*. The most prolific of all Shmup developers in this period of time, Cave, fails to even enter a Shmup into the second category. Ignoring everything bar colour analysis, an interesting pattern begins to emerge.

In the context of Shmups released in Period Four, there seems to be a large divide between Shmups released with highly saturated palettes as opposed to those with more gradual gradients of colour. An examination of Shmups released by Cave over this period shows that by and large, all of their Shmups have had highly saturated graphical
presentation. The games pictured below in Table 6 all appear on either Cave’s 2nd Generation or 3rd Generation Hardware, both powerful 2D platforms capable of 16 and 32 bit colour as opposed to the above M72 example which featured 10 bit colour. As such, spectral analysis of these titles makes it difficult to ascertain any real gradient leaps over the entire light spectrum. Figure 245, a spectral analysis of the Espgaluda 2 screen shot in Table 6 is testament to this. The type of gradient detail offered by these larger bit depth images makes visual dissection of the histogram more difficult in comparison to those based on the output of the older M-72 hardware. Figure 243

Figure 244

205 As figure in Table 6 were not taken directly from the frame buffer, accurate histogram modelling was unavailable.
Ibara

Ketsui

DoDonPachi-Dai-ou-Jou

Espgaluda 2

Table 6
Ibara, released in 2005 in Japan, uses a colour palette indicative of a game of similar origin released in the same year. In Japan in 2005, the highest selling game was Animal Crossing: Wild World DS with an impressive 1,169,757 units sold (Game Sales Charts, 2005). A slew of other highly colourful games were also in the mix that year, including Tamagotchi Connection: Corner Shop!, Kingdom Hearts II and Mario Kart DS. Figure 246 is a histogram analysis of the light spectrums found in the adjacent screen capture of Animal Crossing: Wild World DS. The Nintendo DS, a legacy of the dated Nintendo 64 hardware when compared with other more contemporary technologies, is limited in its ability to produce smooth gradients of colour. Nevertheless, Animal Crossing Wild World DS is by no means using the most of the hardware and the choice of colour gradients utilised is as much part of the visual design as it is part of the technical limitations of the hardware.
In the U.S. in the same year, the highest selling game released was *Madden NFL 06* on the Playstation 2 with 2,900,000 units sold, while in the U.K. sporting titles proved equally as popular, with *FIFA 06* being the highest selling game for that year. Both of these titles appeared on the latest generation of home consoles, and had a greater ability to reproduce smooth gradients of colour when compared to the DS hardware. This is...
demonstrated in a histogram analysis of two screen shots taken from both games. Although large peaks at various wavelengths can be seen in both Figure 247 and Figure 248, there are not the sharp leaps that can be seen in Figure 246. Further to this, the wavelengths of light are more closely related to each other, indicating a coloured, dynamic light source: a feature of more realistic styles of visualization.

Further examination of the US and UK sales charts for that year reveals the lack of any “cartoonish” or highly stylised games, and despite Animal Crossing: Wild World DS being available worldwide, it only features in the Japanese Top 10 (Table 7). When considering the various tastes of different cultures when it comes to games consumption, then this should not come as any surprise; however, despite both forms of games existing within each market it becomes apparent that visual presentation has a significant impact in how a game is perceived, even before someone sits down to play it.
Table 7 gives some insight into how colour usage and subsequent perception of reality in games can impact how a game is perceived. In the UK market, the majority of titles use colour palettes with high levels of saturation and overlapping colour spectrums, indicating a more realistic style of visualization. The US Console top ten in Table 7 is similar, with the exception of Pokemon Emerald, which is a cartoon franchise and targeted at a younger audience. In comparison, the Japanese chart has a wide mixture of colour usage in their top 10. This seems to suggest a different level of acceptance in this market for titles that are more cartoonish in their colour usage.

<table>
<thead>
<tr>
<th>US PC Top Ten 2005 (NPD)</th>
<th>UK Top Ten 2005 (Chart Track)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. World of Warcraft - 957,000</td>
<td>1. FIFA 06</td>
</tr>
<tr>
<td>2. The Sims 2: University - 574,000</td>
<td>2. Pro Evolution Soccer 5</td>
</tr>
<tr>
<td>3. The Sims 2 - 559,000</td>
<td>3. Need for Speed: Most Wanted</td>
</tr>
<tr>
<td>4. Guild Wars</td>
<td>4. Gran Turismo 4</td>
</tr>
<tr>
<td>5. Roller Coaster Tycoon 3</td>
<td>5. Star Wars Episode III: Revenge of the Sith</td>
</tr>
<tr>
<td>6. Battlefield 2</td>
<td>6. FIFA Street</td>
</tr>
<tr>
<td>7. The Sims 2: Nightlife</td>
<td>7. Star Wars: Battlefront II</td>
</tr>
<tr>
<td>10. Call of Duty 2</td>
<td>10. The Sims 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Japan Console Top Ten 2005 (Famish)</th>
<th>US Console Top Ten 2005 (NPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Animal Crossing: Wild World (DS) - 1,169,757</td>
<td>1. Madden NFL 06 (PS2) - 2,900,000</td>
</tr>
<tr>
<td>2. Gran Turismo 4 (PS2) - 1,066,749</td>
<td>2. Pokemon Emerald (GBA) - 1,700,000</td>
</tr>
<tr>
<td>3. Brain Training (DS) - 1,011,341</td>
<td>3. Gran Turismo 4 (PS2) - 1,500,000</td>
</tr>
<tr>
<td>4. Nintendogs (DS) - 965,665</td>
<td>4. Madden NFL 06 (Xbox) - 1,200,000</td>
</tr>
<tr>
<td>5. Winning Eleven 9 (PS2) - 923,288</td>
<td>5. NCAA Football 06 (PS2) - 1,100,000</td>
</tr>
<tr>
<td>6. Dynasty Warriors 5 (PS2) - 917,985</td>
<td>6. Star Wars: Battlefront II (PS2) - 1,000,000</td>
</tr>
<tr>
<td>7. Gentle Brain Exercises (DS) - 875,371</td>
<td>7. MVP Baseball 2005 (PS2) - 970,000</td>
</tr>
<tr>
<td>8. Tamagotchi Connection: Corner Shop! (DS) - 770,391</td>
<td>8. Star Wars Episode III: Revenge of the Sith (PS2) - 930,000</td>
</tr>
<tr>
<td>9. Kingdom Hearts II (PS2) - 737,652</td>
<td>9. NBA Live 06 (PS2) - 820,000</td>
</tr>
<tr>
<td></td>
<td>10. LEGO Star Wars (PS2) - 800,000</td>
</tr>
</tbody>
</table>

Table 7

How does this affect Shmups? In the West, Period Four is a time in which Shmups struggled to find Western releases. This is directly related to the push for “realism” in console game titles. As an adult gamer, especially a casual gamer, picking a game from the shelf of a store and seeing realistic graphics and colour usage depicted in the screen shots seems like a more appropriate choice then a similarly priced game, with highly
All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

stylized, cartoon graphics and colour usage. A similar analogy might be seen in the mass acceptance of manga and anime in Japan with adults as opposed to the West where animation is considered more of a child-focused pursuit (Natsume, 2000).

The preference for realistic colour schemes, particularly in Western adult markets, meant that Shmup were immediately at a disadvantage. Shmups rely on high contrasts in order for the player to quickly identify collision objects such as enemies and bullets. What this meant for Shmups is that in order to be comparable on a colour level to the current, realistic titles, dynamic lights were needed in order to provide a more blended, and realistic colour range. Dynamic lighting had not been possible previously on the consoles and some low-level arcade platforms during Period Three, due to the severe overheads that it places on certain platforms. Period Four, with its more powerful hardware sets, was able to utilize dynamic lighting a low ‘CPU-cycle cost’ which meant that it began to be implemented in a wider variety of games. Dynamic lighting also became a contemporary standardization seen in many realistic and even unrealistic games of Period Four. This ultimately did have an impact of Shmups released during this period, and will be used as an analytical tool to help evaluate the case studies to follow. Before looking at dynamic lighting in relation to a specific set of cases studies, one of the zeitgeist Shmups of Period Four will be examined.

Out the many Shmups released in the time frame between 2000 and 2005, how many of those have actually received commercial distribution and localisation in the West? Furthermore, how many of those have gone on to be successful in the Western market place from a purely financial perspective? None of the Cave games released in this time period received any sort of Western localisation, and even 3D dimensional Shmups such as Under Defeat and Border Down, despite having ‘realistic’ styles of visual presentation when compared to the games developed by Cave, never were localised for Western markets. There is however, one Shmup in particular that stands out from its contemporaries: this Shmup is the Ikaruga, released by Treasure, in 2001.

Zeitgeists: Ikaruga (Treasure, 2001)

Ikaruga, the infamous Shmup from Treasure, based on shield polarity, and polarizing Shmup fans since its release in 2001, has been the subject of much discussion within the Shmups community. Ikaruga is problematic for the Shmup community for a number of reasons: probably the foremost of all being its popularity outside of the Shmup
community. Treasure as a developer has a high cult value associated with it, so all of their releases are met with “fan-boy” like enthusiasm, despite any flaws within the games. Previous titles from Treasure such as Radiant Silvergun (1999) have skyrocketed in value due to supply and demand, despite the game receiving mixed reaction in the Shmups community.

The other problem that Ikaruga brings with it is its avoidance of the contemporary Danmaku trend of developers such as Cave. More puzzling, is that Ikaruga is probably one of the most iconic Shmups to be released in recent years. To put the game in historical context, let us examine it alongside Shmups of the same year.

Image removed due to copyright

Ikaruga and its peers

Night Raid (2001) [Figure 249].206 like many other Shmups of the era, used a play mechanism gimmick: namely bullet reflection. Visually, Night Raid is highly simplistic in comparison to Ikaruga, partly due to the aging Taito G-Net hardware on which it was released. Night Raid failed to make much of an impression upon release and was never widely distributed. Mugg, (2002) when reviewing the similar PSX port had the following to say about the graphic presentation of the game:

Graphically, this game is exceedingly bare-bones and downright abstract. The enemies are comprised generally of basic, low-polygon models and are normally nothing more than textured geometric shapes. The backgrounds are even stranger, comprised of equally generic polyhedrons spinning and swirling in a very surrealistic manner. Granted, they get the job done and give a fairly good sense of motion, although, this is no Zero Gunner 2/Giga Wing 2/Ikaruga. In fact, it still strikes me as odd that Takumi, after releasing three Dreamcast Shmups, decided to port this game to the PSX. (para. 7)

206[Figure 249] Night Raid. Adapted from Night Raid. Copyright by Takumi, 2001. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.
Shikigami no Shiro (2001) also a Taito G-Net game, had wider success than Night Raid and even received a Western release under the name of Castle Of Gods. Ports of the game were also available for the PC but a Western console release was never made available. Shikigami no Shiro shares a similar feel to Esp.Ra.De. in that the player chooses one of several magic-wielding youths to be their onscreen avatar.

Visually, the game is superior to Night Raid despite sharing the same hardware. Popularity is hard to gauge on an empirical level due to lack of any quantitative data, but from observation there seems to be a higher awareness of this game, probably in part due to the Western release of the sequel, Shikigami no Shiro 2 (2003).

DoDonPachi 2: Bee Storm (IGS, 2001) came about through a Cave licensing agreement which allowed small Taiwanese developer IGS to create a “Pachi” game for their PGM platform. The game is often viewed as a very poor brother to the original series particularly in game play context. Author Mike B (2003) of Destroy All Monsters (DAM) had the following to say of Bee Storm 2:

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20 Figure 250 Shikigami no Shiro. Adapted from Shikigami no Shiro. Copyright by Alfa Systems 2003. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.

208 Figure 251 DoDonPachi 2: Bee Storm. Adapted from DoDonPachi 2: Bee Storm. Copyright by IGS, 2001. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.

209 Please refer to appendix
Sub-par graphics and un-original level design are one thing (ok make that two things) but the thing that lets DoDonPachi 2 down most of all, at least when compared with the original, is the fact that game play (and technically wise it simply isn’t as good. At the start of the game as you choose between 3 rather dull (and as previously mentioned rather ugly) ships, you are asked to select you super-weapon, Charge Beam or Blast Bomb just like the first two games. But what's this... I can only use one of ‘em from now on..? Couldn’t you choose which to use depending on whether you were holding down the charge laser button or not before? Hmm... It doesn’t seem to work anymore. I’m stuck with just the one type of super weapon I selected at the start. Aww...shucks... there’s half the entertainment and game play in terms of choosing how to finish off those big bosses in style down the tubes. Regression then...oh dear. (para. 6)

The last game mentioned here in the context of Ikaruga’s release year contemporaries is Zero Gunner 2 (Psikyo, 2001) which is a singular game in itself. Sharing the similar Sega Naomi platform as Ikaruga, Zero Gunner 2 features similar 3D styled game play and “excellent” graphics (Reinhardt, 2006) that are easily on par with the majority of commercial games released that year, Shmup or other.

The story of Ikaruga is simple yet poetic and follows the cyclical nature of the Radiant Silvergun narrative. The full narrative can be found in the game’s manual but is expanded upon in the Japanese version of the game during game play. Below is a paraphrased version of the story.

A man named Tenso Horai had discovered the Power of the Gods. He and his followers, The Divine Ones, used the power and conquered many planets in the name of peace. The Tenkaku, a federation of freedom fighters emerged to challenge them. Their efforts were futile as they lost nearly every battle. A young pilot named Shinra survived and crashed in a village called Ikaruga. The villagers nursed him back to health and gave them their fighter, the Ikaruga. While en route to take on the Divine Ones, Shinra shot down the assassin Kagari and rescued her. She joined Shinra and had her fighter, the Ginkei altered with the same specifications as the Ikaruga. Now the two of them fly to destroy the Horai and return order to the innocent.

210 Zero Gunner 2. Adapted from Zero Gunner 2. Copyright by Psikyo, 2001. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.
211 Western releases of Ikaruga removed all in-game text pertaining to the narrative in a crude localisation attempt.
The approach to the narrative process shares common roots with some Atari 2600 titles. The approach that *Ikaruga* used was something not seen since the days of the Atari 2600 in the early eighties. As the visuals of the 2600 left much to the imagination, the game developers relied on scene setting narratives to entice the gamer into their virtual worlds, although in the context of *Ikaruga* this is done primarily to adhere to the fast moving Shmup narrative principle. Images are also stored on the game’s GD-Rom in an “Omake” folder or ‘extras’ folder that is only accessible when placing the GD-Rom in a regular CD-Rom computer drive.

To take a quote from Battlestar Galactica: “all of this has happened before and all of this will happen again”, summarises the link between *Radiant Silvergun* and *Ikaruga* as protagonists in fight against the same villain. Also unsurprisingly, the above quote shares much in common with the Eastern philosophies from which both games draw heavily. (Miller, 2005) Now let us consider *Ikaruga* and its stylised visuals. Yasushi Suzuki is the artist not only responsible for *Ikaruga*, but also *Radiant Silvergun* and *Sin and Punishment*. (Treasure, 1997) Much the same as Joker Jun, Suzuki has a distinctive style: he favours watercolours as illustrated in his “Elegant” series and in the conceptual art for *Ikaruga*.213 Figure 253, Figure 254214

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212 Further images can be viewed on Suzuki’s website.; http://www016.upp.so-net.ne.jp/elegant/  
213 Although none of the images appear in-game, they were placed in a special “omake” folder on the *Ikaruga* GD-Rom disc and could be accessed in a regular PC CD-Rom drive.  
214 Figure 253, Figure 254 Examples of Yasushi Suzuki. Adapted from [Online] Elegant. (Available) http://www016.upp.so-net.ne.jp/elegant/ Copyright Yasushi Suzuki, n.d. Reprinted under the terms of “fair dealing” in the 1968 Australian Copyright Act, Section 40.
The in-game graphics (Figure 254) are based on the same washed-out watercolour look as the above examples (Figure 255) with emphasis on the yin and yang juxtaposition of light and shade that characterises *Ikaruga*’s play system.
Suzuki was also responsible for the game’s asset design with Producer / Composer Hiroshi Iuchi responsible for producing the backgrounds to complement Suzuki’s concept art. The use of colour is particularly strong in Suzuki’s own style and strong comparisons can be seen between the artist’s own watercolour style and his work in *Ikaruga*, especially on the ship textures.

One can also see a resemblance to a Cell-Shaded style where each image is stylised like a watercolour painting.
Iuchi’s work on the background design of Ikaruga is highly complementary to Suzuki’s work. Portrayed as a moving painting, there are many identifiable objects that make up the background design: cityscapes, industrial sections, mountains and even lush forests. However, the manner in which these backgrounds are presented, suggests an abstract and almost post-apocalyptic world akin to that seen in *Panzer Dragoon Saga* (Sega, 1998). Parallels can be drawn between *Ikaruga* and works such as “Les Mondes Engloutis”, Hayao Miyazaki’s “Nausicaa of the Valley of the Wind” and even Jean Giruad’s “Moebius”. Much like these works and *Panzer Dragoon Saga*, the background design suggests a technological world where these technologies are so assimilated into the culture that their representation is more artistic than functional. Large sections of industrial infrastructure and Megalopolises are portrayed more as stone rather than our own metallic incarnations.

A summary of the visual semiotic affect of *Ikaruga* would impart upon the gamer a definite sense of epic proportions. That the imagery is stylised like paintings promotes the nature of the narrative and conveys *Ikaruga* as more than a game, but rather a legend. Parallels in the transmission of this affect can be seen in Michelangelo’s depiction of liturgical scenes such as "La Creación", an image being used to tell of an important legend [Figure 258].
Suzuki and Iuchi’s visual styling of *Ikaruga* presents a timeless depiction of the narrative. The assets used within the design are uncharacteristic of anything really past or present, they have no faces and they have no indicators of what technology they were built from. Even the sole depiction of Shinra in the game select screen is abstract and unidentifiable (Figure 259). Without faces, or identifiable features, how do we associate the assets of *Ikaruga* with our own Jungian archetypes? The key to understanding *Ikaruga*’s portrayal of archetypes is to look at the subtle visemes that allude to the player’s quest against evil.
The player begins their quest by leaving the “Sword of Acala” in a blinding flash of light [Figure 260]. This leads the player through a game world that gets progressively darker. The ending credit sequence is quite literally the light at the end of the tunnel, and is the only time in the game where there is predominately white light, a symbol of the afterlife. This end sequence also features flocks of white doves flying over lush green mountain ranges, with the dove being a symbol of peace in both Christianity and Judaism, a suiting end to both Shinra’s self sacrifice and the end of evil. Particularly in the case of Christianity, Doves and greenery represent the end of the flood and Noah’s covenant with god. In Japan, it also symbolises the end of war, a similar representation of salvation and new beginnings.

What the stylised visuals of Ikaruga do is impart the game with a personality of its own and personify the Ikaruga itself, which makes the ending even more touching and rewarding for the player as it goes through the process of “honourable death”. In a truly Japanese ending, the Ikaruga and Shinra destroy themselves to destroy “the power of the gods” in the ultimate sacrifice after an epic David versus Goliath themed battle.

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218 Acala is the destroyer of delusion and the protector of Buddhism. His immovability refers to his ability to remain *unmoved* by carnal temptations. Despite his fearsome appearance, his role is to aid all beings by showing them the teachings of the Buddha, leading them into self-control.

219 The “Ikaruga” is the actual ship that player one uses.
The epic nature of the final battle is difficult to convey using words alone: the visuals, the music and the intangible link that personification of the Ikaruga has on the player amounts to an emotionally charged experience with a wide range of emotions spanning heightened tension, a sense of empowerment, the feeling of significance and, crucially, the final release which provides a “sad” euphoria through the final actions of the Ikaruga. The Ikaruga imparts its final message to the player almost as if the inanimate object had a living breathing body:

Ikaruga: “Release the restrain device. Using the released power may result the possibility of destruction of the ship. You did your best. Was I helpful to you? I am deeply grateful to you”.

The final ending comes down to Shinra and the Ikaruga. The Ikaruga fires all of its remaining energy at the Ubunagami Okinokai (Figure 261) to destroy it, knowing full well that by doing so it will kill itself and Shinra. Importantly, it gives meaning to an otherwise senseless shooting bonanza. The time spent in the virtual world had purpose, albeit virtual purpose, but who wouldn’t feel good ridding the world of an impossible evil or to go one step further and to sacrifice yourself to do so?

The Music of Ikaruga

As with any game, the visuals only tell part of the story. Hiroshi Iuchi’s work on Ikaruga involved many aspects of the game’s design and implementation, but it was the first time that he had been involved in the composition of music for a commercial product. Because of this, the soundtrack of Ikaruga has dramatic flair and artistic consistency usually not seen in Shmups and definitely rare for a composer with little commercial experience.

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220Figure 261 Ubunagami Okinokai. Adapted from Ikaruga. Copyright by Treasure, 2000. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
The soundtrack is orchestral in nature, featuring bold fortissimo brass sections during heated boss battles and the urgency of snare drum surface rhythms to promote tension (Skiles, 1976). Although comparisons between Iuchi’s composition and Super-Music composition can be made, Iuchi’s score always has elements of uncertainty and tension with bold releases of power only occurring during boss encounters.

The above example, taken from Chapter 3 of Ikaruga (Score 9), demonstrates the use of many percussive elements to provide tension through use of surface rhythms. The snare drum through its use of sixteenth notes and sixteenth note triplets provides the same sense of urgency that is so often copied in the introduction music to news broadcasts. The Timpani and bass drum also provide grandiose forward movement through their accelerating rhythm. The importance of these beats is mirrored in their majestic resonance and long decay time, booming over the top of all other instruments.
Below all of the orchestral timbres lies a melody line indicative of the lyrical melodic style of Japanese Epic Form. This piece of melody, taken from Chapter 1 of *Ikaruga* (“Ideal”) is performed lyrically by strings as the *Ikaruga* sweeps down through a layer of clouds and flies above a lush green forest. The lower octave harmony enters as the action in the foreground intensifies and it reaches its climatic point when the *Ikaruga* is confronted by two large ships for the first time. The octave harmonisation then moves through 9th and 11th to emphasise the change in mood and the elevation in tension within the foreground.

**Ikaruga: Game Mechanics**

*Ikaruga*’s play mechanics, like those of *DoDonPachi* are easy to grasp and difficult to master, hence rewarding those who spend some time with the game. To master and dominate the game takes 90% memorization and 10% twitches as most bullet patterns are static and following a strict movement plan will result in minimal deviation of enemy attack patterns from game to game. Unlike in *DoDonPachi* where the player must draw fire then strafe to engage, *Ikaruga*’s play system relies heavily on exploiting the patterns of enemy polarity throughout the game and chaining them into triplets. Enemy movement throughout the game is a reference to many other Shmups in the genre. In the second act of the first stage we see enemy movement akin to *Xevious*’s...
first attack waves, then in the fourth act we see patterns more akin to the rigid straight line of *Gradius*’s initial attack wave. In fact, all enemy movement inside *Ikaruga* is rigid and very purposeful, with the only notable exception coming in the form of the third level mini-boss, which pursues the player through a series of channels in the foreground. The purposeful nature of all of these pre-determined patterns in the game suggest a need for a robotic like savantism in the execution of the game, making *Ikaruga* more of an exercise in memorization than any other Shmup to date. Herein lies the problem: *Ikaruga* with its rigid enemy formations and very limited AI make it more of a puzzle game than a shooter, but the visuals are so spectacular that many either forget about this or are too amazed to even notice.

To some extent, *Ikaruga* is a highly distilled form of *Radiant Silvergun*’s play mechanics with the same emphasis on chaining together triplets of similar colour enemies. What is quite odd about *Ikaruga* is the juxtaposition of rigidity in the foreground and flowing motion in the background. The game uses its 2.5D aspect ratio to full advantage in the background with pivoting camera angles and smooth flowing diagonal movements, yet the fixed camera perspective of the foreground is in direct opposition to this. The more technically savvy will notice that the two different layers are treated differently with regards to their processing: namely, lighting in the foreground does not carry over to the back and vice-versa.

**Ikaruga, Colour, Saturation & Hyper-reality**

Moving back now to the earlier discussed issue of saturation of colour, *Ikaruga*, due in part to the fact that is set in a three-dimensional world rather than a two-dimensional one, does show smoother colour gradients than *Figure 246*.
In fine art, abstract and imaginative works are nearly always communicated by the use of limited or unrealistic spectrums of colour. In some cases, distinctively separate spectrums of colour are used to emphasize form and lighting in a manner which does not match the realistic conventions of light and colour. Works by Picasso such as “Factory at Horta de Ebro” demonstrate the use of narrow colour spectrum to emphasize both form and abstraction. Further to this, narrow use of colour spectrum is often emphasized by saturation to lead to a higher level of abstraction as seen in the works of Francis Bacon. If the contemporary market place is so obsessed with graphics realism
(Bittanti, 2004) then why do these photo-realistic games have such high levels of saturation and such limited spectrum usage that we often associate with abstraction in fine art? From further examination, it is apparent that this type of colour usage and game presentation is in fact a contemporary, coded element, indicative of complementary trends in popular culture, particularly film and music video clips.

From a design perspective, high levels of colour saturation can have both a function and an artistic effect. Artistically, both high and low levels of saturation can be likened to stylisation, and in the contemporary context, high levels of saturation were the norm in the visual representation. Besides the aesthetics, the more functional side of this form of representation when the colour saturation is increased is that it can make it easier to navigate the virtual space, as individual objects are easier to see when compared to the inconsequential elements of the background. When you consider that the majority of 3D games created today have an emphasis on realism, it is essential to guide the player through the virtual world by making sure that important objects stand out. High levels of saturation lead to greater levels of contrast between on screen entities, thus creating environments with a clear distinction between interactive and non-interactive elements.  

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221 [Figure 264] Ico aesthetic example. Adapted from Ico. Copyright by Sony Computer Entertainment, 2001. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.

222 [Figure 265] Half Life 2 aesthetic example. Adapted from Half Life 2. Copyright by Valve, 2004. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Zeitgeists: Border Down

Created by former Taito members of the *G-Darius* development team, Border Down was released by the newly formed development team, G.Rev, in 2003. Although Border Down was G.Rev’s second game after *Doki Doki Idol Star Seeker* (2001), the company was already experienced in both Shmup and Naomi platform development, having previously worked with Treasure on *Ikaruga*. They would later go on to help create *Gradius V* (2004) for Konami. *Border Down* was one of the only horizontal Shmups released during Period Four and along with *Gradius V* is an intentional nostalgic throwback to the popularity of 4:3 Horizontal Shmups during the late eighties and early nineties (Figure 266).
When looking at the development staff behind *Border Down* it is easy to see why this nostalgic throw-back is so apparent. According to Randorama (2002) from Shmups.com, the president of the company [G.Rev], Mr. Maruyama, was one of the project leaders on *G.Darius* and started working at Taito on *Metal Black* Figure 267. Yack (Yasuhisa Watanabe) is an ex-Zuntata member and also worked on *Metal Black*. Although it is difficult to find a single, definitive answer by the development team, *Border Down* is often described as being the “spiritual successor” to *Metal Black*. Since nostalgia plays such a large part in *Border Down*, it is important to look back to the influences on the game from Period Two, *Metal Black* and *G-Darius* Figure 268. *Metal Black* was originally intended to be the third game in the *Darius* series: essentially *Darius III* (Ursini, 2008). Taito, though, decided to distance *Metal Black* from the *Darius* family, despite the many aesthetic and secondary world similarities. One of the reasons for this, according to Ursini (2008), was due to the incredibly bleak setting of the game, a post-apocalyptic version of a futuristic, dead Earth. Lead designer

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22[Figure 267] *Metal Black*. Adapted from *Metal Black*. Copyright by Taito, 1991. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.

23[Figure 268] *G-Darius*. Adapted from *G-Darius*. Copyright by Taito, 1997. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
of *Metal Black* and *Border Down*, Hiroyuki Maruyama, has a distinctive style according to Ursini (2008), whereby post-apocalyptic representations are used to emphasize a strong sense of “life lost” and dysphoria. These themes are strong in *Metal Black*, *G-Darius* and to a lesser extent, *Border Down*. Interestingly, this emotional style is one of the reasons why Taito separated *Metal Black* from the *Darius* lineage: they could envision this apocalypse happening to Earth, but not the fictional planet of Darius.

*G-Darius* was the last of the *Darius* lineage officially released by Taito. The game featured an “enemy-acquisition” mechanic, whereby you could capture enemy craft and use them as your allies which were another nostalgic throwback to the mechanics of *Galaga* (Ursini, 2008). Similar to other neo-Shmups of Period Three, *G-Darius* also utilized the contemporary 3D hardware to its advantage. *G-Darius* also continued the theme of boss laser cannons and took it one step further by introducing what was called the “beam duel”. Players could directly counter a boss’s laser by using their own ‘Alpha Laser’. \(^{225}\) This feature would also make its way into *Border Down* and was an important, nostalgic referencing element, albeit in a more dramatized, visually impressive way \(^{226}\).

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\(^{225}\) _Figure 269_ *G-Darius* Beam Duel. Adapted from *G-Darius*. Copyright by Taito, 1997. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.

\(^{226}\) _Figure 270_ *Border Down* Beam Duel. Adapted from *Border Down*. Copyright by G.Rev, 2002. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
Border Down had more nostalgic similarity to its spiritual predecessors, however these elements are best explained given further context. Border Down is set in a period of Earth’s future where they have begun to colonize Mars. As to be expected, in the realm of video game futures, contact is lost with the new Mars colony. After some investigation, it is realized that this is due to the invasion of a hostile, alien entity, the “F.A”. To counter this invasion and save the inhabitants of the solar system, the “Solar System Defence Forces” send a small detachment of un-manned combat vehicles. The player takes control of one of these vehicles, remotely from Earth in a quest to stop the invasion.

In terms of game play, Border Down borrows the branching level selection system from Darius and adds a new, previously unseen means of dictating branching level choice. Border Down uses a “border” system that enables the player to choose three levels of difficulty at the start of each round. Not only is each “border” progressively more difficult, it also gives the player fewer lives to use. The player is rewarded for playing the harder borders by being given the true ending of the game. If a player uses too many continues, or plays the game solely in the easier modes, then they get a different and considerably bleaker ending, akin to that used in Metal Black. The game also has three different routes for each level of the game, each becoming progressively more difficult depending on the border selected by the player. Although the player only plays six consecutive levels in a full game of Border Down, there are at least three variations

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227 Please refer to Digital Appendix Resource: Border Down 6-C.flv & Border down 6-D.flv to see two of the four different endings for the game
of each level, and four variations of the final level, level six which totals twenty-five different levels [Figure 271].

This approach to over-riding level structure is not only a nostalgic reference to Shmups of Period Two [Figure 272] but also emphasizes the concept of micro-encounters: short, high intensity bursts of gameplay that are punctuated and made separate by some type of game mechanism. This approach to game design can be seen in many games and was a design mantra for *Half Life* and subsequently, *Half Life 2*, where the technique was called “experiential density” (Birdwell, 1999). The style of micro-encounters was used extensively in *Metal Black* and *G-Darius*. Ursini, (2008) describes the emotional response to micro-encounters in *Border Down* well:

*Border Down* is about short but extremely intense moments. In a few seconds, you can get 20% of your total score by executing a difficult technique. It is hard and frustrating to learn these techniques, but once you learn to do them, nothing can stop the sheer joy, the untamed pleasure of discharging accumulated tension. Videogames, like the rest of life, are about meeting conditions and being able to obtain critical results at the crucial moment.

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228 [Figure 271] *Border Down* Bean Duel. Adapted from *Border Down*. Copyright by G.Rev, 2002. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
Another nostalgic reference comes directly from the narrative of *Border Down*. The first three levels of the game, including their variations, are all designed to be simulation, preparing the player for the real alien invasion in level four. Parallels can be drawn between this and *Image Fight* (1988) which had a similar approach to narrative. Further nostalgic referencing occurs in *Border Down* at the start of level four as the player begins to fight their own forces outside of the training simulation. This is very similar to the first stages of *Metal Black* where Earth’s old defence forces are acting against the player such as in Figure 273 where an alien hermit crab is using a defunct aircraft carrier as its shell.

Stage three from *Border Down* is a reference to the frantic, anxiety inducing asteroid field encounters from *Silpheed*.

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229 Figure 273 *Metal Black* nostalgia reference. Adapted from *Metal Black*. Copyright by Taito, 1991. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
230 Figure 274 Stage 3. Adapted from *Border Down*. Copyright by G.Rev, 2002. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
Further referencing happens during stage three of *Border Down*, when the player is thrust into an exceptionally detailed battle which happens over a large scale capitol ship battle [Figure 276].\(^{232}\) Other comparisons can be drawn not only from other Shmups but also from popular films such as *Return of the Jedi* [Figure 277].\(^{233}\) Scenes such as these are powerful at conjuring up very strong emotions, as the conventions of the game begin to mimic those seen in film. This style of representation has strong emotional associations attached to it, directly linked to the gamer’s previous emotional experience and taken from films using the same technique. Therefore, when games implement this approach effectively, they are able to conjure up these associations. A sense of dramatic scale is also communicated to the player, making them feel as if they are immersed in this powerful, secondary world. Scenes such as these also add a sense of awe and even anxiety and tension. There are also underlying level design principles at play here.

\(^{231}\) [Figure 275] *Silpheed* stage six. Adapted from *Silpheed*. Copyright by Game Arts, 1993. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.

\(^{232}\) [Figure 276] *Border Down* Stage Three. Adapted from *Border Down*. Copyright by G.Rev, 2002. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.

\(^{233}\) [Figure 277] Return of the Jedi Space Battle. Adapted from Return of the Jedi. Copyright by Lucas Film, 1983. Reprinted under the terms of “Fair Dealing” in the 1968 Australian Copyright Act, Section 40.
As *Border Down* is a horizontal Shmup, intentionally referencing the Shmups of Period One and Two, it also draws heavily from the concept of compression and funnelling discussed at length with regards to H.R. Giger and *R-Type*. What *Border Down* does extremely well is mix the concept of traditional compression and funnelling with the level design principle of occluders and portals, most often associated with FPS and 3D level design.

The concept of occluders and portals relates directly to line of sight: restrain the player’s line of sight and they will feel disempowered, increase their line of sight and they will feel empowered and in the context of the game, even god like.\[\text{Figure 278}\]
is an example of occlusion hiding objects directly behind the occluder, causing either player interest, in the terms of an adventure game, or in an action game, causing anxiety as the occluder may be hiding a possible ambush. In FPS games, line of sight dictates player empowerment, especially in regards to weapons. Sniper rifles, for example, usually have slow reload speed and low fire rate as they have the ability to artificially extend the player’s line of sight and hence empower them in open arena environments.

Figure 279

The concept of compression and funnelling, although being applicable to all forms of gaming bar text adventures, has been used extensively to examine the previous Shmup case studies, as the theory of portals and occluders does not apply to an over-head, 2D environment. Screen boundaries are, by default, the occluders and the screen area is the portal. 2D games have attempted to use fog of war to counteract this, but these types of games are in the extreme minority. Border Down is different because it is a 2.5D horizontal Shmup with three-dimensionally rendered game elements. Border Down utilizes compression and funnelling for the active play layer, and portals and occluders for the depth axis.

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279\textsuperscript{234} \textsuperscript{279} Occlusion Example. Reprinted from Game Level Design, p 231. Copyright by Charles River Media Inc. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Figure 281 is a cross section of Figure 280 and demonstrates how the primary play field or active game layer is supported by cinematic layers that are able to work using the portal and occluder approach. Level three of Border Down uses this technique to establish a sense of visual dynamics to the game. The term visual dynamics is a reference to musical dynamics, and its use in composition to create a sense of scale and size. Dynamics usage in music such as those seen in the psycho-acoustical difference between a verse and a chorus give the listener a sense of scale and growth as one section of music has notably more “energy” than the previous when listened to in a linear sequence. The same type of approach can be used to analyse the difference in mood between the first section of Border Down’s level three (Figure 274) and the open, and dynamically different section as seen in Figure 276. The player is at first in a highly constrictive asteroid field at the start of the level that not only has many compressive elements in the active game layer, but also has a significant amount of occlusion happening in the cinematic layers (Figure 274). This makes the player feel disempowered and cautious. When the cinematic layers turn to portals in Figure 276, the comparative mood between the sections embellishes the later through a process of visual dynamics.
The use of portals and occluders to create this sense of visual dynamics was a highly used technique, especially in first and third person style games of Period Four. The sensation and sense of relief caused when the player first walks out of the Black Mesa research facility in *Half Life* is embellished by the detail that the player has spent so long in occluded environments. Games such as *Ico* (2001) also used these contrasting sections of space to their advantage. Even the racetracks of *Gran Turismo* used elements such as tunnels and down-slope racing sections to act as important elements of visual-dynamics.

“AAA Fever”

The analysis of *Border Down* begs the question that if it was such a well-designed game, with heavy nostalgic referencing, then why did it not rejuvenate the Shmup genre in the West? The most obvious answer to this lay in consequences of the “*Daytona* recession” and that *Border Down* was only ever ported to the ill-fated Sega Dreamcast platform in its local Japanese incarnation. Although this release was great for the niche section of Shmup players who could not afford the significantly more expensive Naomi version, it did little for the general public, as awareness of the title was extremely limited due to the lack of Western arcades that had the title.

Even if *Border Down* had received a localized Western version, one can speculate that it probably would not have been deemed commercially successful due to a phenomenon that I dub “AAA Fever”. In the context of video game publishing, an “AAA” title is one expected to have significantly high sales. In the terms of game development, an “AAA” title is one with a development team consisting of hundreds of members, and which also
has an appropriately large budget. As AAA titles were beginning to become more prolific during Period Four, consumers began to budget their purchases based around the release dates of these games. Although the quality of game design was still a factor in consumer purchases, AAA titles had the immediate advantage of being graphically impressive and “cutting edge”, at least via surface value. Further, the vast resources at the disposal of these titles meant that significant marketing campaigns preceded them, even going so far as exchanging money for favourable reviews and advertising space within the game media (Hall J., 2003) (Kennedy, 2008).

The launch of the PS2 is also partly to blame for AAA fever. Although sold as a gaming console, the PS2 was the cheapest available DVD player at the time of its release, and subsequently it appealed to more than just gamers. Furthermore the PS2 was a considerably expensive piece of hardware when it was first launched at 39,800 yen (about $360-$370USD), therefore it was less in the domain of the average gamer, and more in the domain of home theatre buffs and people who ordinarily wouldn’t be known as gamers. As seen in the spectral analysis conducted earlier, older consumers were drawn to the more realistic graphical representations only available to well funded, AAA titles. Games that were different to the contemporary AAA titles including Metal Gear Solid 2 and Gran Turismo often had an unwarranted stigma of being childish, or not representing value for money when compared to the equally priced AAA titles.

Another element hampering casual Shmup uptake during Period Four was that most AAA games were cinematic experiences. During Periods Two and Three, there was an emphasis on using FMV sequences to embellish narrative and create a sense of graphical realism that could not be achieved using in-game graphics. Period Four though was the first in which games were advertised using their in-game graphics. Gran Turismo 3 was the first to do this and featured a bold, but highly successful marketing campaign that simply featured in-game footage which was used in cinema advertising [Figure 282].235 designed to create an intentional association between the two mediums and their consumers.

Graphics were the most accessible part of the gaming experience offered during Period Four and the most easily appraised. Therefore, graphics became a measurable way for consumers to judge the value for money offered by these games. The consequence of this consumer desire was that development costs went up considerably, as did the number of units which needed to be sold in order for developers to break even. In a presentation by Kurt Busch from Krome Studios delivered at “Growing Worlds: Turning your stories into games, conference” in 2007, Busch compared average development costs between the contemporary market and that of the early 1990s.

According to Busch (2007), in 1991, the average development budget was around $300,000 USD. For a game to break even took around 120,000 unit sales in the $49 to $69 USD price point. Famitsu magazine as cited in (Beyond 3D, 2002) put the average development budget for the PS2 at an average of $1 Million USD in 2001, however AAA titles such as Final Fantasy X, had reached up to $40 Million USD in development costs (Beyond 3D, 2002). Border Down, on the other hand, sold a meagre 15,000 units, although all were sold to consumers in a short period of time, creating significant demand on the second hand market.

Budgets for Naomi based Shmups of this time were as low as $10,000 USD. Trizeal (2004) was released to mixed reviews when first debuted in Japanese arcades, nevertheless the developers opted to port the game to the Sega Dreamcast, a console long since dead in the West. In an odd move for a Japanese developer, Triangle service released a letter on their website asking all of those interested in Trizeal to pre-order the game from retailers so they could pique enough interest to have the game published and released commercially. The following quote is paraphrased from the larger letter found on Triangle Services home page (Triangle Service, 2004).

I always find it poor form when a creator speaks out in media like magazines or somewhere, or at a place like this here. I often think this. The quality of his work
should be told by his hand, not his mouth. But my predicament doesn’t allow for such ideals. It’s a shame. And I know I’m being silly. Arcade video game “TRIZEAL”. It’s fairly obvious to anybody going to amusement arcades that TRIZEAL has not been selling well. Terribly, in fact! Was the timing bad? Is it too expensive? Various reasons come to mind, but... Wrong. It’s Triangle Service’s fault because we weren’t able to create a product which would sell well even in adverse conditions. But... Like “Nemo”... Help me!

The Dreamcast port of *Trizeal* was released on the 7th of April 2005, and it appeared that Triangle Services SOS had done its job. The game sold over 2000 copies in its first week, (IGN, 2005) which is quite an achievement considering the game was release for a commercially dead console, especially when considering the mixed reviews given by the Japanese arcade market. It is also further evidence of the demand for Shmups within the Japanese market.

Japanese arcades seemed to be somewhat immune to the AAA fever that had plagued the Western home console consumer market. The last few years of Shmup releases in Japan have illustrated a constant interest in the genre, despite underwhelming Western interest. Although not as impressive as the success the genre enjoyed in the late eighties and early nineties, 2005 data show a steady influx of professional quality Shmups to Japanese arcades (Figure 283, Figure 284).

![Figure 283](image-url)
The All Nippon Amusement Machine Operators’ Union (AOU) published the findings of a 2004 survey investigating their own domestic arcade industry (AOU, 2004). The 2004 survey polled 10,774 gamers to identify factors such as the reason why individuals go to arcades and what sort of games they played while there. The results showed that there is still overwhelming interest in shooters in Japan.

Of the 10,774 people surveyed, 18.6% said that “shooting games” – Shmups – were their favourite genre of video game. Furthermore, 36.8% of Japanese gamers visit an arcade one to three times a month and the majority spend up to 1,000 yen per visit (approx $12AUD).

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Although Danmaku Shmups were never officially released in Western arcades, the continued, commercial success of the genre in Japanese arcades warrants further investigation.

**Zeitgeists: Espgaluda**

*Espgaluda* [Figure 288] is a Danmaku style Shmup released by Cave in 2003, with a subsequent home port on the Playstation 2 released in Japan only in 2004. *Espgaluda* is a prequel to Cave’s *ESP. Ra. De.* released in Japanese arcades in 1998. *Espgaluda* is a

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continuation of the Danmaku games that Cave had been developing now for nearly a decade. The game featured similarities in game mechanics when compared to its predecessors such as the focus on Bullet Hell, draw-fire-strafe mechanics as well as bullet harvesting as seen in other Danmaku titles such as *Guwange* (1999). For a long time, Danmaku had been forging an identity of its own through the games developed by Cave. Although Cave’s games do not share similar names, or secondary worlds, they can for the most part be considered extensions on the experience offered by subsequent Cave titles. Among its many similarities to other Cave games, *Espgaluda* had a very similar visual feel to earlier Cave games, despite being created by a different artist to other Cave titles.

Epitomizing the in-genre nostalgic mode of modern, Danmaku Shmups are visual works of Junya Inoue, otherwise known as Joker Jun. Besides his other visual works, Joker Jun is the man responsible for the artistic feel of an entire generation of Shmups, particularly the Danmaku style of Cave. His work began at Toaplan, then after the demise of Toaplan he moved to Cave, along with a majority of original Toaplan staff. To name Joker Jun’s works is to name a “who’s-who” of Danmaku Shmups, which is ironic, considering he didn’t actually like creating them (Gamengai, n.d). Beginning with Toaplan, Joker Jun was involved in such Shmups as *Dogyuun* (Toaplan, 1993) and *Batsugun* (Toaplan 1996). Moving to Cave in 1997, Joker Jun worked on *Do DonPachi* (Cave, 1998), *Esp Ra.De.* (Cave, 1999), *Guwange* (Cave, 2001), *Storm of Progia* (Cave 2001) and lastly *Do DonPachi Dai-Ou Jou* (Cave, 2002) [Figure 289]. Joker Jun’s influence can be seen as integral to the visual styling of Danmaku.

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Joker Jun’s visual style, although drawing heavily from manga and anime influences, can be described as having a unique shading style with an emphasis on disproportionate human forms. Joker Jun in a 2006 Gamengai (n.d.) interview, when asked whether he liked Japanese style [art] answered:

No, not especially. I can only draw subject matter that I’ve seen. I’ve only lived in Japan, so can only draw Japanese scenery... I guess (laughs). Going off of that, since I grew up in the country, there’s Guwange. Since I now live in Tokyo, there’s Esp.Ra.De. Progear was a world I never lived in, so it was a lot of work (laughs).

When looking at Espgaluda, and the Danmaku Shmup subgenre that began as early as Period Two, a focused process of pseudo-individualization becomes apparent in not only the play mechanic, but also the artistic styling. Developers such as Cave, in order to protect the appeal of Danmaku for the Shmup “hardcore”, have even evolved their product to the point where they have treated their visual design as an integral and unchanging standardization. The result of this is that Cave games will always appeal to Cave fans, but the likelihood of Cave games gaining mass appeal will be limited by how far reaching their pseudo-individualization process is.

The Danmaku genre that Cave created is unique in many ways from the other Shmup case studies examined not only as part of Period Four, but also Periods One, Two and Three. Ultimately, Espgaluda is a game with a significantly higher entry barrier than both Ikaruga and Border Down, however, this is not a concern for Cave, as their primary demographic is the hardcore Shmup player, looking for an extension of previous game experiences with a difficulty curve to match their years of game play investment. When examining Espgaluda and other games, there is a significant difference in player experience when comparing novice to expert. Many game analyses make the mistake of assuming that the game can be beaten. This is an attitude that began as a consequence of home console game development. Whereas arcade game development, especially during Period One was designed only to be beaten with skill, home consoles also relied on time spent as being a factor, which ultimately influenced whether or not the player could beat the game. Danmaku Shmups, however, are an entirely skill-driven genre, primarily due to their indirect score competition mechanics. In order to understand the difference in play experience then between novices and

Cave, 2002. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
expert platers, kinetic visemes are an effective means of evaluating these differing play experiences.

Figure 290

Figure 290\textsuperscript{41} is an example of a user submitted; super play run of the game published to YouTube. An analysis of the kinetic visemes of this example demonstrates that an expert player is able to strategically move around the screen and pre-empt enemies before they have a chance to launch large scale barrages. This particular player is dominating the screen space, moving at will into areas normally controlled by the enemy. By doing so, this player has an empowering experience. They are demonstrating mastery, relief and sense of competency that a lesser player would not possess.

\textsuperscript{41}Figure 290 Superplay Example. [Online] Adapted from ESPGaluda - Arrange - 394mil (Part 2/6). (Available) http://www.youtube.com/watch?v=r5KhFalwwOs. Copyright by Cave, 2003. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Figure 291 is derived from another Cave Danmaku Shmup called *Mushihimesama* (2004). Figure 291 depicts the Kinetic viseme experience of a lesser, novice player in a Danmaku style Shmup. Compressive elements are so overwhelming that they are left more and more disempowered and able to only move in consistently tighter confines. As the player’s primary fire access is fixed, there is no other option than to shoot forward. The player might be shooting, but their eyesight will not be on the target, rather it will focus on the maze of constricting barrages they are negotiating. Despite the potential that Danmaku has to create full screen destruction, the desirable emotions offered by the genre are only accessible to a very small few; however, this is not such a bad approach to game design.

*Figure 291* Mushihimesama Compression. Adapted in part from *Mushihimesama*. Copyright by Cave, 2004. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
At E3 in 2008, Nintendo were accused of ignoring their “hardcore” fan-base (Kohler, 2008). Other sources such as Knight (2007) have blamed Nintendo for not rewarding the hardcore player’s investment in time spent within their favourite franchises. One of the Nintendo franchises that received the most criticism for doing this is Zelda, particularly the 2002 release of *Zelda: the Wind Waker* [Figure 292]. ^243^ Zelda games follow the adventures of the protagonist Link against his nemesis Ganondorf. However, this is where the similarities end, as Link is always different, and so too is the setting. Very rarely are any of the secondary worlds from the previous Zelda games carried over into the new game and as such each Zelda game can be played without any pre-existing knowledge of the genre. *Zelda: the Wind Waker* was also criticized for its “kiddie” graphics (NeoSeeker, 2002) as being an element specifically intended to gear the genre towards a younger demographic.

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games in this period such as *Resident Evil 4* and *Metal Gear Solid 2*. What these titles did was utilize the same secondary world that their predecessors did, and simply extended the play mechanics to adapt to new and contemporary trends.

Although games such as *Zelda* are ultimately geared towards creating the lowest entry barrier possible, Nintendo has overlooked one of the key points of the contemporary games market. People are not simply playing games in their youth and then forgetting about them in adult life, but rather continuing their game playing habits into their adult life. In some cases, pseudo-individualization can be used to create a renewed interest in a franchises back catalogue and also extends to para-game player psychology where players feel included and appreciated in the development process of their favourite franchises.

This appraisal leaves the Danmaku genre in an odd position. Although Cave will struggle to gain a significant amount of new players to its franchises, it can be guaranteed that those who have been drawn in will ultimately be compelled to explore their extensive back-catalogue. In the past, this would have not yielded profit for a game developer, however due to the renewed interest in “retro” game releases (Coates, 2007) via systems such as the Wii Virtual Console, XBLA, and PSN, there now exists the opportunity for these Niche developers to self-publish and reach a more diverse and importantly, new audience.

**Evaluating Period 4**

Table 8, derived from data acquired from VGChartz (2010B) is a list of highest grossing console games from Period Four. Games that are noticeably missing from this list are the European and North American sporting games, where the PC market was a significant contributing factor. Additionally, *Half Life 2* should be noted as a significant influence on popular gaming during this time with at least 6.5 Million retail copies sold and an unknown amount of copies provided through Steam - Valve’s digital distribution system.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Game</th>
<th>Developer</th>
<th>Platform</th>
<th>Unit Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pokemon Ruby / Sapphire</td>
<td>Nintendo</td>
<td>GBA</td>
<td>15.4M</td>
</tr>
</tbody>
</table>

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24 Adapted from *Metal Gear Solid 2*. Copyright by Konami, 2001. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
When considering the desires of the average gamer during Period Four, it is imperative to consider the impact that the AAA title had on consumer mentality. The arcade market during this period is not factored into the gaming trends of the average gamer, due to the limited amount of new arcade titles that made it to Western arcades when compared to the previous periods.

**Period Four: Empowerment**

Although the Danmaku genre offered significant empowerment to those already familiar with the genre standardizations, it did little for those new to the genre and was a significant entry barrier. Even *Ikaruga* with its Western release and relatively low entrance barrier when compared to other contemporary Shmups found it difficult to attract new players, primarily due to the perceived difficulty of the game in the minds of casual gamers. Where other games gave you the chance to move through the worlds at your pace, the on-rails nature of the Shmup genre proved too difficult, too quickly for most.

Probably one of the most empowering game experiences of Period Four was the use of the Grav-gun in *Half Life 2*. Although this has already been discussed earlier on in the study, it warrants further investigation here. The FPS had always had the upper hand when it comes to empowerment and immersion, however, the ability to use the environment itself against your enemies was unique and a contributing factor to the game’s continued success. One feature that had always been missing from the FPS
genre was the ability to use anything other than a weapon when interacting with the environment. The Grav-gun solved a significant design problem for the genre. Instead of having to figure out the more difficult problem of creating realistic hands and hand interaction in the genre, the FPS acted as the player’s hands and used an uncomplicated input scheme that players would already be familiar with. The Grav-gun created a highly strategic death match experience that rewarded not only time spent, but skill acquired. Successful players were able to dominate the game and not even fire a shot, instead “fragging” their enemies in creative ways like killing them with sinks and toilets, aiding in the sense of schadenfreude.

**Period Four: Flow**

For flow, it is the Shmup genre which appears to be most effective here, but on one proviso: flow will only work for the most experienced players. The Shmups of Period Four relied heavily on memorization in order to complete the game. Enemy placement was purposeful in order to create, smooth flowing game play for those players who could identify the underlying patterns. *Ikaruga* is an excellent example of this sentiment. According to Jimaroid (2003), a gaming blogger, “*Ikaruga* is Gaming Zen; the Buddhist influences are apparent in every aspect of the game, but most uniquely in the way it can take you into a zone of almost meditative and clear thinking. Breathing steadily, clear of thought, the world fades away and all that remains is *Ikaruga* and you”. This Zen-like state is easily observable in the various super-play videos that exist for games in the Shmup genre. The individuals responsible for these videos demonstrate a level of controlled mastery that makes the even the most difficult Shmups seem disconcertingly easy. One of the most widely known examples of the dedication the hardcore Shmup players demonstrate in achieving these super-play videos is the example of the two handed, two-player run through *Ikaruga*. In this example a single player plays both craft at the same time and still manages to get a near perfect game.

![Figure 294](https://www.youtube.com/watch?v=ToBdzV7w5Pc&feature=related)

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245 *Figure 294* *Ikaruga*, two players, two hands, one player. [Online] Adapted from Ikaruga - Chapter 5, Normal, Double play. (Available) http://www.youtube.com/watch?v=ToBdzV7w5Pc&feature=related Copyright by Treasure, 2001. Reprinted under the terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
The reason why these games were able to create such potential for flow was by offering the player clear cut choices, that were always met with clear and consistent rules by the game itself. Furthermore, flow from a game mechanic perspective was achieved by using simplistic game design, balancing strategies such as “triangularity” and counter balance, which, although limiting the amount of initial choices a player could make, gave the game strategic depth. Adventure games still were able to create a sense of flow via narrative and other technological factors, but missed out on this “mechanical” flow, as they often had ever changing rule sets, which were a consequence of their pre-scripted nature. In a normal third person game, there are so many choices offered to the player that it is difficult for the player to create clear cause and effect relationships, especially when it comes to strategy. Many of the choices that the player can undertake in a third person adventure game yield no strategic or game-play consequences. By limiting player choice and giving each action a positive and negative consequence, an effective environment thus enables mechanical flow.

In purely mathematical terms, we can perceive that the majority of 3D, action / adventure games offer the player a world consisting of “NP” problems. NP problems are mathematical computational problems that require $x^2$ or $x^x$ steps; i.e. problems which on first glance have no perceivable end (Koster, 2009). A game like *Resident Evil Code Veronica* is a good example of this. A simple “switch and door” problem in this type of game may, on the surface seem straightforward, but turns out to be far more complex in practice. For one, a player will need to use a number of steps to ascertain where the key might be, or how it may be accessed, and then there will always be intentional barriers along the way that turn a seemingly simple problem into one with literally hundreds of smaller actions.

Koster (2009) states that although NP problems have easy solutions, the player does not know how long they will take to finish, and they also do not know if strategies that they
have previously applied will work. Koster (2009) defines a “P” problem as being one in which the player is always guaranteed to solve the problem in a predefined amount of steps. Ikaruga is a good example of this. By limiting the player’s choice, puzzle solutions become easy, but there is a clear and defined counterbalance for everything that the player does, which essentially resets the puzzle back to step one every time a decision is made. This breaks a large task into small “switches” which when combined and sped up create a fair and equitable experience for the player, where cause and effect and consequence are well defined. Most importantly, P problems enable an environment for mechanical flow to happen.

<table>
<thead>
<tr>
<th>If enemy is black</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Change Polarity to Black</strong></td>
</tr>
<tr>
<td><strong>Advantage:</strong></td>
</tr>
<tr>
<td>- When enemy dies, black bullets are released allowing the player to accumulate power ups for homing laser</td>
</tr>
<tr>
<td>- Player not susceptible to enemy fire</td>
</tr>
<tr>
<td><strong>Disadvantage:</strong></td>
</tr>
<tr>
<td>- Enemy takes twice as long to die</td>
</tr>
<tr>
<td>- Player only receives half the points</td>
</tr>
</tbody>
</table>

| **Change Polarity to White** |
| **Advantage:** |
| - Enemy is defeated twice as fast |
| - Player receives twice the points |
| **Disadvantage:** |
| - Player susceptible to enemy fire |
| - No bullets acquired for homing laser |

Figure 295
Period Four: Instant feedback

Although Shmups in Period Four offer clear and immediate feedback, it is usually only associated with the negative elements of the game: that is, if you are hit, you will die, and if you hit an enemy they will explode. What was never communicated clearly were the underlying hidden features of some of these games, particularly in regards to chaining mechanics. Of all of the Shmups surveyed as part of Period Four, none offered any effective feedback mechanism in-game, which effectively explained how an optimal score could be achieved. Understandably, the Shmups developed during this period where intended for a market already familiar with some of these features, however in the process of undertaking this study, it was noted that many players unfamiliar with Shmups had little idea that *Ikaruga* had the chaining mechanic, and most who played *Espgaluda* did so without even using the secondary fire mode.

FPS games and action adventure games were much better in terms of the feedback that they offered, not only due to higher graphical fidelity, but also because all of these games in Period Four had moved away from the one hit, one kill design mentality that had epitomized games in Period Two and to a lesser extent, Period Three. Having a life system gives the player leniency and also relaxes the consequences of any poor game design decisions, by allowing the player to gain feedback without it being critical to their progression. This was necessary for these types of games, as in the quest for visual realism, many potentially deadly elements in the environment were as signposted as
they were in the games of Period Two and Three. Some games during this period also offered pre-emptive feedback systems, warning players of potential hazards before they encountered them.

**Period Four: Bring the Player to Action**

Although the market for games aimed at a younger audience was a powerful influence on game development during Period Four, no longer were people interested in saving the damsel in distress, nor were they necessarily concerned with alien attackers without agendas. Visualization techniques had also come to the point where a vast myriad of visual styles could be effectively achieved in-game. These visualization technologies also had greater ability to convey visual nuances that weren’t previously possible. This was also reflected in the types of narratives being used in the games studies as part of Period Four. Visual nuances led to an increased ability to convey a more sophisticated narrative to the player. What this led to was a style of game design in which the player was directly motivated to experience more of the narrative.

*Resident Evil Code Veronica* (2002) could almost be considered an interactive narrative, punctuated by various action sequences. *Resident Evil Code Veronica* gives the player an artificial sense of choice, despite the fact that the game is an entirely linear experience. The primary motivation for the player in the game was not really to demonstrate any potential mastery of skills (as there wasn’t much required other than playing conservatively) but rather to stay alive in order to experience how the plot unfolds.

Due to the prevalence of narrative driven games during Period Four, although there exists a motivation for the player to experience the narrative for the first time, there is not the same level of replayability that is offered by games allowing for emergent narrative. One way that games got around this was by allowing for competitive PvP game play modes that encouraged the player to not only stay alive to experience the narrative, but also to use the single player experience to help practice and acquire skills before embarking into competitive PvP play.

In Period Four, *Halo* (2001), *Age of Empires II* and *Half Life 2* all had effective multiplayer modes that were supported by the narrative of the single player game mode. Players were initially compelled to act primarily through narrative exploration, but were then motivated by the acquisition of skills and how this could then make them feel
All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

Competent and empowered when presented with other human players. Although both Crawford (1984) and Cook (2005) attest to the importance of player skill acquisition as being a primary motivator, for some players, without the initial narrative draw card, skills acquisition was not enough. This player psychology is also a consequence of marketing strategies during Period Four. An examination of retail releases of games and their box artwork shows none are sold based on the promise of giving the player certain skills. The majority advertised by using examples of the game’s graphics and a quick blurb about the game’s narrative or underlying secondary world.

**Period Four: Education**

In their quest for visual realism, third person type games suffered from the possibility of giving the player too much choice, most of it irrelevant to successfully playing the game. With all of these choices comes the need for very carefully structured player education. One of the more interesting ways in which this was achieved was in the case of *Metal Gear Solid 2*. Creator Hideo Kojima is known for his often eccentric approach to game design, but for *Metal Gear Solid 2*, this eccentricity led to an obvious and effective way of educating the player which also promotes a sense of immersion.

![Figure 297](http://news.gotgame.com/wp-content/uploads/2008/11/mgs.jpg)

Most of the narrative in *Metal Gear Solid 2* is told through the codec screen, which is meant to be a representation of the main protagonist’s two-way communication system. In most third person games, it is assumed that the player will identify with the protagonist and then on a psychological level, assume that they are the virtual entity that they are controlling. *Metal Gear Solid 2* is slightly different. When in this two-way radio mode, the game’s characters not only talk to Raiden, the game’s

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protagonist, but they also specifically address the player as if they were a third entity within this discourse. These interchanges also help the player to learn new skills and identify potential risks that have little or no telegraphing when actually encountered, as without prior warning the player stands no chance of survival.

Shmups offered very little in the way of new ways of training the player. Although initial levels encounters were structured in such a way as to make required strategies obvious, this was not enough for the majority of Shmup players. One of the issues behind this was the dated tutorial systems that Shmup employed, which was a legacy of the arcade medium as a whole. Shmups, along with most arcade games during Period Four, often had a very brief in-game tutorial that only explained what was new or different about the particular Shmup in question. Fundamentals of the game were often not covered, or they were printed on small instruction cards attached to the arcade machine itself. As many of these arcade machines were simply generic and not dedicated, many operators did not use the instruction cards for fear of them being stolen or vandalized. *Border Down* is one particular Shmup that suffers due to a very poor tutorial system. Although the game is an exercise in nostalgic design, there are a lot of new features that simply confuse the player when first encountered, such as the immediate border switching that happens when the player dies. These abrupt and unexplained interruptions to the game leave the player bamboozled as to what actually happens. Considering that arcade games have a very small opportunity to compel players to play them again, this was a considerable oversight on behalf of the designers.

**Period Four: Challenge and Reward**

Challenge and reward in the contexts of the contemporary, popular games of Period Four relates to the discussion of player motivation. For the most part, reward was embodied in the potential for subsequent narrative experience. One of the games in Period Four that directly rewarded the player for taking risks via narrative is *Silent Hill 2* (2001). *Silent Hill 2* was a game in which player choice and morality played a large role in the type of narrative that would be offered in the game’s conclusion. One of the most significant game design contributions that *Silent Hill 2* created was a type of branching narrative structure that rewarded specific types of players with narrative endings that they would deem appropriate. Put simply, if a player went through *Silent Hill 2* thinking that Silent Hill was a real place, simply filled with monsters, then they would be rewarded with an ending in which all of the problems in the game stem from
these monsters. However if the player acknowledged that Silent Hill was a construct of protagonist James’s mind and that he was in fact already dead, then these players would be rewarded with an ending that was more sophisticated on an emotional and psychological level.

*Border Down* attempted a similar type of narrative-reward approach, however instead of making the type of game ending dependant on moral choices, the game based its ending entirely on skill. Gamers who demonstrated many mistakes in accomplishing the final result would be given a pessimistic and bleak ending, whilst those players who demonstrated overwhelming mastery would be given an ending indicative of their own personal success. Although skill factored into the endings of *Silent Hill 2*, the extreme difficulty of *Border Down* meant that the vast majority of casual players could not even make it to the end once, even on the easiest border.

If narrative was the reward, then the risk for third person adventure games during Period Four was the potential for time to be lost. When compared to Shmups, where the risk was always death, the potential for the player to waste time really doesn’t sound appropriate in comparison, however this time lost was always counterbalanced by players in non-Shmups having the opportunity for incremental save points.

Time lost can also be a consequence of continually failed enemy challenge encounters. The use of finite player lives was also coming to an end during Period Four. Even Shmups such as *Border Down* could see that the concept of lives did not make sense from a practical perspective and was a facet of game design that went against immersion. *Border Down* countered this by using the concept of many, unmanned drones, but in action adventure games, death had lost its permanency. The move away from finite lives also showed that in third person adventure games, it is nearly impossible to account for and subsequently train the player for every possible choice that they could make. By removing death, developers created a gamer more inclined to experiment, undertake choices that have the potential for only small success rates and ultimately add a safety barrier for poor game design. With this in mind, it is easy to see how time lost can be a considerable risk for the player, which ultimately allows the player to explore the virtual world more than what they would if the rules regarding death were stricter.
Period Four: Immersion

The level of graphical realism created by the console and computer mediums led to one of the first truly interactive cinematic experiences since the inception of the laser disc medium in the early nineteen-eighties. Although abstract in their aesthetic representation, games such as *Ico*, *Resident Evil* and *Kingdom Hearts* all created immersive play experiences via the use of consistent secondary world elements and coherency of narrative, aural and aesthetic conventions. Challenge-based immersion was found in all of these other games via the use of complementary PvP modes such as death match and co-op, or via the use of semi-intelligent game entities that offered the possibility for schadenfreude and self-legitimization.

Innovation in technological development such as rendering depth also meant that game worlds could now be large and expansive, offering the possibility for the same visual dynamism that had been a feature in films. These technological innovations also saw the first instances of game physics engines that created the possibility for complex and realistic cause and effect relationships, subsequently embellishing sensory immersion. These cinematic conventions were used in many of the second generation neo-Shmups of the time such as *Ikaruga*, *Border Down* and *Zero Gunner 2*, however, systems such as realistic physics and AI were not found to be used as they did not lend themselves to the pre-determined, pattern based design that had become a standardization of the genre.

Although pre-determined, pattern-based design is contradictory to creating a sense of life like realism, it was found that Shmups, especially Danmaku Shmups such as *Psyvariar 2* and *Espgaluda*, created significant, indirect completion based immersion through high score tables and super play culture. As discussed earlier, these para-game systems also led to a sense of “belonging” outside of the game experience.

Period Four: Contemporary Coding

A number of recurrent themes were observed to be standardizations of the contemporary market. The first standardization that was observed amongst all games analysed, including Shmups and other games, was the usage of saturated colour palettes. The usage of these colour palettes was a consequence of the emergence of new, real-time dynamic lighting and served a very practical purpose of adding definition to the virtual space. Although this aesthetic approach was partly dictated by both technology and necessity, it did resemble the aesthetic styles used in popular culture of the time,
particularly music videos. High saturation and high contrast had become a popular and contemporary means of processing video images. Bands such as Korn used this approach in many of their film clips, both during and preceding Period Four. Films of the time such as Gladiator (2000) and The Chronicles of Riddick (2004) also utilized high saturation and high contrast. In these examples, the use of high contrast and high saturation can be linked with the influence of CGI on the film’s production. In terms of emotional response, the adaptation of this aesthetic method in games can be viewed as an intentional means to remove the childish associations of video games by making them more like the film and cinema products of the time, which were associated with a more mature demographic.

Another contemporary standardization observed in non-Shmups and other non-hardcore game genres was the removal of finite lives from the game environment, thus allowing for higher amounts of risk-taking behaviour. As death was no longer a significant impediment, it meant that players could safely indulge the hedonistic impulses of the id without compromising the need to success imposed by the super-ego. This approach to game design was a legacy of the prevalence of save game systems that became widespread in console games during Period Three. As a result, in-game milestones were found to be closer together, hence alleviating sustained periods of anxiety and reducing frustration for gamers who lacked enough skill to stay alive.

**Period Four: Familiarity**

Period Four can be described as a golden age for game sequels and experience extensions. Apart from *Halo* and *Kingdom Hearts* (2002), all of the games in Table 8 are either sequels or experience extensions, based on existing intellectual properties.

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24 Figure 298 Korn: Freak on a Leash. Adapted from Freak on a Leash. Copyright by Korn, 1998. Reprinted under the Terms of “Fair Dealing” in the Australian Copyright Act, 1968, Section 40.
Admittedly, *Kingdom Hearts* had the advantage of being based on the famous and familiar intellectual property of Disney, and *Halo* was an experience extension of the popular FPS genre. This trend is not just a representation of consumer desire, but also a financially informed decision created by the significant development cost of Period Four AAA titles and the subsequent financial risk that publishers faced. It was becoming extremely difficult for new intellectual property to receive publisher approval and become a reality. Compounding this was the investment of emotion that long term players had invested into their favourite franchise. It is difficult for consumers to forget these positive emotive associations and move to something new, where they would be effectively left to create an emotional bond from scratch.

With both of these factors in mind, it is easy to see why small-scale Shmup developers became financially viable again: innovation was incremental and respectful to the existing consumer demographic. These developers were also part of the consumer base that they were developing for. While not ideal on large scale commercial products, this approach to game design yielded strong results as is evident in the Sega Naomi Shmups, all of which eventually received a home port, at least in the home console market. Nostalgia had become a strong selling point in these games, especially in *Border Down* and the Danmaku style of games released by Cave. Table 8 also reveals the importance of this nostalgic referencing with games such as *Mario Kart* and *Super Mario Brothers* being highly successful titles, not only with younger audiences, but also with the same audiences who had grown up with them during Period One and Two. In all of these examples, familiarity and nostalgia were conveyed using a number of techniques, aesthetic, aural and mechanical. Games such as *Grand Theft Auto* were more adult versions of games such as *The Legend of Zelda* and thus a mechanical reference. *Border Down* used numerous aesthetic and aural cues, and games such as *Mario Kart* used all three methods.

Although this discussion covers Period Four, it now brings the tenth heuristic full circle, demonstrating the importance that familiarity can play when considering that we have an aging demographic of gamers, representing the largest portion of the market. Therefore, before evaluating the findings of this study and discussing the hypothesis, the next section of the study will focus on the tenth heuristic.
**Period Four in Summary**

In the West, the arcade medium had gone into significant recession, triggered by a number of factors, but predominantly due to limited software releases and a strengthened home console market. Shmups and Fighters were still particularly popular in the arcade, however, the lack of Western localization meant that despite the quality of these arcade releases, they became relegated to a much smaller niche market. Although console ports of these arcade titles eventually made their way to the West, for the most part they were over-shadowed by AAA titles. Period Four also represents new blood in the console market with the release of the PS2 and its DVD playback capabilities. Targeting the home theatre market was not a new idea. Consoles such as the Phillips CD-i and Panasonic 3Do attempted to combine home theatre with gaming as early as Period Two, however these systems were met with mixed responses, mainly due to the excessive retail prices associated with these cutting edge machines. Where the PS2 differed, however, was in its price point: upon release in the Japanese market, the PS2 was the cheapest DVD player available and also boasted the ability to play the latest game software. In hindsight this was a significant drawcard as it combined two large parts of Sony’s business in the one medium.

As a result of the melding of cinema and games that the PS2 perfected, there came the preference for cinematic gaming experiences. “AAA” titles became a driving force in consumer desire. Games that were more cinema than game skewed contemporary gamers’ desire but also added a layer of abstraction. Indeed, these games were more “realistic” and graphically immersive than their predecessors, but to the detriment of typical game play: a system of rules that help to define winners and losers. Competitive games were still highly popular, however Period Four is unique in that many AAA titles are narrative based, often with single player modes with no directly competitive mechanics. Although this trend was not common to all Period Four games, it can be seen as a main point of difference when comparing it to previous periods analysed in this study. Shmups were still commercially popular within their niche markets, however, the level of skill required to play these games came at the detriment of entry barriers, something that the AAA market was keen to avoid in the hopes of improving commercial viability.

Shmup developers during Period Four were cleverly cautious. Not naive to the fact that Shmups were a niche product, developers such as Cave instead decided to target their
hardcore demographic. As found during the case studies, this approach is a double-edged sword which, although satisfying the needs of the existing user base, often precludes all but the most dedicated novices from picking up the genre. Whereas the AAA market promoted low entrance barriers, the Shmup genre and its adherence to highly competitive modes of play meant that it no longer met the changing desires of the average demographic of gamers. Period Four is not the end of the genre, however, rather the ending point of this study.

Chapter Six, which follows, is a discussion of the Tenth Heuristic and the potential that nostalgia might hold for the revitalization of the Shmup genre. In the final section of the conclusion, this study will also look at the potential future for the genre, based on the extensive research undertaken as part of this study.
Chapter 6: The Tenth Heuristic, Familiarity & the Findings of the 2004 and 2008 Surveys into Nostalgia and Age

Chapter Six discusses the findings of the 2004 and 2008 surveys which investigated potential links between nostalgic preference and year of birth. The findings from these surveys will be presented and linked to the data gathered as part of Chapter Five. By doing so, this chapter addresses a key objective of the study and adds further weight to the tenth design heuristic. As mentioned in Chapter Four, the tenth heuristic “The Game Must be Familiar” is integral to this study and deserves specific discussion in order to help address the hypothesis. It is the contention of this study that all games must be familiar in order for the gamer to be affected. This has been discussed at some length in Chapter Three and Four. Recurrent themes in emotion experienced by players as discussed in Chapter Three suggests not only a common type of player experience and emotion in effective games, but also the ability to recognize these encoded emotions by a diverse population of gamers. This chapter will examine the impact of nostalgia on gamers’ preferences. This type of analysis has never been done before in the context of gaming. The information contained within this chapter is presented in order to substantiate the hypothesis, by showing that there is a correlation between nostalgic preference and age. This chapter focuses on the case studies presented in Chapter Five, but also refers to the hundreds of games reviewed as part of this study but not discussed in detail within the body of this text.

In Chapter Five, every game studied has had some type of historical reference that informs its design. Beginning with Proto-Shmups, even Space Invaders, there is a clear and logical connection with the art, science and philosophy prior to it. R-Type and Contra referenced not only the games prior to their development, but also sociological and popular culture themes. This trend continues until Period Four, where every game studied references the past in many different ways from the mechanical referencing of Border Down to the socio-cultural referencing of cold war themes in Metal Gear Solid 2. This demonstrates a clear cut link between player preference and pre-existing game experience. Delving deeper, this is an essential discussion which helps bring this study full circle to address the hypothesis that on a core, emotive level, video and computer games have remained unchanged since their commercial genesis and it is merely the means of representing these core, emotive traits which have changed.
The notion that familiarity is essential to not only successful game development, but also this study, correlates with the previously discussed theory of Albert Ellis’s ABC model (2008). Ellis’s ABC model was discussed in relation to the heuristic, “bring the player to action” in Chapter Four. To re-quote an earlier passage: According to Ellis, all conscious reactions require an underlying belief that is not learnt, but rather an element of the subconscious mind, that is, we are only affected because there is an existing belief which occupies sub-conscious thought. Ellis’s model also demonstrates that we are unable to be affected unless we can relate the stimulus to some type of underlying belief. (Figure 299).

How this relates to the Tenth Heuristic and the hypothesis is that experience and sensation are familiar, because they are already part of the psyche of the gamer. More specific to the hypothesis though: this demonstrates that an important constant in the game experience is for players to recognize “represented” emotion in games based on what they already know and have experienced on a psychological level. Ergo, we recognize emotion only because we have experienced the triggers of these emotions previously and subsequently recognize these triggers in the games we play. There needs
to be a proven link between a gamer’s existing experience and the games of which they are most fond. When discussing positive emotional experiences in relation to familiarity, the need for extended discourse on nostalgia and its potential becomes evident.

**The 2004 Data**

The preliminary results from the 2004 study had a sample size of 108 participants with a mean- average birth year of 1979. The 2004 Data shows a graph of the data collected from this study with minimum, maximum and average values plotted along with a linear average trend line ($y = 2.6528x + 1972.8\ R^2 = 0.7926$). The 2004 Data demonstrates a clear pattern and trend. When combined with the console generational data and graphed, a clear relationship between year of birth and nostalgic preference becomes apparent.

<table>
<thead>
<tr>
<th></th>
<th>2600/5200/Pre8Bit</th>
<th>NES/MS/7800</th>
<th>NEO/MD/SNES</th>
<th>SAT/PSX/N64/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generational Height</td>
<td>1982.5</td>
<td>1987.5</td>
<td>1992.5</td>
<td>1999</td>
</tr>
</tbody>
</table>

Table 9

The 2004 Data shows that despite the different ages of gamers surveyed, there is a pattern that suggests there is a correlation between nostalgia and age in the video game market, despite Holbrook’s conclusions of “nostalgia proneness” (1993, p. 245).
Based on the findings of the 2004 data, an average age was subtracted from the “generational height” to ascertain the relative ages at which people experienced their “nostalgic height”. The generational height is derived by creating a mean-average value from the minimum and maximum years of a console’s commercial life span. Table 10 presents the data gathered through this process and demonstrates a range of ages from as young as eight and a half through to a seventeen. Although the first three generations in Table 10 are within a small margin, the higher value seen in generation four can mainly be attributed to the smaller sample size gathered for this generation.
2004 Survey Total Data

<table>
<thead>
<tr>
<th></th>
<th>2600/5200/Pre8Bit</th>
<th>NES/MS/7800</th>
<th>NEO/MD/SNES</th>
<th>SAT/PSX/N64/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generational</td>
<td>1982.5</td>
<td>1987.5</td>
<td>1992.5</td>
<td>1999</td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of Nostalgic</td>
<td>8.547619048</td>
<td>7.882352941</td>
<td>10.19767442</td>
<td>17.1</td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10

When averaged, the data presented as part of the 2004 study found that an individual experiences their nostalgic height at an age of 10.93191. The findings of the 2004 survey are more representative of the findings of Davis (1979), and Kessous & Roux (2008) than that of Holbrook, citing that nostalgic peak in relation to video games occurs during early adolescents rather than the individual’s early twenties.

**The 2008 Data**

After redefining the survey question in accordance gathered as part of the 2004 survey DP, KC and AA were used for the collection of data in 2008. Participants were asked to nominate the period of gaming that they felt most nostalgic about, or still played to this day. They were also asked to provide their date of birth. In total, the 2008 survey had a sample size of 83 participants. AA had the lowest average date of birth of participants (1973.467), whilst DP had the youngest sample on average (1980.549). Combined with the average birth date data from KC, the average year of birth for the 2008 study was 1976.667, only slightly lower than the 2004 study (1979).
All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

The most convincing data that a relationship exists between year of birth and nostalgic preference came from the data gathered from DP (Figure 301). Of the 2008 data, DP represented the largest part of the sample size, with thirty-six participants with an average year of birth of 1980.549. Based on this data set, the average age for nostalgic height preference was 10.95 (Table 11).

When the data from the 2008 data was combined, a slightly different result was found (Figure 302). The linear trend line \( y = 1972.9e^{0.0008x} \) finds a similar average trend, to the 2008 DP data (Figure 301), however with less of an upwards trend \( y = 3.3912x + 1972.1 \). The reason for this is due to some skewed results from the samples taken from
AA and KC: specifically, respondents with a year of birth of 1962 and 1960, for generations four and five respectively.

When compared to generational height, the 2008 data represents a similar relationship between year of birth and nostalgic preference as seen in the 2004 study. 

When compared to generational height, the 2008 data represents a similar relationship between year of birth and nostalgic preference as seen in the 2004 study. (Figure 303).

Table 12 is the total data collected from the 2008 with the omissions of Period One, six and seven which did not have a high enough sample size to provide a fair representation. It also should be noted that generation five, had one of the lowest sample size of eight, so the data gathered from this generation will need to be tested in future years, although this is outside the scope of this study. After the data has been collected, the 2008 survey found that a gamers’ nostalgic height occurs around the age of 14.8, which is higher than the first study in 2004. Based on the combined data of the 2004 and 2008 study, it is safe to assume that the height of nostalgic preference occurs between the ages of 10.9 and 14.8, a period of around four years.
To relate the data gathered during these studies back to the case studies as presented in Chapter Five we need to consider how nostalgic proneness might have influenced the development and subsequent success of the games analysed. For example, if one was to trace the success of *R-Type* back to specific examples of nostalgia, then using the data gathered as part of this analysis, we could conclude that western science fiction of the early to mid-nineteen seventies could have played a significant role in shaping the desires of consumers in 1987, however this all depends on having access to gamer demographic information which simply is not available for that period. What makes this process more difficult is the fact that average age statistics for gamers are next to impossible to ascertain for the years prior to 2000. Figure 304 shows average age data generation from ESA reports over a six-year period, with a linear average forecast, predicting average age trends back until the year 2000.
It should be noted that the ESA data is produced by an American industry organization, representing various commercial and political interests. The research undertaken by the ESA is not publically available for public scrutiny, nor does it give any methodology as to how it ascertains exactly what an “average gamer” is. Nevertheless, it is one of few accessible sources that make records available. The ESA data used to create Figure 304 can be found in the bibliography under “The Entertainment Software Association, 2004-2009”.

If games have not changed on an emotional level since their inception, then the data presented above in Figure 304 provides a way to objectively appraise this, using the familiarity heuristic and data gathered during the case studies in Chapter Five. As the linear average projection in Figure 304 can only be reliably traced back to the start of Period Four of this study, it is more difficult to give objective comparisons between nostalgia and age and the preceding periods studied, however, it is possible to give a somewhat objective appraisal for Period Four.
Implications of the Data

Applying the above data, if the average age of gamers at the start of Period Four was roughly 24 to 25 years of age, then their average year of birth would be around 1976. Based on the combined findings of the 2004 and 2008 survey, then by projecting forward 10.9 to 14.8 years, we can see a window of potentially nostalgic reference material available (not necessarily just released) in the time frame spanning 1986 until 1991. Beginning with Border Down as studied in Period Four of Chapter Five, we can see that this nostalgia and age data matches the tenth heuristic evaluation. As seen in the case study, Border Down was intended to be a spiritual successor to Metal Black, which was released in 1991. Border Down also used a number of elements seen in the Darius games from 1986 through until 1989. Additionally, Border Down utilized a branching level selection system popular from 1984 until 1997, which occupies a standard deviation of four years around the predicted birth year.

There were also popular culture, aesthetic and mood references to Return of the Jedi, released in 1983, and widely available and consumed between 1986 and 1991, or with the standard deviation, 1982 until 1995.

Metal Gear Solid 2, released in 2001, uses a similar nostalgic “window” to that of Border Down. As with Border Down, Metal Gear Solid 2 also makes heavy use of nostalgic referencing by utilizing socio-cultural themes derived from the cold war era, which ended during the period between 1986 and 1991. There were also extensive references to 1980s films such as Rambo, First Blood, released in 1982, with a sequel in 1985. Themes drawn specifically from this reference were the notions of the “lone wolf” warrior with deep-seated emotional issues that is seen in the game’s protagonist “Raiden” and also in the character of John Rambo. There are also specific visual references when comparing the character of Roy Campbell in Metal Gear Solid 2 with

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A standard deviation of around four years either side of this figure were found after filtering data based in mode averages.
As seen throughout Chapter Five, this type of process can be applied to all of the games studied, Shmup or not. However in order to prove the hypothesis, a logical connection between these nostalgic cues, whether they be aesthetic, narrative, or secondary world based, and emotion, needs to be shown. What this particular empirical data finds is that there is an underlying desire to re-create or re-experience the familiar, especially the nostalgic, because it holds the most positive emotional experiences for the gamer. Not only does nostalgia hold some of the most positive emotional associations, it also possesses some of the most fondly regarded negative emotions. Schadenfreude is a good example of this, as there might be games in the players past experience where schadenfreude was well communicated through a particular method of representation.
Thus, when they experience a particular form of nostalgic schadenfreude representation in their adult gaming lives, it automatically creates a positive association, akin to Ellis’s ABC model studied earlier.

When this data is also applied to game development cycles, there is also enough data presented in Chapter Five to suggest that these nostalgic experiences not only influence consumption of video games, but also development. Evidence of this exists in the proto-Shmup analysis in Chapter Two where developers would continually reference successful games made in the years prior to their own, as well as implement themes that could be traced back to nostalgic roots. Although the proto-Shmup study focused heavily on the notion of pseudo-individualization, the data presented here also seems to suggest that on an emotional level, pseudo-individualization is somehow comforting and desirable in the minds of both consumers and developers. To bring this study full circle, we now need to address the research question and ask what have gamers actually been playing? To do this, the concluding chapter will examine the majority of games studied in Chapter Five and analyse them based on emotional affects.

**Limitations of the data**

It needs to be acknowledged that further work is required in regards to this particular type of statistical analysis. There are two main reasons for this. The first is that it was found to be difficult to get significantly large sample sizes. No incentives were offered for undertaking either of these two surveys, however my motivations were made clear. The second issue is that there needs to be on-going, preferably annual, work undertaken involving these survey questions. Of the two points of concern, the second is the most significant. The deviation between the final findings of both studies can be attributed to a number of variables such as the changing of the console generation or simply the popularity and changing userbases of the forums selected. One of the other reasons for deviation however could be more to do with an aging gaming demographic. There is no data which looks at gaming habits per-capita and as such there is no definitive way to tell how sample sizes for particular age groups may skew the overall results.
Chapter 7: Conclusion

At the beginning of this study, the notion was put forth that on a core, emotive level, video and computer games have remained unchanged since their commercial genesis and it is merely the means of representing these core, emotive traits which has changed. At the heart of this discussion was the phenomenon of representation, a process by which emotion and sensation could be encoded into a relatable means for communication. These emotions and sensations which later lead to affect in the psyche of the player were represented differently in video games over time, partly to do with contemporary trend effecting communication, but predominantly due to advancements and changes in the technologies used in games. Found in Chapter Five was a situation in which both Shmups and non-Shmups offered the same list of emotional traits as found in literature reviewed in Chapter Three, however, in the case of non-Shmup games these emotional traits were communicated differently over time.

Shmups did adapt to changing cultural trends and advancements in technology, due to the limitations in their mechanical definition as discussed in Chapter Two. Shmups were not able to use these new technologies to their full extent, particularly in relation to virtual world navigation and visualization techniques. FPS games were able to utilize new 3D technologies and game design strategies to their advantage, however, Shmup developers were hesitant to change the formula of their designs, particularly during Period Three and Four, due to fears that any change might alienate portions of the mostly hardcore gamer demographic that consumed them.

As found in Chapter Five, this hesitation to change and evolve led to a clear example of divergence in consumer desire. Despite Shmups being the most prolific genre of gaming during Period One, the demise in their production and consumption was found to be linked to changing desire by gamers. Another element found in the case studies presented in Chapter Five was a symbiotic relationship between contemporary elements, technology and familiarity. Contemporary desires drove technology and technology drove contemporary desire. However, what limited this process was the need for familiarity, as a product could never be successful without having a set of already familiar triggers in the representation from which players could be affected.

To address the research question and provide a logical means to bring this study full circle, this concluding chapter will present the findings from Chapter Five by addressing
each heuristic, how that heuristic led to emotion and how the heuristic was changed over time to address changing desires in players. By using this approach, this chapter will work backwards from the case studies, to the heuristics and then to the emotional representations (Figure 306). This approach will relate the large body of work that is Chapter Five back to the original hypothesis.

![Figure 306](image)

Now that all of the heuristics have been evaluated individually, a more holistic evaluation will tie these pieces of evidence together in support of the research question. As the tenth heuristic has been covered at length in Chapter Six, this heuristic will now be summarized and the implications from this chapter presented as questions for further research. This chapter will also specifically address the potential future of the Shmup market by reflection on changing gamer demographics over time.

**The First Heuristic: Empowerment**

Empowerment leads to a number of emotive traits ranging from awe (when action can be linked to on screen consequences, especially destruction or “domino effects”), schadenfreude, naches, ownership, rebelliousness, immorality, self-legitimization, achievement, the feeling of being autonomous and competent, a sense of freedom and obviously the sensation of empowerment itself. Secondary consequences of
empowerment also mean that the player can experience fun, mystery, excitement, amusement, fantasy and belonging. As empowerment covers all of the essential emotive traits, it needs to be part of all effective games. Empowerment is not only the ability to exercise control over the virtual environment, but also the ability to have consequence, creating a distinct cause and effect relationship between the gamer and the game itself.

Shmups during Period One used two mechanisms to control empowerment, and hence put it into both positive and negative states (empowerment, disempowerment) to allow the player to experience different emotional states. The two main mechanisms used to do this were: enabling the player to have extended line of sight to promote empowerment; or reducing line of sight, disempowering the player. The second way that Shmups implemented this heuristic was by creating clear cause and effect relationships via the depiction of on screen destruction, leading to many emotions, but particularly awe, empowerment and schadenfreude.

As found in the case study of Period One, different ADSR curves for vertical and horizontal movement were problematic in games that referenced Shmups and their precision, twitch-based mechanics. In the literature review of the empowerment heuristic, it was found that control played an essential role in conveying this heuristic. One of the key elements regarding movement and empowerment was the need for clear and consistent ADSR curves. Different ADSR curves when used in the same game and combined with limited line of sight as seen in Contra are problematic. It was found that inconsistent ADSR curves lead to extended periods of tension, which, when counterbalanced with relief, is not problematic, however, as noted in Contra and its continually spawning enemies, there was minimal relief emotion offered to the player. Although in modern contexts this approach would be unacceptable, it was found that this approach to game design was a standardization of the arcade medium and hence not problematic within the time it was created.

Ownership, achievement, inquisitiveness, freedom and empowerment during Period Two were implemented in Shmups by the introduction of macro-management mechanics such as rhizomatic level selection and purchasable power ups. Another reason for the introduction of these mechanics was to match the desire for more prolonged game experiences brought about by the renewed interest in home console gaming. Indeed, the addition of macro management gave the normal game mode of
Shmups purpose and met with changing desires, however, due to the limitations of the genre, the implementation of these mechanics could never take precedence over the normal game content.

Macro management type games were ideal for the home console and computer markets as they rewarded careful choices over twitch. Due to the extensive amount of control that the gamer can exert, they felt extremely empowering when designed correctly. Consumers of these two mediums looked for value for money and that translated to games with extended play experiences, rather than games that promoted short bursts of game play that the arcade medium was known for. *Sim City* and *Elite Plus* were all good examples of this approach to game design. Although there was desire for a diverse range of games, and both quick and slower game experiences, Period Two was a time in which home consoles developed an identity of their own, rather than simply being an affordable way for consumers to play ported arcade titles.

One of the few Shmups during Period Three to implement the empowerment heuristic effectively was *Raiden Fighters* and its successors. *Raiden Fighters* depicted a very specific cause and effect relationship between the player and software, embellishing the player’s actions within the game world by depicting embellished and over-the-top explosions, catering to the player’s sense of empowerment, immorality, rebelliousness and sense of awe. Unfortunately, *Raiden Fighters* did not get the recognition it deserved in the West, due mainly to the mentality of arcade operators of the time preferring games with proven track records instead of taking risks on new games.

Freedom and the illusion of choice were key elements in the success of *Grand Theft Auto*. Whereas other games had locked the player into a predefined series of scripted events, *Grand Theft Auto* allowed the player to take ownership over their play experience by allowing them to explore the sand box of *Grand Theft Auto* however they saw fit. Although this style of game mechanic is not ideal for all games, what it demonstrates in terms of consumer desire is the ability to pace the game experience as they deem fit. *Grand Theft Auto*’s environment only works due to save-game facilities, which were quite new to the medium of console gaming. Using this system gives the player a sense of empowerment that extends beyond the software and continues into their day to day lives. Games such as *Grand Theft Auto* could be played in short bursts
or long bursts and even replayed time and time again until the player achieved their desired outcome.

Empowerment in Shmups during Period Four was usually only available to the most seasoned Shmup player. Excessive difficulty and reliance on long standing standardizations created a significantly high entry barrier for people wishing to play Shmups. Shmups still offered emotion to these players, however it was usually fiero and frustration, devoid of any of the more desirable emotional states.

First appearances also meant much to potential gamers, especially during Period Four. Despite the excessive difficulty of Shmups of this time, gamers were often not drawn to the genre as on the surface Shmups looked ‘old hat’ and hence did not represent contemporary, desirable standardizations as they pertain to empowerment. A lack of realism in the representation (third person perspective as well as usually lower detail graphics) meant that player did not perceive the Shmup genre to be empowering from the perspective of creating a relatable context.

In non-Shmups games during Period Four, the sand box environments from games like *Grand Theft Auto* allowed the user to exercise real world conventions in the virtual environment. *Half Life 2* embellished this type of empowerment by giving players an elegant means of manipulating their environment, which also served as a unique and effective game mechanic. This ability to have realistic levels of control over the play environment was explored by a number of titles, however, it needed to serve some type of game play purpose in order for it to be effective, and for the player to feel encouraged to use the technique.

**Empowerment over time**

Control over the play experience was a key way in which this heuristic and its associated emotive consequences were implemented. Ultimately, having control over an avatar and its movement was not enough as time went on. Players demanded control and customization of as many facets of their game play experience as possible. As discussed, this need to exercise empowerment also extended to the players’ day-to-day lives. Gamers not only desired to control the game, but the terms and conditions in which they played that game.
Embellishing cause and effect relationships in realistic and non-realistic ways was also important to the changing desire in the implementation of this heuristic. Every action needed consequence and even these consequences needed to lead to further actions (Domino effect). The emotions associated with this heuristic are still available in Shmups, but only a very small percentage of gamers are able to experience these due to the high entry barrier and skill level required to feel empowered within the game world.

Technology plays an important role in the implementation of this heuristic. Often technology in games is primarily associated with graphics, however technological advances such as physics systems, networked play and increased memory processing capability have supported the development of this heuristic more than graphics. It has been found in this study that the ability of the game engine to manage multiple in-game assets and continuously track their states is integral to the implementation of this heuristic. Further, it was also found that the game design needed to give the player the ability to apply strategic movement patterns in-game that made them feel empowered and “clever” in comparison to the other game entities. When players were limited to strict movement conventions, they felt disempowered, however overly complex movement systems worked against flow and player education heuristics.

The Second Heuristic: Flow

Over the course of the study, the implementation of flow utilized different means. In the early stages of gaming, flow was primarily conveyed by the game’s mechanical systems. During Periods Two and Three, this moved to more of a narrative focus (albeit with a strong mechanical focus) and then to the emotive flow standardizations in Period Four. Although flow does not necessarily directly create specific emotions, its successful implementation provides a more effective environment for the other heuristics to convey their respective emotions and sensations.

As narrative was prohibitively expensive to implement in the games in Period One, Flow needed to be achieved via the mechanical systems of the game adhering to Ng’s (2005) and Csikszentmihalyi’s (1991) explanations of flow implementation. In this regard, both Shmups and non-Shmups did well, however, the truly effective games of the time were careful in the way in which they implemented “a challenging but tractable task” and “clear goals and immediate feedback”. Gamers’ desire was quite uniform in regards to how this heuristic was represented during Period One. Notable exceptions to
this were games in which the player had to continually adapt to new systems and hence be cognisant of the game rules, rather than the game itself. In this regard, players preferred consistency from the game play experience once initiated and this expectation remained unchanged throughout the case studies in Chapter Five.

Intuitiveness of control and duration of play experience became important factors in Period Two in regard to flow. In the case of control, Shmups had the upper hand when compared with the popular medium of fighting games. Whereas Shmup controls were simple and intuitive, the steep learning curve associated with fighting game control schemes was a factor that made it difficult for novice to intermediate players to achieve flow. In this regard, simplistic controls, or rather intuitive controls, were desirable in this period, but the extended playtime of Shmups was not desirable.

“A challenging but tractable task” is one facet of flow in which Shmups became less effective during Period Two. Although this is not necessarily applicable to all Shmups of Period Two, the trend to longer levels in the majority of games of the genre meant that milestones such as level change interludes were far more difficult to achieve. Players desired tractable tasks such as those seen in fighting games, where the game play experience was divided into a number of micro-encounters, all of which offering foreseeable and consistent milestone placement. Alternatively, some Shmups even went to the length of not allowing the player to start from where they died, further creating an undesirable “tractability”. Tractability and milestones were found to alleviate moments of prolonged tension and provide essential moments of relief for the player.

In addressing the flow heuristic in Shmups of Period Three, embodied narrative was seen to be a desirable trait of games of the time. As Radiant Silvergun is one of the few Shmups to incorporate and effectively achieve narrative flow, it does not form a good basis for comparison, as it is the exception to the rule, not the norm. When a player’s desire was shifted to narrative driven games, Shmups could not compete, especially on the home console and computer mediums. Mechanical flow was achieved in many of the Shmups of this period via use of chaining mechanisms and strategic enemy placement; however the tractability of these mechanical systems suffered due to the extended playtime before feedback milestones were achieved, if achieved at all. Whereas games had only previously designed to be beaten via the acquisition of skill, the focus on narrative flow in Period Three meant that desirable games in the popular
market context needed to be shifted away from these complex mechanical flow systems as they were only accessible to a minority of gamers, rather than the majority.

Fighting games especially focused on elements of mechanical flow, however they began to be relegated to the hardcore minority during Period Three. Button mashes such as *Soul Calibur* and *Tekken* though proved popular due to the ease at which even a novice could have the illusion of exercising control and consequently experiencing a state of flow. Narrative flow, particularly emotive flow, had become more desirable during this period. Gamers began to expect specific combinations of emotions, which in turn created a sense of forward propulsion in the games narrative, thus aiding in the sense of flow. As the play experience was reliant on time spent, rather than skills acquired, it meant that flow could be achieved in a wider demographic of gamers, subsequently making the game more effective from a marketing standpoint.

Mechanical flow in Shmups during Period Four had attained its peak, at least as far as the hardcore minority of Shmup players were concerned. Distilled mechanics as used in Shmups of this period were simplistic, yet difficult to master and created “P” problems which more effectively created mechanical flow when compared to the NP problems that were part of the mechanical aspects of AAA games. Desirability of these types of effective P problem Shmups saw resurgence in the Japanese market and limited export market of Shmups, however failed to create a significant impact on the wider demographic of average gamers.

Period Four’s flow mechanic in “other games” was not too dissimilar to that as seen in Period Three. This particular implementation of the flow mechanic was still the most desirable in terms of the average gamer, however, as game development focused on creating visual realism by removing non-diegetic feedback systems, NP problems began to emerge in opposition to creating a sense of mechanical flow. These NP problems often created “stalemate” scenarios in the game that created frustration and broke the player’s sense of flow. Games which successfully addressed these issues were those with a clear game language. These games complemented the narrative flow with a mechanical system that focused more on P problems, rather than NP problems.

**Flow over time**

Developers acknowledged the fact that not all gamers could complete their games and that this was a problem when games began to be sold in their entirety (computer and
console games) as opposed to games sold in micro encounters (arcade games). In the eyes of the consumer, there was considerable risk with buying skill-based games, as there was no guarantee that they would possess the skills to be able to complete the game and hence experience the emotions intended by its developers.

Narrative games, on the other hand, represented value for money in the eyes of the consumer. Consumers began to expect that all games could be beaten again, in stark contrast to the standard that Space Invaders set in 1978. Flow could be carefully implemented in narrative-based games as features such as pacing, sensation and emotional content could have their deliveries timed. Therefore, creating effective narrative flow was deemed to be more desirable in the mindsets of average gamers. Not to be ignored though are the mechanical flow systems that appeal to more hardcore and specific gaming demographics. In the case of the hardcore minority, narrative flow can be beneficial, however, mechanics must always come first.

**The Third Heuristic: Bring the Player to Action**

Before the player is brought to action, emotions such as mystery, anger, fiero and even frustration must be conveyed alongside the more positive emotional traits. As discussed throughout, the most effective way to compel the player to act is to trigger powerful subconscious memories and associations. The methodology outlined two main ways to ascertain the effectiveness of this heuristic - traditional psychoanalytic frameworks, as well as semiotics (visual, aural and kinetic visemes). It was found in the course of this study that object relationships played an important role in conveying sensation (compression and funnelling as well as kinetic visemes), whilst visemes were more associated with conscious processes.

Compression and funnelling played an important role in the player’s emotional response to games during Period One, particularly those which backed up this mechanic with supporting aesthetic visemes. The sense of anxiety and subsequent relief conveyed by the use of this mechanic in games such as *R-Type* and *Darius* is testament to the effectiveness of this approach to compelling the player to act and as such, was found to be used in many effective games after this period.

Another design element that Shmups designers excelled at during this period was enabling self-legitimization through screen clearing (sweeping) techniques in the game.
mechanic. This mechanic was found to appeal to two polarized emotional responses. First, it was found to lead to fiero and anger, due to the kinetic relationship between the objects and the player and their compressive forces. Secondly, it was found to lead to emotions of relief, awe, schadenfreude and the sensation of feeling competent when the player was able to repel these compressive forces.

As discussed in the evaluation of Period One, sweeping and clearing had been a legacy of the arcade genre and was most directly related to indirect completion through score table systems. What was seen during this period was a desire for sweeping and clearing to serve more on an intrinsic, less competitive purpose. Through their commercial success, games such as *Metroid* and *Zelda* proved that gamers desired sweeping and clearing to contribute to another game system, not necessarily scoring. Games such as *Zelda* and *Metroid* demonstrated the power of sweeping and clearing when it was also used to support the mechanic of wealth and accumulation. The combination of these two systems allowed for greater depth of emotion in exploration, awe and empowerment. The desire for this approach became even more apparent in the findings of Period Two.

As seen in the case studies of Period Two, Shmups attempted to personify elements of the gaming experience in order to bring the medium more in line with contemporary trends of the time. In a vast majority of Shmups analysed during this period, personification was seen to help give the player more of a relatable environment to aid in the transmission of emotion. One of the driving factors behind this desire for a personification of the gaming experience was found to be the increase in graphical fidelity offered in games of this time. Previously graphical resolutions and colour depths had not adequately depicted semi-realistic characters. With the advent of these technologies, personification not only became possible, but also desired. For some games such as *U.N. Squadron* and *Aero Fighters*, this system served a mechanical purpose by altering narrative and game characteristics; however, it also acted as an essential communicative tool to help convey emotion from the avatar to the player.

The personification of Shmups was driven largely by other games of this period such as *Street Fighter 2* and *Wolfenstein 3D*, which all relied heavily on the humanizing of abstract game worlds to compel the player to act. Non-Shmup genres had the ability to render the game experience from a first person perspective, thus removing a layer of abstraction from the game experience and hence creating a more intuitive game
experience, as it more closely followed the conventions of real life. Further, the removal of the avatar as a mediating agent between the player and the game world significantly changed the kinetic semiotic relationships. Now that the player sitting in front of the machine was an object in the kinetic relationship rather than an object in the game world, their relationship with the game went from a spectator role to a personal one; as a consequence, any threat directly aimed at the player was now literally focused on the person in front of the machine. It was found in this study that this approach to visualization removed an element of “cognisance of abstraction” from the gamer and therefore made it easier to trigger sub-conscious cues, thus leading to the same, albeit more personal emotional responses. The popularity and subsequent desire of the first person environment is seen extensively during and after Period Two.

It was found in the case study of Shmups during Period Three that there was a wave of Shmup development dubbed Neo-Shmups which attempted to further adapt 3D technologies and remove layers of visual abstraction by placing the player behind their craft in order to come up with a compromise between the third person perspective of traditional Shmups and the more desirable first person perspective which was being used in other games. Many of these Shmups also attempted to use more empowering control schemes, allowing the player to engage enemies in a more strategic manner and hence feel more empowered and competent in their gaming experience. In compelling the player to act, this approach was found to appeal more to the casual gamer rather than the hardcore gamer, who instead chose to pursue the other branch of Shmup development during this time – Danmaku Shmups. Danmaku Shmups compelled competent players to act by using a more embellished mechanism of sweeping than was seen in the Shmups of Period One. Although these Shmups compelled a certain minority to act and indulge their ego, the difficulty curve meant that the vast majority of gamers who played these Danmaku gamers felt nothing but frustration.

The desire to personify the game experience in Period Two had a significant impact on all forms of gaming, but in the quest to bring realism and more relatable experiences to gaming, essential elements such as telegraphing were lost. By the time Period Three emerged, game designers had found ways in which to address the telegraphing issue found in the case study of Period Two. Not only was telegraphing found to make the game experience more fair and equitable, it also embellished the emotions of empowerment, schadenfreude, fiero, naches, rebelliousness, immorality and

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achievement, as the enemies within the game, although acting “realistically”, were considerable easier to “outsmart” and more able to legitimize the players’ ego. Shmups, particularly Danmaku Shmups, make a good comparison point here: gamers like the appearance of a difficult game as it makes less competent players feel legitimized. Danmaku Shmups, on the other hand, had non-realistic depictions of enemies, which were far more numerous and had far less telegraphing to warn novice players of incoming dangers. This made the player feel disempowered, as they had been beaten by some type of abstract entity, not another ‘intelligence’ as other more realistic games depicted.

Another element causing the player to act during this period was narrative flow. Mechanical flow was essential for games aimed at the hardcore market (particularly Shmups), however as this state of flow was not achievable for the majority of gamers, narrative flow became more important in bringing the player to action. One benefit of this approach was that it enabled game designers to time the emotional delivery of the game, ensuring that a deliberate mix of positive and negative emotional states could be achieved.

Period Four was a time of mass pseudo-individualization for the Shmup genre. Instead of focusing on the larger market, developers such as Cave attempted to embellish the elements of the genre that most appealed to the hardcore minority of Shmup players. This process of pseudo-individualization focused on artistic style and mechanical flow states. The majority of Shmups analysed during this period of time avoided narrative flow, especially overly complex narrative, and instead focused on distilled mechanics which appealed to the hardcore minority of Shmup players. These distilled mechanics compelled hardcore players to act by providing, fair, yet extremely difficult play modes that created the opportunity for significant self-legitimization and emotions of empowerment and the sensation of competency not offered in the average games market. Interestingly, this approach to game design embellished the emotion of belonging. The super-play culture provided the opportunity for gaming “elitism” and a sense of belonging in an exclusive club, not offered in the casual gaming market. This was found by looking at the para-game culture surrounding Shmups such as online score tables and user-focused discussion forums.
Although contentious, it was the finding of this study that in Period Four, the popular games market had become host to games that were far less difficult within a historical context. Players began to expect that all games could be beaten, and further, should be able to be beaten given enough time, rather than skill. It was found that the illusion of difficulty and subsequent accomplishment was important in effective games of this era. The player needed to identify with traditional “blockers” within the game that offered the negative emotions such as anger and frustration in order to feel compelled to act. These blockers were found to be used to prohibit further narrative experience, hence narrative experience had now become the goal. Cut-scenes and scripted events were also found to be popular, as they were an effective way of ensuring that the player received the intended emotional content.

Narrative elements of “other” games were also found to support multiplayer game modes, as they often acted as extended tutorials for the multiplayer aspect of the game. Players who wanted to experience high amounts of schadenfreude were more likely to do so if they had played the narrative elements of the game first, before embarking on the directly competitive multiplayer modes. It was found throughout the study that the ability to experience self-legitimization through schadenfreude was a significant contributing factor to player motivation.

Bringing the Player to Action over time

Found throughout the case studies in Chapter Five was the need for self-legitimization. This became a driving factor behind bringing the player to action. Shmups had always allowed for self-legitimization, especially the Danmaku Shmups, which began to become popular with hardcore Shmup players in Period Three. However, these games could never achieve the same level of self-legitimization that other games could, as no Shmups offered a directly competitive player-versus-player mode.

Another component found in relation to this heuristic is that there always must be the illusion that the game is more difficult than it actually is. Games that effectively applied this heuristic were those that played on the gamer’s inherent shadow archetype and made the game about the player’s own inner demons, rather than some abstracted set of experiences. It is here that psychoanalytical process becomes important to the analysis of game design. As all sensation and emotion is first experienced on a sub-conscious
level, it is essential that these subconscious processes be explored during any game analysis, as they lead to such powerful and diverse emotional states.

**The Third Heuristic: Flow**

Two approaches to achieving flow were found in this study: narrative or emotional flow which created a series of logically connected emotional states; and mechanical flow, which is achieved via the implementation of “P” problems in-game mechanics. Emotional flow is usually achieved via narrative systems that offer a consistent and accessible emotional experience to all players. Mechanical flow, via the implementation of P problems, offers frustration and anxiety to inexperienced players, but offers more skilled players greater sense of competency and self-legitimization than narrative flow.

A characteristic which defines all Shmups and “other games” of Period One is the usage of solid-state memory in order to remove any technological distractions from the gaming experience. Solid-state memory, however, was problematic in that it could not store vast amounts of data, therefore meaning that most games in Period One could not rely on narrative flow, and hence had to be focused on mechanical flow. Shmups excelled at mechanical flow, as seen through the case studies. One of the main reasons why this was found in all Shmups was consistency in ADSR curves for spatial navigation and extensive usage of P problems in the mechanical design.

P problems were also used extensively in other games of Period One, however, games such as *Contra* were found to have used inconsistent ADSR curves and game play modes, which are detrimental to the sensation of exercising control and creating a challenging but tractable task. Interestingly, the ADSR curves used in *Contra* were only problematic because the game utilized enemy projectile barrages directly taken from many Shmups of the time. For other platformer games such as *Metroid* and *Super Mario Bros.*, these ADSR curves were not as problematic, as these games were not primarily about negotiating barrages. For players who experienced difficulty with *Contra* and its inconsistent ADSR curve, emotions such as anger, frustration and a lack of empowerment would not be uncommon.

With the advent of greater storage capacity, Shmups were developed with significantly longer levels, resulting in longer play times before emotions such as relief could be experienced. In regards to flow, this approach was found to be detrimental to achieving a challenging but tractable task as the player had less incremental milestones by which
to break up their game play experience and reflect on the skills required to get them to this point.

Although the advent of CD based storage media created significant issues with creating a state of flow in some games, there was a push to creating micro-encounters in games that offered a better chance of creating flow via the element of a “challenging but tractable task”. These micro encounters gave the player smaller and more manageable increments by which to achieve milestones, allowing for reduced periods of anxiety that were balanced with more points of relief. Fighting games such as Mortal Kombat and Street Fighter II executed this well, as did more linear, level based games such as Wolfenstein 3D and Sonic the Hedgehog.

As discussed earlier, Shmup development during Period Three can be defined by examining two approaches: the neo-Shmup, which attempted to make the genre match contemporary desires, and the Danmaku, which focused on creating a more hardcore version of the genre. Each variation of Shmup was found to contain elements conducive to flow. Radiant Silvergun managed to merge narrative flow and mechanical flow, although the narrative imposed length requirements on the game play made it difficult to finish the game in a short period of time, thus not being conducive to Shmup players looking for score attack challenges. DoDonPachi had a well-defined set of mechanics, however, it suffered from lack of narrative and excessive difficulty, which meant that it precluded many gamers from experiencing its well-designed mechanical flow system.

Other games such as Street Fighter 3: Third Strike were found to have highly effective mechanical flow systems, however as with Shmups of the period, these games were too difficult for the majority of gamers to be able to experience their flow systems. What sets Period Three apart is the focus on narrative driven games and the subsequent creation of emotional flow that stems from them. The desire for narrative was discussed as part of the heuristic “bringing the player to action” but it also pertains to flow, as these hard-coded narratives were found to create a well paced sense of emotional flow. Game play in these games also used the micro-encounter approach to accentuate the challenging but tractable task component of flow, however these micro-encounters were punctuated with narrative interludes, turning the player from active participant to receiver. As a result, the game experience focused on mystery, awe and exploration (inquisitiveness) with short game play experiences containing heightened tension. This
heightened tension was found to improve the perceived value of the narrative interludes, thus embellishing the associated emotions.

It was found in the case study of Period Four that nearly all Shmups surveyed had moved away from trying to address the popular market, especially in the West, and instead decided to focus on appeasing the desires of the hardcore Shmup minority. The distilled mechanics which define Danmaku Shmups of Period Three were further distilled and refined to embellish the states of mechanical flow, only achievable by skilled and dedicated gamers. Even Border Down which had a well defined narrative is not a Shmup aimed at a wide market similar to Radiant Silvergun, but rather a very specifically targeted work of nostalgia, aimed at an older demographic of Shmup players.

During Period Four, a desire for narrative driven games with NP problem game play was found to be common. NP problems were found to be detrimental to mechanical flow, however, the narrative flow compensated for this and offered many gamers the same emotional content, regardless of the level of skill they brought into the game environment. This change in desire was found to be part of a greater push to make systems such as the PS2 appeal to a non-gaming market. In order to appeal to a non-gaming market, entry barriers, such as required pre-existing knowledge, needed to be omitted. The removal of standardization reliance on the mechanical level meant that game play needed to be less abstracted from real life in order to be intuitive for non-gamers. As a consequence, NP problems became more common, although to the detriment of mechanical flow. The game experience was carefully tailored to allow all players the same emotional content. It was found that both Shmups and other games in Period Four offered the same emotional content, but that the accessibility level of the emotional content was lower in the case of other games in Period Four.

Flow over time
The greatest change in the way that the flow heuristic has been implemented over time is the desire for flow available to all players, regardless of their skill level. Over time, it was found that mechanical flow was dropped by the majority of average games in favour of the more accessible and scripted narrative and their emotional flow systems. It was found that there is still a place for both, but juxtaposition of the two systems was problematic, with one system taking precedence over another. In regards to emotional
content and the flow heuristic, it was observed through hands on analysis that the flow heuristic is mainly concerned with elements of sensation, rather than direct emotion.

**The Fourth Heuristic: Education**

Ways of educating the player were observed throughout the case studies as either being overt systems, such as instruction cards and “tutorial modes”, or covert systems which attempted to train the player during the actual game experience using carefully crafted scenarios and encounters. Both systems were found to be effective, however it was the covert systems that conveyed a greater sense of ownership, empowerment, and achievement as well as the senses of autonomy and competency.

A dualistic approach to player education was found in the more effective arcade games of Period One. Complementing the overt, printed materials on the arcade machine, effective Shmups such as *R-Type* and *Darius* used well-crafted scenarios at the beginning of each level that allowed the player to associate the enemy with the action before presenting them with multiple enemies at one point in time. Feedback was also very clear in these games, with graphics and sound creating clear cause and effect relationships.

For the most part, all of the other games analysed in Period One followed the same overt and covert systems of player education. For the most part, the same strategies used in Shmups in regards to player control and object interaction remained the same in other games. Due to the similarities in mechanical systems, only small deviations were found, however, effectively designed education systems resulted in the same emotional responses between Shmups and other games.

During Period Two, standardizations had become more frequently used for player education. In comparison to Period One, many of the games surveyed in Period Two began to have standardizations unique to either their own genre, or their specific intellectual property. Given the diversity of games being created during this time and the experimentation being undertaken in the Shmup genre, this approach began to create higher entry barriers than what was previously found in Period One.

One of the approaches taken by other games in regards to player education was the introduction of multiple pre-game screens that enabled the player to acclimatize to the game’s tactile systems (controls etc) before being placed into the game environment.
This approach, although indicative of all contemporary games, was a relatively new concept for the time and one that acted as well-designed covert education system, allowing the player to take further ownership over their game play experience. Kinetic visemes were found to be a covert means of facilitating player education that subsequently allowed for a sense of ownership over their game experience, however this approach did come with a caveat: not all gamers benefited from this system, as there were no logical blockers in place to halt players who had not successfully completed the training.

One of the best examples of games with covert education system and well-implemented logical blockers is *Half Life*. The use of logical blockers allowed the player to pace their own education experience and it was found that logical blockers had become a standardization of player education. When players are presented this system, they more often than not only associate its outcomes to be control related, not necessarily strategy related. This is where games such as *DoDonPachi* and to a lesser extent *Radiant Silvergun* did not meet with changing user desire.

During Period Four, it was found that Shmups as a genre relied on large amounts of standardization in regards to player education. Although a number of covert systems were utilized, it was found that Shmups of this period relied on overt systems such as player instruction cards, which are a legacy of the arcade games covered in Period One and Two. *Border Down* was one of the few games to allow branching difficulty paths for the player. These branching difficult paths also impacted on player education. As difficulty decreased, the amount of covert clues increased. For Shmups, this was an effective system meaning that a wider spread of emotions was available to more novice players, however logical blockers and educational standardizations had become more desirable in the wider mainstream markets.

Just as the push for realism had created the need for less realistic telegraphing systems to make games fun, so too did the push for realism create the need for less covert training systems in mainstream games. *Zelda the Windwaker* and *Metal Gear Solid 2* were all found to use overt game education cues in conjunction with the more traditional covert systems that had been used extensively in Period Three. The reason for this approach was found to be the types of NP problems that began to emerge with large sandbox style environments. It was found that without these overt and covert clues,
players ran the risk of becoming increasingly frustrated with certain aspects of the game.

**Education over time**

During the course of this study, it was found that education leads to ownership, achievement, empowerment, self-legitimization as well as the sensation of autonomy and competency. These emotions are only associated with the successful completion of educational goals within a game. When educational goals are not achieved, it leads to anger and frustration in amounts disproportional to potential reward. It was found that educational goals in Shmups were difficult for all players to achieve, and a factor leading to their demise in the popular markets.

**The Fifth and Sixth Heuristic: Challenge & Reward**

Challenge and reward, although being two separate heuristics, were best analysed together as they directly related to each other on an emotional level. Challenge and reward, although represented as attainable objects within the game worlds, are merely emotional states. This finding supports the hypothesis as all games are played for emotion, ergo emotional response is a constant. Furthermore, the analysis of this heuristic found that emotions such as anxiety, tension and even anger and frustration are necessary for players to experience in correct amounts.

During Period One, challenge was often represented in the form of compressive forces, encroaching on the player’s position. This was found to lead to extended period of tension, which when overcome, subsequently led to not only relief, but also schadenfreude, empowerment, rebelliousness and even immorality in the form of dominance. In this style of game, reward was represented as score and explosions; however, emotional response associated with beating enemies was the actual reward for the player. Compression and funnelling techniques were also observed in other games of the time, leading to the same emotions, but the key point of difference was that these other games did not have automated scrolling, therefore compression was mostly achieved by the foreground elements. As a result, these games were less tense than the effective Shmups analysed during this point in time, but the player still had the same range of emotional responses.

Emotional rewards during Period Two were found to be represented in more “literal” ways such as systems of wealth and accumulation, and sweeping and clearing.
Previously, score had been one of the only tangible ways in which to embody reward, however the emergence of these systems created a tangible link between emotion and in-game reward. Although Shmups and many other games for that matter had been focused on sweeping and clearing, the addition of wealth and accumulation created a system by which, the game itself was challenge and the ability to spend was the reward. These systems were found to be highly effective, as they add to the sense of self-legitimization by creating an outward symbol of the player’s skill for all to see, thus creating a secondary type of schadenfreude.

Sweeping and clearing in less linear games also led to stronger emotions of inquisitiveness, awe and mystery. Players who explored the game world were rewarded for their time on both an intangible emotional level and a tangible, asset-driven manner (“I have explored the world and found more currency, so now I can buy more equipment”). More often than not, these tangible rewards resulted in means by which the player could indulge in schadenfreude and dominate the game world as well as have bragging rights outside of the game. This concept mimics some of the sentiments of Theodore Adorno in relation to capitalism, whereby people can legitimize themselves via their possessions. Emotional reward was made more literal in accordance with the desires of the casual market.

Narrative reward played an important role in the other games of Period Two. Although the use of narrative was not seen in many Shmups during this period, the observation of narrative rewards function during this period demonstrates the importance of establishing negative emotions during game play to give the perception of perceived value to subsequent positive emotions. It was found that Shmups offered reward through emotions such as schadenfreude, fiero, naches, rebelliousness and immorality as a counterbalance to tension. Other emotional responses were found to exist in Shmup reward systems, however research here demonstrates the importance of being able to indulge the hedonistic urges of the id.

Other games studied during Period Four focused on a duality in emotional game design, where the game content served mainly as the environment for emotions such as tension, mystery, anger and even frustration, while interludes of narrative provided the counterbalance. Emotions such as empowerment, ownership and the sensation of competency were still communicated during game play, however tension played a key role in other
games as it served to embellish the emotions given via narrative interludes. It was found that narrative was an effective tool in terms of player reward during this time as it conveyed awe, excitement and mystery. It was also found that narrative reward is an effective tool of ensuring that all players are receiving a wider array of emotional content.

Narrative reward became an important facet of all popular, effective games designed during Period Four. One of the few Shmups to adopt narrative reward systems into the game design was *Border Down*. Whereas other games of the time had made the narrative reward dependant on some type of moral choice (*Silent Hill 2*), *Border Down* made the narrative rewards based on player skill. This system led to a greater sense of perceived value in the narrative rewards, especially those associated with the more difficult “Borders”. This approach to game design also embodied contemporary the gamer’s desire that greater lengths of tension would ultimately lead to greater reward. The “Border” system was also found to be a means by which to convey exploration in the linear confines of the Shmup genre.

Where Shmups such as *Border Down* relied on skill to generate specific player narrative experiences, games such as *Silent Hill 2* used an interesting “moral choice” system. Skill was a factor in some of the endings, as a system of hidden switches built into the game-scripting engine created specific endings based on the player’s choices during the game. This type of experience was found to make the game play experience more personalized, giving players a greater sense of empowerment and ownership.

Exploration and inquisitiveness was also embellished. This system made narrative reward available to a wide array of players, regardless of their respective skill sets.

**Challenge and Reward over time**

The greatest change to the mainstream of game development over the course of this study is the transition towards the expectation that all games can be beaten. In terms of justifying the price of home console and computer releases, this was found to be an extremely clever move. In games of pure skill (Shmups, Fighters and other PvP experiences), the full emotional range is only available to skilled players. Over the course of this study, it was observed that narrative reward was a means to ensure that all players had access to the intended emotional responses. It was also observed that although this approach may have been the majority desire, a market for skill-based
games still existed, albeit smaller than the casual majority. It was also found that all emotion is reward, even the more negative types of emotion, as they offer a system of comparative states for the player to help compare experiences. Tension was found to be integral to player reward and was an emotional state not found in the course of the literature review of Period Two. However, the most significant finding in regards to this heuristic is the importance of schadenfreude in helping to legitimize the player. As this warrants continued discourse, this will be discussed in this chapter after the heuristic evaluations.

The Seventh Heuristic: Immersion
As outlined in Chapter Four, the methods for analysing immersion are reliant on Ermi and Mäyrä’s (2005) study, which identifies three components: sensory immersion, challenge-based immersion and imaginative immersion. Ermi and Mäyrä found that these components need to be relevant to current social contexts. As such, this heuristic and its potential to convey emotion was found to be reliant on the heuristic of contemporary coding.

In regards to sensory and imaginative immersion, the technology used for arcade Shmups such as *Darius* and *R-Type* had a clear advantage. The fidelity of the graphical representation of these systems meant that they could represent contemporary aesthetics in a manner true to their original renditions. This was found to be a highly effective tool as it streamlined the process of emotional representation and communication by using pre-conceived, subconscious stimulus already present in the gamer to help elicit affect. Specifically, the renditions of Giger’s work as seen in *R-Type* and *Darius*, created strong emotional responses in gamers, as the majority had experienced Giger’s other contemporary works of the time such as *Alien*, and hence had pre-conceived notions of how his work should be perceived.

Challenge based immersion was also handled well by arcade games during this period due to the public nature of the medium, and the standardization of score boards. Emotions such as schadenfreude were more effectively communicated in this environment, as gamers could literally see their lesser others and oversee their play experiences. Ultimately, this would prove to be a double edged sword for the arcade medium, as not all gamers were attracted to such directly competitive environments.
Other games during Period One also used the same approach to immersion that was seen in the Shmups studied, but due to limitations on the graphical fidelity of many of these other systems, especially the home console and computer systems, heightened levels of graphical fidelity were not possible. It was also found that home consoles offered a more intrinsically driven system of competition where the gamer was directly challenged by the game environment, not other players, by the means of direct or indirect PvP. Although not obvious from the case study of Period One, the emotion of schadenfreude began to become an emotional response of the player aimed at the software as a whole: “I beat the game” rather than “I beat this person”. During the case study of Period Two, this personification of the software as a whole would play an important role in changing consumer desire.

Personification of the gaming experience directly impacted Shmups during Period Two, as consumer desire for relatable experiences became an essential design mantra. In terms of emotional response, players felt more immersed in situations they could relate to, and utilized existing emotional experience as triggers of the subconscious mind. It was found that one of the main drives for this desire was the need for players to identify with their onscreen avatars and enter into a more empathetic, communicative discourse. Personification of the gaming experience also meant that the indirect, intrinsic, challenge that had been seen in other games of Period One, specifically home console and computer games became more human and relatable. Now, the experience was less about beating the game as a personified entity and more about defeating personified components of the software: “I beat this character”.

Although Shmups during Period One had the edge in terms of graphical fidelity, other games were quick to catch up, and one of the greatest technological achievements in terms of creating a sense of immersion was the newfound ability to create games with realistic first person perspectives. Admittedly, this technology had been available before, but was not widely available, and was hampered by significant drawbacks such as slow frame rates or lack of graphical fidelity. Games such as <i>Wolfenstein 3D</i> satisfied the requirements of the immersion heuristic such as “the conventions of the game matching user expectations” (McMahan, 2003, p. 67-88) and “the sense of being in a world generated by the computer, instead of just using a computer” (Lombard & Ditton, 1997). Other games using realistic visuals and modes of perspective were far more effective at triggering underlying, subconscious experience, leading to clear affect. This
approach was found to lead to a much more streamlined communication of emotive content between the game and the player.

During Period Three, Shmups either attempted to adapt to changing desires in visual and perspective representations as seen in Neo-Shmups, or in the case of Danmaku Shmups, attempted to appeal solely to challenge-based immersion via the distillation of play mechanics. The emphasis on creating a series of P problems was found to appeal to hardcore and dedicated players, but was found to be a considerable entry barrier for novice players. One of the features that this illustrates is the desire for challenge-based immersion, particularly PvP challenges, in the hardcore market. It was also found that para-game elements such as forums and competitive communities were an external factor helping to create a sense of immersion in the genre and its culture as a whole. In this regard, challenge-based immersion was also found to lead to a sense of belonging.

Personification of the play experience during Period Three was complemented by further innovation in games technology, specifically AI. The emergence of semi-realistic computer AI led to the creation of more human-like entities, allowing for higher levels of schadenfreude to occur in the absence of other human players. Improvements in computational power created the ability to implement more realistic and believable virtual environments, leading to the possibility of more effective immersion from an audio/visual perspective. Controls and inputs for 3D games had also “come of age” during this period and it was found that many of the problems associated with controller inputs in the virtual world had been fixed towards the end of the period.

Cinematic conventions that formed the basis of the mainstream “AAA” game desire were found to have directly influenced Shmups such as Ikaruga and Border Down. In the case of Ikaruga, it could be argued that this application of contemporary consumer desire was one of the elements that led to the game being one of the only Period Four Shmups to be localized for Western markets. Ikaruga, as well as Danmaku Shmups such as Espgaluda and Psyvariar 2, were all found to create significant, indirect PvP challenge based immersion. Although super-play culture can be considered a pursuit of the hardcore market, Ikaruga featured English score systems, even supported with prizes from the games Western market publisher: Atari. During the analysis of Period Four, it was found that Shmups could not match the production values offered by the
new trend of AAA development and hence did not appeal to new or casual gamers in the way that AAA titles did.

The desire at the time for semi-realistic game experiences led developers to create aesthetically rich worlds, which mirrored the conventions of real-life and began to feature impressive (for the time) AI and physics systems. It seemed that the push for personification of the game experience begun during Period Two had finally reached a point in time where technology was able to deliver. Games such as *Half Life 2* not only created a highly immersive environment by meeting with all of the requirements of this heuristic, but also led to strong emotions of empowerment, ownership, immorality, rebelliousness and the sense of competency and autonomy. Games such as *Half Life 2* did this by creating an environment that was abstract, yet cohesive, and followed many real world conventions that had been previously missing from other games in prior periods. Elements such as extended environment interaction led to strong emotional responses when the virtual world became more relatable to the gamers real life experiences.

**Immersion over time**

The easiest way to describe the changing consumer desire in regards to the immersion heuristic over time is by looking at how desire led to increasingly fewer layers of abstraction within the game world, hence making the virtual follow specific conventions of real-life. However, as mentioned during Period Four, real life is not fun. Game developers therefore created experiences from real life that a person might have experienced, such as being dominated, and then created the unreal option of challenging these dominating forces and transcending them. It was found throughout the case study of Period Four that immersion was certainly communicated through the criteria that Ermi and Mäyrä (2005) specify, however, the real power of effective immersion was giving the player the opportunity to exercise free-will in an environment where these decisions were initially opposed, but ultimately rewarded. It is in this regard that we can see that immersion is not reliant on creating a sense of the real-world, but rather about creating an environment to re-live relatable experiences.
The Eighth Heuristic: Immediate Feedback
Immediate feedback was found to be an essential, supporting heuristic to flow, bringing the player to action, education, challenge and reward and immersion. This heuristic has already been discussed at length during the case studies, however, one element that needs to be summarized is the impact of audio as a feedback system, specifically the game’s soundtrack. Although the soundtrack is not purely reactive to the players input like other means of feedback, it does provide important contextual information helping to provide a desired emotional response. In this regard, Shmups were not seen to have had specific audio recordings setting them apart from other games. What was observed, however, was a transition from audio at the forefront of the gaming experience to music which played more of a supporting role, akin to what is termed “muzak”. The music utilized in Periods One and Two relied on a number of recurrent standardizations such as ternary form, super-music style melodic contour and the obligatory, atonal, repetitious boss music.

The main changes to occur in relation to game music came about with the widespread adoption of red-book audio that happened during Period Three, and the adherence to cinematic conventions that had become popular in the AAA titles of Period Four. In regards to the hypothesis, this does support the notion of changing consumer desire, as it was found that emotional responses were the same over all periods, while the method of representation was different. Where the real significance of this observation becomes apparent is in regards to nostalgia and the empirical analysis discussed in Chapter Six. If audio provides the context for emotional response, then it is possible to reference nostalgic music in modern games in order to promote the emotional context for nostalgic experience in the gamer. Despite the significance of this finding, it requires further research mainly due to survey results indicating nostalgic height data for gaming is different to the results found in popular music nostalgia studies.

The Ninth Heuristic: Contemporary Coding
Contemporary culture referencing was found to be an essential element of gaming, partly because it provided context for specific types of representation and also because it was able to convey a sense of belonging to gamers beyond the software experience. Cultural references to popular films of the 1980s were found in many of the effective
games studied during Period One. This aesthetic referencing was found to give context for the meaning and also create emotional associations between the game and the player’s past experience of the original film stimulus. This was found to be an advantage for these games due to the lack of memory storage available at the time. Significant narrative content was not possible in the software, so it used various aesthetic and psychological cues to trigger existing experience. It is in this regard that Shmups such as *R-Type* and *Darius* managed to embody popular desires.

Other games of Period One such as *Contra* and *Metroid* also managed to utilize the types of experience cues through similar aesthetic referencing. It was found that the home console genre of the time was also creating an identity for itself. No longer was it the arcades “poorer sibling” but rather a medium in its own right, which also began to create desires specific to itself. The contemporary movement that consoles were able to capitalize on was the desire for “value for money”. Ultimately it was found that this was a core desire of the console gamer. This led to a different approach to games design, where games were less about short bursts of experience, and more about longer experiences not available in the arcade market.

Period Two was a significant turning point for Shmups. No longer were Shmups the most prolific form of gaming, but that title had gone to the platformer games that seemed to dominate the home console landscape. The Gulf War had a significant impact on the representation of many games, not only Shmups. It was found that the desired player avatar during this period was an equal tie between fighter jets and space ships. “Super-War” type Shmups were also a popular form of aesthetic representation during this time.

One feature Shmups designers could not capitalize on due to the limitations in their genre definition was the contemporary gamer’s desire to experience “telepresence”. Telepresence was largely embodied and popularized by Virtualities, SU-2000 consumer level virtual reality systems, which had the price tag of an exotic sports car. For consumers, contemporary desire was embodied in the realism of the first person experience offered by V.R. as well as some arcade and computer games of Period Two. Another contemporary desire that Shmups designers capitalized on was the desire for longer play experiences, emphasising mechanics such as wealth, accumulation and sweeping, which had become popular in the contemporary market at the time.
Ultimately, both Shmups and other games were found to have the same emotional responses, however the sense of immersion was far more effective in the games of the time that focused on telepresence.

The contemporary trend at the time was to bring “old” intellectual properties into the realm of 3D. In many ways, the neo-Shmup movement can be seen to be effective: the transition from Shmups of old to neo-Shmups was a nostalgic reference that for the most part worked well. Many of the Shmups studied in Period Three saw widespread commercial release in the West and some even did so well as to warrant sequels. As a consequence of the optical media that the majority of Period Three consoles used, the fast paced nature of the Shmup genre suffered somewhat, but the move to optical media satisfied another contemporary desire in Period Three – the desire for games with extended narrative.

It was found during the case study of Period Three that consumer desire had moved more towards narrative experience, particularly a desire for FMV sequences. Although this was found to be difficult to work into the Shmup genre, it worked well in the majority of mainstream games, giving all players access to a wide and diverse range of emotional content not wholly dependant on the player’s skill.

During Period Four it found that the majority of Shmups created could be classified as products for the hardcore minority, rather than products intentionally aimed at the mainstream. Emotional content was found to be similar to other games of Period Four, however in the process of refining the genre for the hardcore market, these emotions were only available in their entirety to highly skilled players. It is important to point out that this was not necessarily a ‘bad thing’ for the genre, as the market had now become diverse enough to warrant highly specialized products such as Danmaku Shmups. Although these Shmups may have embodied the contemporary desires of the dedicated, hardcore market, the Shmup genre could not capitalize on all the contemporary desires of Period Four. One of the few contemporary trends utilized by Shmups of Period Four was the contemporary trend towards high saturation, high contrast graphics that was becoming more and more popular in the mainstream market. This desire was found to be fuelled by a changing user-base who desired games that were more of a cinematic experience as opposed to a traditional video game.
AAA fever had become the main contemporary desire of Period Four. Games emphasising third or first person, open-world narrative experience had become highly popular. This period also saw the birth of “single player” and “multiplayer” modes. Interestingly, all games prior to this period could be classed as multiplayer as even single player games emphasised score systems which formed the basis of indirect PvP. ‘Single player modes’ were a new concept and one that stemmed from the highly narrative-driven AAA titles of the time which had become so popular.

**Contemporary Coding over time**

Over the course of the study, it was found that Shmups originally began referencing popular culture such as film and TV quite heavily, and over the course of time, as the medium gained maturity, it began to reference itself. Although outside influences were still prevalent, the majority of “contemporary coding” in games was found to be in the form of game play standardizations. Whereas games often played second fiddle to films, over time they began to become their own powerful entity. Instead of being of the culture they were the culture. This process was also found to lead to emotional standardizations. Players had come to expect certain mechanics to deliver certain emotional content. The significance of this movement towards standardizations in-game experience emotion needs to be explored further; especially considering the potential of pseudo-individualisation to create stagnation in a product.

**Hypothesis Evaluation & Concluding Thoughts**

One of the core variables in this study was identified as being the process of representation. It was argued and subsequently found that at the heart of all effective games were the same emotional responses, and that these emotional responses could be both implemented and evaluated using a set of specific heuristics.

It was demonstrated that specific means of representation provided powerful emotional cues that exploited an end-users sense of familiarity, specifically nostalgia, and that there is a predictable link between birth year and nostalgic peak. The implications of this study are obvious for industry. Nostalgia and familiarity play an integral role in the gaming habits of consumers. As it has been demonstrated that there is an upward trend in the average age of gamers (The Internation Digital Software Association, 2002), (The Entertainment Software Association, 2004-2009), industry needs to utilize elements
such as “nostalgia proneness” to create more effective and targeted products. Industry implications though are secondary concerns of this study. The real relevance lies in the academic considerations.

With each gaming medium come different analytical considerations. Narratology, a key “ingredient” of current methods such as Ludology, fails to explain the narrative elements of arcade games such as *Dance Dance Revolution*, Redemption Machines and even games such as *Atomic Blast Man*. Methodologies and gaming genres alike are the definite product of contemporary gaming technologies and trends. Games are very much still in their infancy and so too are the tools of analysis, requiring analysis from both past and present perspectives. Games analysis often fails to examine games from a holistic basis, hence the need for this current study. What this study demonstrates is that emotion is the essential constant when analysing video games. Analytical models need to focus more specifically on emotion and affect, as this study found that this is a common element of all games, effective or not.

An unexpected constant to come out of this analysis is game mechanics. When discussing representation, the most obvious ways in which “representation” occurs are through visual aesthetic and aural soundscapes, however it was also found that game mechanics, specifically wealth and accumulation and sweeping and clearing were recurrent features of all of the games surveyed, Shmups or otherwise. In the context of games, game mechanics are a form of representing emotion, albeit a form of representation that is a constant due to the low level nature of the concept. Admittedly more research is required in the field of identifying and documenting specific game mechanics, as there are many differing semantic definitions given to certain game mechanics. If game mechanics were formalized in the same way that emotion has been formalized in this study, then perhaps more effective analytical tools would follow. In regards to this study, the mechanics of wealth and accumulation and sweeping and clearing were found over all four periods and the emotional content communicated by these mechanics was found to be very similar when implemented effectively. It was also found through analysis that there are significant grounds for game mechanics to be associated more with sensation rather than conscious processes. The rationale for this is that game mechanics were observed to be constants along with emotion, and that games have long since been an important part of human experience. That is to say that games
are not appealing because we recognize our desires in them, but rather because games allow us to fulfil our desires.

In terms of desire and games, it has been demonstrated that emotions, both “positive” and “negative” are essential for effective games. This study also demonstrates changing desires in terms of representation and how both contemporary and familiar elements are essential in this process. These facets of game design require specific tailoring to unique and changing demographics of mainstream gamers, however, specific trends were noticed in the course of the analysis in Chapter Five and these require further investigation. These findings are that mainstream games are getting easier; negative emotion is reward; and schadenfreude is probably the most significant emotion associated with gaming experience. In regards to player skill; easier games allow a majority of players to experience the desired emotional content, especially when this is supported with linear narrative sequence. Games are products containing elements of art. Any product found difficult to use will not sell: the same analogy applies to games. In regards to changing desires in terms of representation, this was the most significant finding: people want games they can beat. Skill-based games such as Shmups are not as popular with the mainstream, because to access the entire gamut of emotional content takes significant skill and it is naive to think that every player will be able to achieve this level of skill.

This changing desire from consumers highlights the question: what is a game? Does the casual market actually want games, or does the average consumer want interactive experiences? Games have goals, games are structured, and games have winners and losers. It was found during Period Four that player death was less and less important to player progression in the context of AAA titles. AAA titles began to utilize incremental save systems, alleviating the emotions associated with finite player life, which subsequently lent it to what we now call “the single player mode”. The concept of a single player mode and multiplayer mode being two different entities is only a new concept. R-Type is a single player game, however, it is also a multiplayer game as it has indirect PvP built in via a high score system. The removal of score systems from many AAA Period Four games meant that indirect PvP was no longer possible, at least not in an objectively comparable manner. It is in this regard that I make the possibly contentious statement that any game that has a single player mode is actually not a game, but rather an interactive experience. Chandler & Chandler (2010, p. 1) define a
game by looking at the game of chess. According to Chandler & Chandler there are three components to a game: “interactive challenge, well established rules and a goal the player works towards”. On the surface, this may seem to legitimize all interactive experience as being games, however the key distinction comes when we look at what constitutes interactivity. Shedroff, (n.d.) defines interactivity by giving six separate components: feedback, control, productivity, creativity/co-creativity, communication and adaptivity. In Shedroff’s discussion of interactivity, true interactivity is only achievable in the presence of other humans. As such, competitive gaming is the only true form of gaming, if we consider the important semantic differences. It was found throughout the case studies that competitive games are daunting, especially those in public places (Aisbett & Dirkin, 1999, p. 75). The preference for single player experiences demonstrates the desire for experiences which pander to the needs of the ego. This notion therefore links us into the next finding of this study that negative emotions, particularly those stemming from competition, can be perceived to be reward.

Through the process of sublimation, games provide a safe, socially acceptable environment in which to explore emotions such as immortality and rebelliousness. These emotional responses were outlined as being essential from the onset. The study found that all emotion is reward, even anger and frustration and tension. Tension was not found to be an essential emotion in the literature surveyed, however this term is arguably what Lazzaro meant when mentioning the importance of challenge: the sensation of experiencing tension. It is not the ability to experience tension that draws players into the experience; rather it is the chance to alleviate tension in favour of another more positive emotion which is powerful. Reward is not the absence of tension, but the ability to be plunged into the depths of emotional experience and then be roller-coaster into positive emotional states. Tension can lead to joy and excitement, but it can also lead to the ability to experience a further negative, yet at the same time, positive emotion: schadenfreude.

Schadenfreude, finding pleasure in the misfortune of others, was found throughout the games analysed and was implemented in a number of important ways: the player feeling schadenfreude when confronted with other human players, the player feeling schadenfreude when personifying the software (“I beat this game”), and the possibility of others using the player as the object of their schadenfreude, hence compelling the player to act. It was found that schadenfreude, in whatever form it takes, is essential to
the player’s sense of self-legitimization, the process of comparing oneself to “lesser others” in order to legitimate themselves. Self-legitimization – self-actualization – is the highest tier in Maslow’s pyramid of needs and is difficult, if not impossible, for everyone to achieve in their day-to-day lives. Found throughout the case studies in Chapter Five, schadenfreude was found to be an essential human desire and it was found to be present in all of the games studied. One of the more interesting features observed towards the end of Chapter Five is the tendency for average consumers to want easier game experiences. If we consider the impact of easier game experiences on the ability to experience schadenfreude, then it is easy to see how these ‘easy’ game experiences lead to a greater possibility that the gamer can be given this essential emotion.

Below are a clear set of research findings emerging from this study:

1. Emotion alongside game mechanics are constants in regards to game analysis.

   This is the core concern of this study and it was found that no matter what effective game is analysed, they all lead to a number of essential emotive responses. Furthermore, “games” rely on mechanics, and mechanics lead to emotion.

2. All emotion is reward, not just the perceived “positive” emotions.

   As found in games spanning R-Type through to Resident Evil, negative emotions are essential not only to embellish rewards, but also to give the player experience that they have control over. As such, emotions like anxiety were found to be rewarding experiences because anxiety, when overcome, leads to relief. Individual emotions are not enough. Emotions have logical connections as was found in the case study of Period Three where it was seen how average gamers preferred the narrative-driven game experience as they allowed for very controlled emotive flow.

3. Heuristics are only useful when applied in an inter-disciplinary manner.
Although evaluated independently, it was found that each heuristic is nothing without the other nine. Player education is nothing without feedback and empowerment; feedback is nothing without flow. In the course of the entire study, not one effective game was found which only effectively implemented a few heuristics.

4. There is a correlation between nostalgic height and birth year in regard to video games, although further statistical research is needed.

Similar studies have been conducted in relation to popular music and film, but this is the first time that this approach has been applied to games. Chapter Six presents these findings, although more work is needed in the coming years to see if the pattern continues. One of the issues with video games and statistics that was encountered during this study was that are no significant datasets that go back any earlier than circa 2000 in relation to the average gamer’s age. This is indicative of the infancy of video games when compared to other mediums, and holds the potential for future research.

5. Easy games have mass appeal as they allow the novice gamer to experience the entire gamut of intended emotional response.

Easy games equalling mass appeal was found to be more of a mainstream gaming mantra as time went on and the focus moved away from the arcade medium. The birth of the interactive experience, which really began to gain momentum during Period Four, is testament to this. It was found that during this period that games were targeted at a much more casual consumer market. This is not to say that these gamers were identified as being less intelligent, rather it was more important to sell them products which pandered to their egos, in the way any good product does. Period Four is where the concept of “the single player” mode becomes solidified: an experience which makes the player think that they are playing a competitive game, despite the fact it is designed to be beaten.

6. Game mechanics can be associated as a mechanism of sensation; however more work is required to further define these mechanics.
Game mechanics appeal to the subconscious; they remind us of tasks that we need to perform in our day-to-day lives, both recreational and other. These behaviours then trigger associated emotions: “if I collect these, I will be rewarded”, “if this is taken away from me, I will be seen as a loser” etc. As the action precedes the emotion, game mechanics significantly impact on the types of emotions players experience. During Period Two, a significant desire for wealth and accumulation was found as well as a desire for macro management.

7. Although mainstream desires may have changed, developers need to acknowledge the hardcore market.

It was found in the statistical analysis of Chapter Six that gamers are growing up and continuing their gaming habits into adult life. There will always be a majority of average gamers who will play anything that can be marketed well enough, but there will also be a significant gaming demographic who expect their emotional investments to be acknowledged. Particularly during Periods Three and Four, the power and accessibility of the home console market brought with it many people new to gaming. Beneath this however, existing gamers and game franchises were becoming hardcore. If the hardcore market did not exist, then Shmups would no longer exist. The same applies to two-dimensional fighters. The fact that both of these genres still exist in a commercial sense is testimony that the industry must cater for the hardcore market. It was found in Period Four particularly, that hardcore style games were, in fact, much cheaper to develop when compared to the AAA market targeted predominantly at casual gamers. It was also found in the case studies that the hardcore market is extremely loyal for the most part. In the turbulent economic times the games industry is now facing, smaller projects with guaranteed returns make sense.

After evaluating the Shmup genre in such detail, it would be remiss not to discuss their potential future, especially given the power that nostalgia has been found to play. Is there a future for commercial Shmups when they no longer embody the desires of mainstream gamers? Although no one can really answer this question with any
certainty, it has become apparent through the study of empirical data that a commercial space still exists for the genre. This space exists in the form of the many flourishing Japanese amusement centers and their clientele, mostly older gamers, a demographic epitomized by those currently playing the genre. The empirical data also suggests that the upward trend in the average gamer’s age is partly responsible for the continued consumption of the genre, as the current “average” gamer already has some nostalgic bias towards Shmups. This appraisal of the genre's future is based on several factors: the genre remaining true to its definition; the design of visual and aural assets remaining relevant to their various markets. Another consideration of this assessment is the continued support of developers for the genre. As such, revenue produced by the genre must remain high enough to ensure that not only does a specific Shmup title make enough to cover costs, but also makes significant capital for the developers to begin work on new Shmup titles.

In the West, the genre faces its own unique challenges. Not only has the genre been largely ignored by Western arcade operators, but international copyright laws prohibit the sale of some Shmups outside Japan. Consider also that the visual and aural assets of these current Shmups do not cater for Western tastes and one can see that the genre is facing an uphill battle with little chance for success. Yet despite these titles being considerably cheaper than most, many of these releases will fail to create markets outside those already in existence.

With the possibility for continued consumption of the genre, there must also be room for some kind of evolution. In a way, the Shmup formula evolved long ago and the Shmups that form the focus of this study are no more than a “retro” fixation of those who play and make them. The affective qualities of Shmups of the 1980s can be found in a wide variety of contemporary shooters from FPS to light-gun games and beyond. It could also be argued that people have been looking for more and more realistic ways of “shooting them up” and the time for Shmups has passed in the wake of better and more realistic technologies and game world perspectives. However, this is not a contradiction of the importance of nostalgia in preference for the “new”, rather this sentiment supports the notion that people are continually looking for new ways to experience, old, but fond emotions. As such, one can see the role that technology plays in “stigmatizing” old ways of experiencing these affective qualities. Although a highly contentious
statement, this can actually be demonstrated in a quantitative manner by the sales figures of 2D titles as opposed to their contemporary 3D alternatives. Gamers know that technology and perspective do not make bad games great and vice versa.

The stagnant style of the Shmup genre represents stagnation in the video game market as a whole. The games being played today are not part of some type of evolution of gaming, contrary to what many believe. Instead, the games played today are a direct result of the technologies and mediums being employed to make these games. Three-dimensional first person shooters and their prolific nature are a result of two important and inter-related factors. Firstly, appropriate technologies exist which can easily recreate these gaming worlds and perspectives. Secondly, a medium and commercial space exists for this style of game to occupy, in the form of the millions of 3D capable computers in nearly every household in the First World. When one considers the early nineties and the proliferation of FMV style games such as Night Trap and Time Gal; they had a technological medium conducive to them as well as market and gaming mediums to occupy. In the case of Shmups we can see their demise can be directly attributed to these two factors. In the West, where arcades are becoming a thing of the past, so too is this genre. With the lack of a commercial space comes a distinct lack of motivation for Western developers to create such titles, thus creating a vicious cycle. Not only are these conditions stifling to creativity, they remain invisible to most.

It is not only academics who need be informed of this perspective. If we continue down the same path of mass pseudo-individualization that Shmups have, there will be dire financial consequences for the industry. This statement is aimed directly at the huge amount of emphasis placed on sequels and games based on existing, popular intellectual properties. Video games, although very much in their infancy, have already a rich back catalogue of not only software, but also mediums, yet publishers only support the most contemporary of mediums and the needs of the “financial” majority. At one point in time this was needed: the technical limitations of various technologies meant that not all types of games, or game world perspectives, could be realized. Gamers were few in number and often were from very similar and narrow backgrounds. Now, despite technology existing that can realize any number of gaming genres, and a gaming culture becoming more rich and diverse, the consumer really has very little choice in what they can buy. One need only look at the success of Nintendo’s virtual console and Xbox live
arcade to see that nostalgia sells, retro sells, and diversity of software choice can be financially successful.

This raises a very important point as far as the continued success of Shmups is concerned. Although not the focus of this document, more and more Shmups are being developed for the PC, often by sole enthusiasts. The quality varies from release to release, yet the sheer number of these doujin based Shmups being created is something to analyze further. Much in the same way that Shmups of the late eighties and early nineties were a product of their respective developers being influenced by nostalgia, the current breed of doujin Shmups also reflects such nostalgic traits. Based on the empirical data that suggests that nostalgia plays a large role in the way gamers consume games, it is for this reason that publishers must seriously consider distributing such titles through their online console systems. The popularity of various hardware platforms has been won and lost before on choice and availability of software, free or otherwise. The software and the people already exist; they just need a way for their games to reach wider audiences than what is currently available to them in the sea of data that is the Internet. This method can be mutually beneficial for all involved. Independent developers get a chance at finding like-minded markets for their games; console manufacturers reap higher console sales; and gamers get choice.

This study demonstrates the importance that historical software analysis can play in determining shifting trends in the contemporary games market. As every new form of representation is linked to the past, the past becomes a valuable way of determining the effectiveness of certain design approaches. Although the industry is perceived to be fast moving, this study demonstrates that is not really the case, and only by using Shmups as the constant does this become apparent. Yes, the graphical and aural capabilities of various systems have increased significantly, however, an effective game will always remain an effective game, no matter when it was made. Fortunately, this is a point of view which already exists within the scholarly works of game academics, however where this approach to game analysis is particularly useful is in regard to the education of a new generation of tertiary-trained game developers.

One of the areas of professional relevance outlined in Chapter One for this study is in regard to the emerging trend for universities to offer game-related curriculum. Ultimately, it is believed that students will benefit the most from the information
contained within the study. Games today have become incredibly complex in both the way they are constructed and the way they are represented. Often this glossy covering hides the elements essential to effective game design. Beneath the flashy graphics and immense narrative, there needs to be very clear game mechanics and consideration given to the emotions and sensation offered. What historical analysis helps us to achieve is a “back to basics” approach when it comes to game design. Ultimately, while the graphic fidelity and depth of narrative in contemporary games are important, they are supporting devices, and are not what actually makes the game component.

In presenting this interdisciplinary approach to game analysis, there is a follow-on effect for those creating game-design-based curriculum at tertiary level. Games cannot be understood, explained or analysed adequately from individual perspectives. For this reason, it is important that any game design curriculum be developed within a diverse range of theoretical approaches, ranging from psychology, computer sciences to programming. In regards to teaching game design, a holistic, inter-disciplinary approach is the only way in which curriculum should be developed. Indeed, this is the approach already becoming popular with gaming academics, however, educators are the key to the future of the games industry. Effective approaches to training and education are the way to creating a sustainable and diverse gaming industry.
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Luke McMillan 2010


Bibliography (Software)*

Note: This list represents only the Shmups consulted in the creation of this thesis. However, more than 3500 games were consulted, but for practical reasons these could not all be included. The following list also contains staff positions and names as found in the Arcade versions of the software. Some staff lists were not available at the time of publication and have hence been omitted. Additionally, to allow for variations in type and description of personnel and contributors, details were taken directly from the MAME source code.

1941 Counter Attack (Capcom, 1990)
Planning: Poo, Rekite
Object designers: S. Thing, Yokota Yokoz, Terukun, Kuribow
Scroll designers: Sadakichi, Marilyn, Yuki, Kintarou, Harusan
Character support: Akiman
Character coordinator: Rekite
Character effects: Yokota Yokoz
Sound composer: Hifumi
Programmers: Makkow, Babel-2, Dome
Game analysers: Nin, Doda Nda Uda
Director: Kihaji Okamoto

1942 (Capcom, 1984)
Designed and programmed by: Yoshiki Okamoto

1943 - The Battle of Midway (Capcom, 1987)
Designed by: Yoshiki Okamoto
Character designers: Naoko Sato, Miki Chan, Kawamoyan, Aho no Sakata
Music by: Yoshihiro Sakaguchi

1943 Kai (Capcom, 1987)
Game designer: Poo & Dechikun
Producer: Kihaji Okamoto
Character designers: Naoko Sato, Miki Chan, Kawamoyan, Aho no Sakata
Sound & Music: Jungle Kumi
Hardware: Panchi Kubozoo, Jumbo Saito
Programmer: BLBON

1944 The Loop Master (Capcom, 2000)
Support by Eighting/Raizing

19XX The War Against Destiny (Capcom, 1996)
Game designers: I. Satsuma, Tomonori.Nonaka, S. Obata (Manhattan)
Program designers: T. Ueno, Batayoni, Hdo, Dress, Ittetsu, You!, Hits
Scroll designers: Taka, Fukumoyan, Ziggy, Imahori, Hiroshi Sugiyama, Kazu, Goro Suzuki, Sawatch

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Music composers: Syun "Kobekko" Nishigaki, Zuzuki Tatsuro
Sound designers: Hiroaki "Mach-2" Kondo
All sound produce by Arcade Sound Team.

4 D Warriors (Coreland/Sega, 1985)
Rabinia H, Miyao, Sanpei, T. Iga

800 Fathoms / Mariner (Amenip, 1981)

Acrobat Mission (UPL, 1991)

Aero Fighters / Sonic Wings (Video System, 1992)
Staff: Shin Nakamura, Ogawa Hyone, Armored Cruiser, Wataru Yamazaki, Alice Itoh,
Tako Bekku, Neko ikeda, Hikihara, Manbow, H. Motono, Yamamotoya, H. Hino, You-
Chan, M. Tsukada, Kazz, Y. Fukuda, Y. Nakanishi, Naoki Itamura, Masato Arikawa,
Soushi Hosoi, M. Sakakibara, Hironobu Urata

Aero Fighters 2 / Sonic Wings 2 (Video System, 1994)
Plan: Count IKuei
Program: Aiz!, You-Chan
Design: K. Yamamotoya, Takasu, Akira, Armored Cruiser, Oh! Kawara, Manbow
Yokoyama, Eriko
Sound: Soushi Hosoi (Hoso-Q), Pirowo, Norie, Tarako, Hira
Assist: Mac, 840AV, Matsunami, Sisyou, K. Nakajima, Sakon, Masako, Hiki, T.
Tateishi

Aero Fighters 3 / Sonic Wings 3 (Video System, 1995)
Planner: Count IKuei
Programmers: Aiz!, You-Chan, Sysyou
Designers: Armored Cruiser, Takasu, Akira, Manbow Yokoyama, T. Tateishi, K.
Yamamotoya, A. Sakamura, A., Kaz, Hiki, T. Matsu, Oh! Kawara, M. Cats.I, Hil, T.
Sakon
Sound: Q, P, Noise

Aerobot / Formation Z (Jaleco, 1984)

Air Buster – Trouble Specialty (Kaneko, 1990)
Software: S. "To-y" Igarashi, H. "Tiny-Tomo" Takeuchi
Graphics: K. Matsuoka, N. Obana, T. Konakawa
Hardware: H. Mikami, H. Nagayoshi
Music composed by: Tatsuya Watanabe
Sound operate: S. Aizu
Test game: F. Komori, K. Niihara, T. Okamoto
Total coordinate: S. "To-y" Igarashi
General producer: H. Kaneko

Air Duel (Irem, 1990)

Airwolf (Kyugo, 1987)
Yoshikikun, Kankurou, Chapy Hara, Yahichi, Sukesan
Air Gallet (Banpresto/Gazzelle, 1996)
Executive producer: J. Sato
Total coordinator: Toshifumi Kawashima
Producer: Hiroyuki Fujimoto
Director: T. Uemura
Programmer: Mizuiro Honey
Graphic designers: M. Yamaguchi, J. Inoue, K. Ohira
Music composer: Sakai Yoshitatsu (Yoshitaz)

Ajax (Konami, 1987)
Producer: K. Hiroshita
Director: S. Okamoto
Programmer: S. Fujiwara, Gen. S
2D design: N. Sugita
3D design: N. Ishii
Title: Dr. Hide
Character: K. Nakamura
Sound: Y. Uno, Motoaki Furukawa
Hardware: H. Ueno, K. Ban

Alpha Mission 2 / ASO II – Last Guardian (SNK, 1991)
Producer: Eikichi Kawasaki
Planner: Kohyan
Sub planner: Shiba
Programmers: Data-Tada, Muge-San, Magi2, Shochan, Nishido~N
Designers: Toyochan, Maeda, Miki, Y. Kawase, Higa, Keisen. Y, T. Masami, Mano
Sound: Jojoha Kitapi, Konny, Tarkun

Andro Dunos (Visco, 1992)
Producer: Tetsuo Akiyama
Director: Don Gabacho
Assistant director: Keisuke Usami
Programmers: R. Mutoh, Danna, City
Character designers: Yuji Masuda, Tel.Y, Yasushi

Arbalester (Seta, 1989)
Producer: Jun Fujimoto
Manager: T. Sato, M. Honda
Freeman: M. Asakawa
Chief programmer: K. Watanabe
Programmer: Y. Yamaguchi
Graphic designers: K. Nakabayashi, K. Yamada
Sound designer: A. Sato

Argus (NMK/Jaleco, 1986)

Armed Formation (Nichibutsu, 1988)

Director: Takanori Tanaka
Planner: Tomoaki Kabayashi
Main programmer: Shinya Okuda
Programmers: Osamu Tomiyama, Satoshi Fujiwara
Main designers: Hisaya Tsutsui, Shinji Kubota
Designer: Takanori Tanaka
Musician: Takeshi Yoshida
Hard enginner: Isao Shiki

**Armed Police Bartrider (Raizing/8ing, 1998)**
Program 68000 side: Shinobu Yagawa
Program Z80 side: Yuichi Ochiai
Character designer: Kazuyuki Nakashima
Graphic designers: Kazuyuki Nakashima, H. Yokoyama, M. Taguchi, Masaharu Tokutake, Yuki Yonei
Music composers: Manabu Namiki, Ken-ichi Koyano, Hitoshi Sakimoto
Sound effects: Mato

**Ashura Blaster (Taito, 1990)**

**ASO – Armored Scrum Object (SNK, 1985)**

**Asuka & Asuka (Taito, 1990)**

**Aurial (Sega, 1990)**
Chief programmer: Takanori Kurihara
Sprite designer: Masanori Yoshihara
BG designers: Hiromi Kurihara, Maki Ohzora
Music composers: Sinichi Sakamoto, Napalm Hiromitsu
Assistant director: Yoshihisa Shimizu
Programmer: Naoki Hoshizaki
CG designers: Mina Morioka, Susumu Konno, Tomoko Nakayama
Supervisor: Michishito Ishizuka
CG operater: Yutaka Hirata
Director: Ryuichi Nishizawa

**B Wings (Data East, 1984)**

**Bakuretsu Breaker (Kaneko, 1992)**
Direction: Piston Takashi
Game planning: Moomin Hiroyuki
Character designers: Short Arm Seigo, Haniwa Kazunori, Puttun Midori, Takeuma Youji, Dekopachi Hiroko, Sakeguse Kohichi, Donald Chiyomi
Program: Popo Yumiko
Hard planning: Mokkori Masa
Sound and music: Golden Tamayo, New Half Yoshihiro

**Bakutotsu Kijuutei - Baraduke 2 (Namco, 1988)**
Music composed by: Norio Nakagata, Takane Okubo
Baraduke (Namco, 1985)
Sound composer: Yuriko Keino, Norio Nakagata

Batsugun (Toaplan, 1993)
Executive producer: Yuko Tataka
Programmers: Suki! Suki! Kohchan No-Make, Sigue Hayasato, Ikeda In Naeba, Yoshitatsu Sakai (the 3rd)
Graphic design: Yuko Tataka, Takeshi Kamamoto, Junya Inoue (Joker Jun)
Characters designed by: Junya Inoue (Joker Jun)
Musics composed by: Yoshitatsu Sakai (the 3rd)

Battle Bakraid (8ing, 1999)
Program 68000 Side: Shinobu Yagawa
Program Z80 Side: T. Uemura
Music composed by: Atsuhiro Motoyama

Battle Chopper (Irem, 1987)

Battle Cross (Omori Electric, 1982)

Battle Garegga (Raizing/Eighting, 1996)
Director: Kazuyuki Nakashima
Programming 68000 Side: Shinobu Yagawa, Yasunari Watanabe
Programming Z80 Side: Yuichi Ochiai
Graphics: Shinsuke Yamakawa, Mitsuakira Tatsuta
Sound effects: Manabu Namiki
Test players: Mr. Daigoro, Marika F.

Battle of Atlantis (Comsoft, 1981)

Bells & Whistles / Detana! Twin Bee (Konami, 1991)
Director: M. Ohsawa
Programmer: T. Shimomura
Designers: R. Shogaki, H. Ashida, K. Ishimoto
Animation: Shuzilow.Ha
Sound designers: H. Maezawa, Michiru Yamane, Masae Nakashima
Engineer: H. Matsuura

Bermuda Triangle / World Wars (SNK, 1987)
Director: Eikichi Kawasaki
Software: SNK jr.
Designers: Rampty, Tetsuyaki
Assistants: Miss Yoko, Angel
Hardware: Akitadesi
Sound: Kenny
Producer: Mr. Oba
Printing: Tomotae
Bio Attack (Taito, 1983)

Bio-Ship Paladin (UPL, 1990)
Game designed by: Tsutomu Fuzisawa
Program designed by: Itsam Matarca
Character designers: Tsutomu Fuzisawa, Kinya Aoyama
Background designers: Mutsuo Kaneko, Miho Urushibara, Shiho Sasaki
Sound effects by: Yoshio Nagashima

Black Heart (UPL, 1991)

Blast Off (Namco, 1989)
Game design: Nak, Tak
Program: Nak
Graphics: Tak
Character: Arg, M.G
Music: Kob, Tog
Sound: Nob

Blaze On (Atlus, 1992)
Star programmer: Dandy Arai
Sound: Macco
Japanese planners: Ethiopian Taro, Toshiya Matusyama, BIRD
Object engineers: Shinji Tago, Hikaru Takeyasu, Masahiro Kuroda
Screen designers: Shinji Tago, Hakase100%, Magnam.K
Opening animators: Kenji Teraoka, Yasuhide Kikuchi, Motoaki Satoh, Naoki Kobayashi, Yusuke Satoh, Kazuyo Nakamura
Opening CG: You Tai Isseki, Hikaru Takeyasu, Sin
Opening makers: T. Mansell, Hakase100%,ANNENYAMA-Z, Sin

Blazing Star (Yumekobo, 1998)
Executive producers: Akio Inove, Nobuyuki Okude
Producer: Takaya ida
Sub. producer: Isamu yutani
Director: Michio Sato
Main programmer: Minoru Yoshida
Sub. programmer: Taka / M. Sakae
Chief designer: Tomonori Nagakubo
Designers: Kyou Yamanaka, Izumi Senou, Saki, Shotabira, Yumetard, Tatsuo Shioda
Character designer: Daikichi
Design helpers: Mayumi Takeuchi, Itsuo Iton, Mitsuo Takano, Masakazu Ishizaki
Sound designer: Yasuaki Fujita
Music composer: Harumi Fujita

Blue Hawk (Dooyong, 1993)

Border Down (GRev, 2002)

Borderline (Sega, 1981)
Brain (Coreland/Sega, 1986)

Break Thru / Kyokkoh-Toppa (Data East, 1986)

Captain Tomoday (Visco, 1999)
Producer: Don Gabacyo
Director: Ume. W
Graphic designers: Max Noda, Mi, Mo, Mocchi, Mike. Pi!, Sadaijin, Shimarisu, Takano
Programmers: Bilbo, Chi-chan, Marin, Momonga, Alice You

Carrier Air-Wing / U.S. Navy (Capcom, 1990)

Change Air Blade (Sammy, 1999)

Chaos Field (Able, 2004)

Chimera Beast (Jaleco, 1993)
Executive produced by: Tokuhiro Takemori
Directed by: S. Hashimoto
Game designed by: Y. Hiroyama
Programmed by: Manbow
Bg designers: Helluder, Toukaidou Nozomi, Reiko, Tutomu Rukada
Obj. designers: Sigeru, Toukaidou Nozomi, Nanae
Creatures designed by: Y. Hiroyama
Sounds & Music composed by: Kiyoshi Yokoyama

Choplifter (Sega, 1985)
Programmed by Dan Gorlin in 1982 for the Apple II and later ported to the arcade

Chopper / Koukuu Kihei Monogatari - The Legend of Air Cavalry (SNK, 1988)
Supervisor: Eikichi Kawasaki
Producer: Tamadachi
Programmer: SNK Jr.
Designers: Okitaka, Madaka, Warasan
Sound creator: Kanata
Adviser: Tosikita

Chuka Taisen (Taito, 1988)

Cobra-Command (Data East, 1988)
Produce & program: K. Sasamoto
Graphic & design: A. Ontani
Graphic: M. Narita, T. Konishi
Graphic advice: S. Furukawa
Hardware: T. Takayama
Sound: A. Hare
Original plan: T. Seki
Management: T. Kato

Cosmic Avenger (Universal, 1981)
Cotton (Success, 1991)

Cotton 2 – Magical Knight Dreams (Success, 1997)

Cotton Boomerang - Magical Night Dreams (Success, 1998)

Cybattler (Jaleco, 1993)
Director: Team m.word
Character designers: Nao, Takasan, Jun
Programmers: Kuma, Kikki, King
Composers: Pro, Masaaki.U, Tsugumi.Y
Sound effects: Pao
Sound programmer: Kikki

Cyvern - The Dragon Weapons / Cyvern Plus (Kaneko, 1998)
Planners: A. Kaneko, Tony
Sound: Katsuya Yoneda

Daioh (Athena, 1993)
Programmer: Tsutomu Tabata
Graphic designers: Undead Tama, Kata Chumuri, Numa
Composer: Sho
Sound driver: K. Zikil-Hide Ishibashi
Producer: Noriyuki Takasaki
Executive producer: Sakae Nakamura

Dangar - UFO Robo (Nichibutsu, 1986)
Directed by: Shigeki Fujiwara
Software by: Vabi Vube
Hardware by: Isao Shiki
Designed by: K. Nakagawa
Music & Sound by: Kenji Yoshida

Dangerous Seed (Namco, 1989)
Game designers: S. Shimizu, Y. Shinozaki
Character designers: Y. Shinozaki, S. Sasaki, M. Fukuoka
Graphic designers: Y. Shinozaki, A. Usukura
Visual designers: Y. Shinozaki, S. Sasaki, M. Fukuoda, M. Ishida
Programmers: A. Sam, S. Shimizu
Music composer: Y. Nagumo
Director: H. Shima
Assistant director: S. Shimizu

Dangun Feveron / Fever SOS (Cave, 1998)
Music composed by: Ryuichi Yabuki, Nanpei Misawa

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Darius (Taito, 1986)
Directed and produced by: Toshio Kōhno
Game designers: Toshio Kōhno, Akira Fujita, Kazuya Mikata
Programmers: Ken Hasegama, Takashi Kuriyama, Hideaki Tomioka, Tohru Sugawara, Hidenori Sasatani, Hideki Hashimoto
Art designers: Tetsuroh Kitagawa, Yoshihiro Wakita, Junji Yarita, Yukio Ishikawa, Kohzoh Igarashi, Genya Kuriki, Taira Sanuki, Masami Kikuchi, Mitsuru Ogama
Mechanical engineers: Takeki Nakamura, Eiji Kubota
Cabinet designers: Takeo Shiraishi, Hisayoshi Nakane, Natuki Hiroswawa
Hardware designers: Takashi Ohhada, Syuji Kubota, Seigo Sakamoto
Music composers: Yasuhiko Tanaka, Hisayoshi Ogura, Naoto Yagishita, Tsukasa Nakamura, Eikichi Takahashi, Masahiko Takaki

Darius Gaiden - Silver Hawk (Taito, 1994)
Producer: Hidehiro Fujihara
Game designers: Hisakazu Kato, Akira Kurabayashi, Masami Kikuchi, Yutaka Nagayama, Naoto Omura, Hidetaka Harada, Rintaro Doi, Katsumi Kaneoka, Hisayoshi Ogura, Katsuhisa Ishikawa, Thanks: Kentaro Matsumura
Art directors: Kat, Masami Kikuchi, Baw-Baw
Programmers: Kurabar, Yutaka Nagayama, Naoto Dmura, Hidetaka Harada
Hardware engineer: Katsumi Kaneoka
Decorator: Rintard Doi
Sound (Zuntata): Hisayoshi Ogura (OGR.), Katsuhisa Ishikawa
Bit pattern: Makoto Fujita, Ucky Maeda, Toru Kawaishi, Yuko Kajihara, Miwa Kamiya, Vap, A-Wave

Darius II (Taito, 1989)
Directed and produced by: Hidehiro Fujiwara
Game designed by: Hidehiro Fujiwara, Takatsuna Senba
Programmed by: Akira Ohtsuki, Tatsuou Nakamura, Masashi Tsuzura, Shinji Soyano
Art designed by: Masami Kikuchi, Takatsuna Senba, Hisakazu Kato
Cabinet designer: Yoshinori Aiura
Hardware designed by: Toshiyuki Sanada
All music composed and arranged by: Hisayoshi Ogura (Team Zuntata)
Sound editors: Yasuhisa Watanabe, Norihiro Furukawa
Sound software: Naoto Yagishita

Darwin 4078 (Taito, 1986)

Defender (Williams, 1980)
Eugene Jarvis (DRJ), Sam Dicker (SAM), Larry DeMar (LED), Paul Dussault (PGD), (CRB), (MRS), Steve Ritchie (SSR), (TMH)

Desert War / Wangan Sensou (Jaleco, 1995)
Sound: Manabu Namiki

Dimahou / Great Mahou Daisakusen (Raizing, 2000)
Main programmer: Yuichi Toyama
Planner & Designer: Ken-Ichi Yokoh
Progress control: Susumu Hibi
Producers: Masato Toyoshima, Tatsuya Minami
Sound: Manabu Namiki
Staff: Kazuyuki Nakashima, Yasunari Watanabe, Yoshitaka Ikeda, Hiroshi Satoh, Kenji Kawakita, Yukiko Sugiyama, Toshikazu Sahoda, Atsuhiko Motoyama, Ken-ichi Koyano, Nobuyuki Irie, Hiroshi Tahara, Tatsuya Uemura, Masahiro Yuge, Haruhisa Udagawa
Support from Capcom, Research & Development, Department 3, Tomoshi Sadamoto

Do DonPachi 2: Bee Storm (IGS, 2001)

Do DonPachi 3 / Do DonPachi Dai-Ou-Jou (Cave, 2002)

Do DonPachi (Atlus/Cave, 1997)

Dogyuun (Toaplan, 1992)
Producer: Toshiaki Oota
Programmers: Hiroaki Furukawa, Toshiaki Oota, Tatsuya Uemura, Washimoto
Music composer: Tatsuya Uemura
Sound effects: Washimoto
Designers: Takaestu Iwabuchi, Miho Hayashi, Yuuko Takada, Anpanmanda, Saori Hiratsuka, Junya Inoue, Ikuo Matsumura, Kaneyo Oohira

DonPachi (Atlus Cave, 1995)
Producer: Kenichi Takano
Programmers: Tuneki Ikeda, T. Tomizawa, H. Uchida, Ryuichi Yabuki
Graphic designers: A. Aburatani, K. Asaba, J. Fujisaku, R. Nitta, Naoki Ogihara
Sound: Ryuichi Yabuki

Dr. Toppel's Tokantai / Dr Toppel's Adventure (Taito, 1987)

Dragon Blaze (Psikyo, 2000)

Dragon Breed (Irem, 1989)

Dragon Saber (Namco, 1990)
Producers: Asinaga Bucho, Yoko Boss
Game designers: T. Negi, O!Sugi
Programmers: "All or not" Nishimaki, "Shiohigaler" Ito
Sound: Shinji Hosoe

Dragon Spirit (Namco, 1987)
Character designer: Macchan
Monster designer: Tatsuya
Graphic designer: Arakawa Da!
Music composer: Shinji Hosoe
Game programmer: Kyota
Technical support: Fresh Yama Take & Har Ware Engineer Staff, Devil Nakamura, Sexy Akina
Game designer: Ojisan Trio Plus 1
Director: Yoko Boss
Special guest: Takky Takahashi
Management: Uncle Ashinaga

**Dyger (Philco, 1989)**
Programmer: No Youngho
Graphic designers: Jang Kyesook, Kwak Wooyong, Nam Hanhee, Choi Kwanghun
Scenario: Kim Yangsu
Music composers: Lee Jeongkyu, Kim Hyungbum, Cho Kwangho

**E.D.F. - Earth Defence Force (Jaleco, 1991)**
Programmers: S A S, Azvear-s
Main graphic: Wan Da You, Ca-Sai, Nekomasa
Sub-graphics: Crayon Gear, Shimizu
Music: Tsukasa Tawada
Produced by: Yuki.Arai

**Eco Fighters / Ultimate Ecology (Capcom, 1993)**
Object designers: S.Y, Imomushi, Chama, The Pin K, Dway!, Ovava, Minobeyan, Kakunaka
Scroll designers: Go, Y.N, May, Ziggy, Oyami, Hiropon
Programmers: Yuuka, A. Komorini, Tilde.Kaw, Commander Guchi, Some-P
Music composer: Syun
Voices: Nishihara K-ta, Nemoto Yoshiya, Yokoyama Chisa
Planners: Meshi, Konou, Etos
Producer: Yokamoto
Original planner: Mori Keisuke

**Eight Forces (Tecmo, 1994)**

**Equites (Alpha Denshi, 1984)**

Producer: Kenichi Takano
Super visor: Hiroyuki Tanaka (Atlus)
Chief programmer: Tsuneki Ikeda
Programmers: Satoshi Kohyama, Ryuichi Yabuki
Chief designer: Junya Inoue
Designers: Akira Wakabayashi, Yuko Nakamura
CG designers: Riichirou Nitta, Atushi Aburano
Sound producer: Junya Inoue
Sound director: Hiroshi Horiguchi (Two Five)
Music composer: Masahiro Kusunoki (Two Five)
Sound effects: Ryuichi Yabuki
Character voices: Mikio Yamaguchi, Yasuyuki Hirota, Yuko Nakamura, Junya Inoue, Noriko Nishimura, Kazushi Takamura
Special assist: Toshiaki Tomisawa
EspGaluda (Cave, 2003)

Espial (Orca, 1983)

Exed Exes / Savage Bees (Capcom, 1985)
Music by: Tamayo Kawamoto

Exzisus (Taito, 1987)

Fantastic Journey / Gokujyou Parodius! - Kako no Eikou wo Motomete (Konami, 1994)
Programmers: Chichibinta Tsukasa, V. Mailer
Character Designers: Shuzilow.Ha, Magurou, Taro Maru, Ishimaroid, Bon.Natsumi
Music: Prophet Fukami, M.Puddin' Satoko, Sitar Senoo
Sound effects: Gokujyou-Tasaka, 118
Hard designers: Million Hide, Suke, Escape Yoshiaki, Nanba Shot Tom
Product designer: Poper Takashi

Fantasy Zone (Sega, 1986)
Music by: Hiroshi Miyauchi

Fantasy Zone II / Opa Opa (Unknown, n.d.)

Fighter & Attacker / F/A (Namco, 1992)

Fighting Hawk (Taito, 1988)

Final Star Force (Tecmo, 1992)
Programmers: Mae-Yan, Laplace, Jun
Mechanical designers: Kazu Tomita, Bon, Hamali Tel, Sato Dou!, Kotoe Murasaki
Background designers: Nawa Lin, Satoru, A. Haruno, Bon, Hamali Tel, Sato Dou!,
Kazu Tomita, B. F. R
BGM composers: Wakasugi Matsuri, Yamasan, Kaorin, Rikarin BZ, Rio
Sound effects: Wakasugi Matsuri
Artwork Designer: Maru-Kata

Finalizer - Super Transformation (Konami, 1985)

Finest Hour (Namco, 1989)
Produced by: S. Yokoyama
Development directed by: S. Okamoto
General agent: K. Matsuoka
Management by: S. Sakurai
Marketing investigated by: Toshio Natsui
Superviser of test play: Y. Seto
Directed and programmed by: K. Nikaido
Character designers: Y. Teshima, T. Kinoshita, K. Yanagihara, S. Sasaki
Graphic designers: N. Yanagisawa, H. Fukuda, M. Fukuoka, M. Nagashima
Development supported by: M. Kato
Music composed by: Katsuro Tajima
Logotype designed by: N. Abe
Lyrics translated by: R. Okamoto
Publicity poster arranged by: H. Kuwahara

Presidental advisor: E. Sato
Graphic utility distribution: A. Nagamatsu
Coordinate supported by: E. Saita, Y. Honda

Fire Barrel (Irem, 1993)
Game designer: Shaka
Programmers: Denchan, R&R Aya
Designers: Maccoy, Yamachin, Core_1
Sound B.G.M: Rikei
Sound effects: Hiya

Fire Battle (Taito, 1984)

Fire Shark / Same! Same! Same! (Toaplan, 1990)
Music created by: Masanory Yuge

Flower (Komax, 1986)

Flying Shark (Taoplan, 1987)
Music and sound created by: Tatsuya Uemura

Forgotten Worlds (Capcom, 1988)
Game designers: Akiman, Nin Nin, Poo, Kihaji Okamoto
Soft programmers: Youchi, Noriko, Takako, Nouchi
Object designers: Kurichan, Takata, Shinsyudon, Sintan, Emetaro
Scroll designers: Mikichan, Hanachan, Kuramoyan, Nouochan, Black man
Sound: Tamayo Kawamoto, Yukichan, No papa
Hardware: Kuchino
Mechatronics: Kamimori

Funky Bee (Orca, 1982)

Funky Fish (Sun Electronics, 1981)

G-Darius (Taito, 1995)

G-Darius ver2 (Taito, 1995)

Gallop - Armed Police Unit / Cosmic Cop (Irem, 1991)

Galmedes (Tecmo, 1992)

Gplus / Galaga 3 (Namco, 1984)
Music by: Junko Ozawa

Gekirindan (Taito, 1995)
Producer: Lee Ota
Programmers: Mr. Lee, Toten, Takahito Naoi, Riki
System engineers: Ymot, Nob
Character designers: Yasunobu Kousokabe, Saori Hiratsuka, Ryota Sasaki, Sakotan, Miyabi Tashiro, Debi., Kao
Designer: Hidetomo Ogino
CG designer: K. Kinoshita
Sound (Zuntata): Kazuko Umino (Karu), Koji Sakurai

**Gemini Wing (Tecmo, 1987)**
Screenplay: S. Sakurazaki
Background designer: K. Niwakamaru
Logo & Base designer: Noise Holic
Monster designers: Willy Ichiro, Strong Shima, Soccer Kozou
Music / Sound Effects: Yuhki
Test play: Sugar Beet, Faw
Programmed by: Clark Gent
Directed by: S. Sakurazaki

**Ghost Pilots (SNK, 1991)**
Producer: Eikichi Kawasaki
Executive directors: Takashi Nishiyama, Tama
Planner: Y.O
Sub planner: Ishimotti
Programmers: Mr. SNK26, 001
Sound: Papaya
Designers: Mioshi, Mr. Poo, 1610, R. Miyazaki, SK, N. Mori, T. Yamoto, Meshitaki, Capsule Kodama, 20 Gall Maeda, Child Higashi, 2DK Yamaguchi

**Giga Wing (Capcom, 1999)**
Planner: I. Satou, R. Hazuki
Character designer: K. Toume
Mechanic designers: S. Satou, Tadahiro Mukaide, T. Suzuki, Ken Taketoshi, Y. Ono
Object designers: Tadahiro Mukaide, S. Satou, T. Suzuki, I. Matsumura, Hiroki Akiyama, Ken Taketoshi
Scroll designers: M. Oose, Kazumi Yogi, Akemi Ootaka, K. Kusaka
Music composers & arrangers: Yasushi Kaminishi, Masahiro Yuge
Programmers: Y. Kobayashi, T. Nishi, K. Ishii, N. Hasimoto
Producers: Y. Ozaki, T. Minami
Executive producers: T. Fujimoto, Yoshiki Okamoto, Noritaka Funamizu
Coordinators: Tomoshi Sadamoto, T. Saitou
Sound advisers: Hiroaki "X68K" Kondo, Tomohiro Masuda
Program support: K. Kaneko, M. Shinohara, S. Yamazaki, Cham

**Giga Wing 2 (Capcom, 2000)**

**Gigandes (East Technology, 1989)**

**Gondomania (Data East, 1987)**
Game designed by: Y. Gondo
Programmers: T. Kitazawa, T. Nishizawa, S. Tamura
Sound by: H. Yoshida
Music composed by: Azusa Hara (AZUSA)
Character designers: Back Man, A. Kushima, H. Nomura
Hardware designer: K. Yoshida
Ending designed by: T. Nishizawa
Supervised by: T. Kitzawa

Gradius / Nemesis (Konami, 1985)
Programmed by: Kazuhisa Hashimoto
Music by: Miki Higashino

Gradius II - Gofer no Yabou (Konami, 1987)
Game programmers: T. Takatori, K. Tsutsui, T. Horimoto, A. Suzuki, Takehiko Fujii
Graphic designers: Miki Yoshikata, H. Ashida, M. Iwamoto, A. Nonami, Kuniaki Kakuwa
Sound editors: S. Tasaka, Motoaki Furukawa, K. Matsubara, S. Hukami
Engineer: K. Hashima
Title designers: F. Shinuya, J. Tanaka

Gradius III - Densetsu Kara Shinwa-e (Konami, 1989)
Director: Hiroyasu Machiguchi
Game programmers: T. Shimomura, Yuko Itoh, M. Ozawa
Graphic designers: T. Miyoshi, M. Igarashi, R. Itoh, K. Hattori, Y. Asano
Sound editors: J. Kaneda, S. Fukami, M. Higashino, K. Nakamura, Mutsuhiko Izumi
Engineers: K. Ban, K. Itoh
Title designers: F. Shibuya, M. Yoshihashi

Gratia - Second Earth (Jaleco, 1996)

Grid Seeker - Project Stormhammer (Taito, 1992)
Game designers: Tsukasa Ohshima, <3Nurse<3 Mizukami, Takafumi kaneko
Programmers: T. Natani, Takafumi Kaneko, Mercury Hayashi, Jinji Tantou
Software: Shirou Yoshida, Youichi Sakai, Hiroyuki Minemura
Character designers: Tsukasa Ohshima, <3Nurse<3 Mizukami, Keppel Maekawa
Object art director: Indy Chinkai
Screen art directors: Takashi Yamada, Lin Hu-Man Gas
Graphic designers: Takashi Yamada, Kenji Hazama, Kouichi Kizato, Tamae Kisanuki, Natsuko Tsuji, Mari Fukusaki, Akiyoshi Takada, Indy Chinkai, Space Creative, A-Wave, Visual Arts Production
Hardware engineer: Katsumi Kaneoka
Decorator: Toshiyuki Takenami
Sound directors: Norihiro Furukawa and Naoto "Yag" Ishita of Team Zuntata
Producer: Toshiaki Kato

Grind Stormer / V-Five (Toaplan, 1993)
Director: K. Takano
Programmers: C. Hayasato, T. Ikeda
Graphic designers: Y. Naora, M. Yamaguchi
Sound director: Masanori Yuge
Gulf Storm (Dooyong, 1991)

Gulf War II (Comad, 1991)

Gun & Frontier / Gun Frontier (Taito, 1990)
Sound composer: Yasuhisa Watanabe (Yack.)

Gunbird (Psikyo, 1994)
Hiroyumi Nakamura, Artmic, Jun-Ichi Niwa, Shin Nakamura, Rick Johnson, Hyoue
Ogama, Wataru Yamazaki, Hideyuki Oda, Ikuda Yosida, Youko Tsukagoshi, Hiromi
Tanegasima, Toshinori Sugita, Seiki Sato, Shiori Saito, Yusa Tarou
Music composed by: Masaki Izutani

Gunbird II (Psikyo, 1998)
Shin.Nakamura, Shiori Saito, Hiroshi Yamada, Naozumi Yorichika, Yoko Tsukagoshi,
Norikazu Takemori, Emi Taniguchi, Keizou Fujita, Yousuke Iwabuchi, Kenichi Fujita,
Kunihiko Nogomi, Katsuya Shikanouchi, Katsuhiro Nishida, Shinji Nohara, Masato
Natsumoto
Music composed by: Masaki Izutani

Gunlock (Taito, 1994)
Producer: Yukio Abe
Directors: Yukio Abe, Tatsuo Nakamura
Game designers: Tatsuo Nakamura, Yukio Abe, Tomohisa Yamashita
Software: Tatsuo Nakamura, Shinji Soyano, Hikaru Taniguchi, Masao Kashino, Isao
Ooyama
Character graphic designers: Hideyuki Kato, Tomohisa Isobe, Shinjiroh Sugitani,
Hiroyo Kujiyai, Yasuhiro Noguchi
Screen graphics designers: Hideyuki Kato, V.A.P, Peacock
Music & Sound effects: Tamayo Kawamoto (Zuntata)
Sound effects: Mu-Nakanishi (Zuntata)
Sound direction: Tono (Zuntata)
Design works: Kyoko Umezu
Hardware: Katsumi Kaneoka

GunNail (NMK/Tecmo, 1993)
Morio, Ore!, Ikezu Kenzi, Mingmei, Ama, Hide-Kaz, Kate Seki, Naoko, A-Saku, San
Chan, Mug, Sato, Midori, Mustard Papa

Guwange (Atlus/Cave, 1999)
Producer: Kenichi Takano
Chief programmer: Tuneki Ikeda
Programmers: Satoshi Kouyama, Takashi Ichimura
Chief designer: Junya Inoue
Designers: Akira Nakabayashi, Hiroyuki Tanaka, Atushi Aburano, Toru Shimazu
Character designers: Akira Nakabayashi, Junya Inoue
Calligraphy: Akira Nakabayashi
Character voices: Yuko Nakamura, Junya Inoue, Kazushi Takamura, Takako Taniguchi,
Takn Nagasawa, Takno Yoshida
Sound producer: Junya Inoue
Music composer: Nasahiro Kusunoki
Sound effects: Nasahiro Kusunoki
Super visor: Hiroyuki Tanaka (Atlus)
Special assist: Toshiaki Tomizawa

Gyrodine (Taito, 1984)
Naomi.S, K.T, Miki Kun, Nice Y.N, Pop Kawa, M. Harada

HAL 21 (SNK, 1985)

Halley's Commet (Taito, 1986)
From highscore table: Kouju Miki (K.M), (NIG), (LSI), Hisayoshi Ogura (OGR), (E.T)

Heavy Metal (Sega, 1985)

HeliFire (Nintendo, 1989)

Hellfire (Toaplan, 1989)
Music and Sound created by: Tatsuya Uemura

Hotdog Storm - The First Supersonics (Marble, 1996)
Programmers: Nobushige Takaki, Mr.Park, Kaolton Taki, Masaaki Sasaki
Mechanical designer: Manabu Takakashi
Character designer: Kazushi Tamada
Map designers: Manabu Takakashi, Kazushi Tamada
Visual designer: Manabu Takakashi
Visual design assistant: Kazushi Tamada
Title designer: Manabu Takakashi
Title graphic designer: Kazushi Tamada
Ending designer: Kazushi Tamada
Sound team: Fumito Tamayama, Shige Masco, Yoko
Director: A.Jin

Ikaruga (Treasure, 2001)

Image Fight (Irem, 1988)
Sound composer: Sclap

Image Fight II (Irem, 1990)

In the Hunt / Kaitei Daisensou (Irem, 1993)
Designers: Akio, Susumu, Tomohiro, Ken Kui, Kozo, Takeshi
Programmer: Nobu, Wanderer
Sound creator: Ai Ai
Publicity staff: Sakomizu
Planner: Tobi_Nag
Assistants: Watashiha Sekaino, Honda Chitsujiyo, Nanoda Yotte, Kono Oounabarani, Ikitoshi Ikerumono, Sono Chino, Itteki Mademo, Subete Watashino, Mono Nanoda

Insector X (Taito, 1989)
Ketsui / Kizuna Jigokutachi (Cave, 2002)

Juno First (Konami, 1983)

Kidou Senshi SD Gundam - Psycho Salamander no Kyoui oh (Banpresto, 1991)
Producers: K. Kawaguchi, Toshifumi Kawashima
Main programmer: Big Common
Sub programmer: Merkava Mk II
Graphic designers: J.F. Sebastian, Muten Roshi
Sound programmer: King Bee
Art directors: Senba Takatsuna, Ohno Wepokichi

Koutetsu Yousai Strahl (UPL, 1992)
Game designer: Kinya Adyama
Game programmer: Ken-Ichi Kunikyo
Music composer: Yoshio Nagashima
Object designers: Kadru Kamigiku, Ichiro Shibasaki, Mutsuo Kaneko, Kinya Adyama
Background designers: Mindru Tomizawa, Megumi Fujii
Hardware works: Nobuyuki Narita

Kyukyoku Tiger (Taito, 1995)

Kyukyoku Tiger II (Taito, 1995)

Last Resort (SNK, 1992)
Producer: Yasumi Tozono
Designers: Yoshio Shimizo, Mitsuo Kodama, Tatsuya Shinkai, Toshimi Tanaka, Khozoh Nagashima, Hajime Itoh, Senaroh Hotta, Saori Etoh, Eri Koujitani
Sound: Toshio Shimizm, Tatenorio Yamate
Developer: Takefumi -Syndicate- Yamamoto

Legendary Wings (Capcom, 1986)
Music composed by: Tamayo Kawamoto

Legion (Nichbutsu, 1987)

Lethal Thunder / Thunder Blaster (Irem, 1991)

Liberation (Data East, 1984)
I. Fushiki, D. Kohama, Y. Ohba, K. Nishikawa

Lifeforce / Salamander (Konami, 1986)
Game programmers: Hiroyasu Machiguchi, Mitsuo Takemoto, Toshiaki Takahori, Ikuko Minowa
Video graphics designers: Jun Sakurai, Miki Yoshikata, Ikuko Bando
Sound editors: Yoshiaki Hatano, Miki Higashino
Engineer: Yasushi Furukawa

Lightning Fighters / Trigon (Konami, 1990)
Programmers: H. Tsujimoto, H. Okazaki, Tadasu Kitae
Graphic designers: Kuniaki Kakuwa, Y. Noguchi, M. Inafuku
Sound editors: K. Matsubara, K. Yamane
Engineers: M. Idaka, H. Matsuura
Title designers: M. Yoshihashi, H. Matsuda

Lizard Wizard (Techstar, 1985)

Macross Plus (Banpresto, 1996)
Producer: Toshifumi Kawashima
Director: T. Komazawa
Programmer: Kazuaki Yamaryo
Chf. designer: Noboru Inamoto
CG Designers: Hiroshi Fukazawa, Naomi Hasegawa, Masakazu Togami
3D Designers: Koji Takada, Koji Yokoe
Music: Kenichi Suzuki
Game designer: Moss.

Mad Shark (Allumer, 1993)

Mahou Daisakusen / Sorcerer Strike (Raizing, 1993)
Music composed by: Atsuhiro Motoyama

Markham (Sun Electronics, 1983)

Mars Matrix - Hyper Solid Shooting (Capcom/Takumi, 2000)
Takumi Staff
Programmers: Takafumi Nishi, Kaju Ishii, Toshihiko Onodera, Naoto Sakurada
Object designers: Ken Taketoshi, Tatsuhiro Suzuki, Hiroki Akiyama, Yuki Ootou
Scroll designers: Kazumi Yogi, Tadahiro Mukaide, Akemi Ootaka
Music composer: Yasushi Kaminishi
Sound programmer: Masahiro Yuge
Concept mechanic designers: Choco, Shorp, Nadialove Kitty, Norihiro Takikawa
Planner: Ikuwo Satoh
Producer: Yukikazu ozaki
Executive producer: Tomoaki Fujimoto

Capcom Staff
Producer: Tatuya Minami
Support from R&Dept. #3, Tomoshi Sadamoto

Master of Weapon (Taito, 1989)
Directed and produced by: George Jyuttute
Game and character designed by: Yukiwo Ishikawa
Programmed by: George K-5, Takeshi Murata, Creamy Tetsu, Maryin Kondoh
Art designed by: Yukimo Ishikawa, Takako Kojima, Dandy Yarita, Makoto Fujita,
Akira Saitoh, Hisakazu Katoh, Oolong Yamada, Kenji Hazama, Animation 20, Santa Claus
Hardware designed by: Eikichi Takahashi, Hiroyuki Noguchi
Music composed and arranged by: Hisayoshi Ogura, Yasuhisa Watanabe
Graphic designed by: Hiroyasu Nagai, Kazuo Nakagawa, Animation 20

Mazinger Z (Banpresto/Dynamic Pl. Toei Animation, 1994)
Sound effect by: Hitoshi Sakimoto

Mega Blast (Taito, 1989)

Mega Zone (Konami, 1983)
K. Hiroshita, Y. Sakamoto, T. Fujiwara, N. Inoue, S. Fukutake

MegaTech - Astro Warrior (Sega, 1989)

MegaTech - Fire Shark (Sega, 1989)
Please Refer to “Fire Shark”

Meta Fox (Seta, 1989)
Producer: Jun Fujimoto

Metal Black (Taito, 1991)
Producers: Senba Takatsuna, Hori Takamasa
Game designers: Senba Takatsuna, Hori Takamasa, Kuroki Naoya, Ohno Tomohiro, Seguchi Takashi, Mizobe Kumi, Watanabe Yasuhisa, Sawaki Jun, Ishikawa Katsuhisa
Art directors: Senba Takatsuna, Ohno Wepokichi
Programmers: Tarabar, Kuroki Naoya, Seguchi Takashi
Hardware engineers: Sawaki Jun, Takeda Tomio
Decorator: Mizobe Kumi
Sound (Zuntata): Yasuhisa Watanabe (Yack.), Ishikawa Babio
Bit pattern: Moriyama Yoshihiro, Tanaka Kuniaki, Nakahara Yoshikatsu, Tsuneoka Masatoshi, Vap-Awave
Cast: Ho Lee Chan, Zuntata, John Neianik 8th, Sakou Menme

Metal Clash (Data East, 1985)
Game programmer: Akira Sakuma

Metal Hawk (Namco, 1988)
Producers: K. Sawano, K. Tashiro
Game designer: H. Nakatani
Game programmer: A. Yuhara
Music & Sound effects: Shinji Hosoe, Kazuo Noguchi
Electrical engineering: M. Yamada, O. Morita
Drive program: T. Inui
PCB designer: T. Okada
Cabinet designer: Y. Nakauma
Mechanical engineering: S. Karino, H. Igarashi, T. Imai, S. Kanebako, H. Tatsumi

Metal Soldier Isaac (Prototype) (Taito, n.d.)
Metal Soldier Isaac II (Taito, 1985)
Mighty Monkey (Universal Video Games, 1982)
Mission 660 / Alphax Z (Woodplace Inc., 1986)
Mission-X (Data East, 1982)
MX5000 / Flak Attack (Konami, 1987)
Mystic Riders / Mahou Keibitai Ganhooki (Irem, 1992)
Nebulas Ray (Namco, 1994)
Planners: M. Kimoto, Y. Yamamura
Programmers: Jin? Tsukka, H.R.M.
Chief designer: H. Kuwabara
Graphic designer: I.T.O. Inc
Music composers: Masahiro Fukuzawa (Charly), Takayuki Ishikawa
Nemesis / Gradius (Konami, 1985)
Music by: Miki Higashino
Night Attack (Data East, 1983)
Night Raid (Takumi, 2001)
Nostradamus (Face, 1993)
Main programmer: M. Nagasawa
Enemy programmers: N. Maruyama, F. Ohtani
BG graphics designers: C. Mutsukura, H. Nasu, K. Igarashi
Obj graphics designers: N. Oikawa, K. Higeta, D. Furuuchi, H. Noma
Music composers: Mika Nozawa, Matsudaira Ako
Sound effects: A. Iwanaga
Spec & Director: K. Igarashi
Omega Fighter (UPL, 1989)
Iwatani, Nobuyuki Narita, Abe, Akemi Tsunoda, Nikei, Shigksa, T.T, Ohnuma
Omega Fighter Special (UPL, n.d.)
Iwatani, Nobuyuki Narita, Abe, Akemi Tsunoda, Nikei, Shigksa, T.T, Ohnuma
Ordyne (Namco, 1988)
Music composed by: Sinji Hosoe
Out Zone (Toaplan, 1990)
Music and sound created by: Tatsuya Uemura
P-47 - The Phantom Fighter / P-47 - The Freedom Fighter (Jaleco, 1988)
Sound composer: Shizuyoshi Okamura
P-47 Aces (Jaleco, 1995)
Sound: Manabu Namiki

Parodius Da! - Shinwa kara Owarai-e (Konam, 1990i)
Main programmers: Chichibinta, Tsukasa
Sub-programmer: Tyuken
Character designers: GaKincho, Touyou Syoutarou, Takemasa.M, Mory-Wandyu, Mikachan
Sound: -Cameo- Matano, -Dokuo- Umeno
Hard designer: Dendoukonisi
Tool designers: Au Toshimi, Kanton Ten

Phelios (Namco, 1988)
Music composed by: Yoshinori Kawamoto (Kawagen)

Play Choice: Gradius (Konami, 1986)
Please Refer to “Gradius” (Konami)

Plus Alpha (Jaleco, 1989)
Main programmer: Papa Sekiya
Character programmer: Motoko
Special programmer: Yuma Yoshida
Main character designer: Rolling.N
Character designers: Otappie Etoh, U. Keijiro
Main scroll designer: Nekomasa
Scroll designers: Markun!, Otatuku
Opening designer: Nekomasa
Present designer: Markun! Takahashi
Ending designer: Otatuku Etoh
Sound: Tsukasa Tawada
Voice actress: Eppin Honda
Sound programmer: Panic Yunma
Game designer: Momonga

Pollux (Dooyong, 1991)
Directors: Jooshun Hong, Youchur No, Choonduk Kia
Hardware Designer: Sunghun Lee
Music: Sanghyuk Lee
Background designer: Meerang Oh, Minjuan Lee
Animation designers: Woohoul Jung, Meesook Yeq
Main software: Haisung Ryou, Joagil Lee

Prehistoric Isle 2 (Yumekobo, 1999)
Executive producers: S. Takaoka, Tanaka
Producer(rq): James. W
Planner: Barso
Direction helpers: Satoshi ito, H. Miyagami, J. Seki
Main programmer: Yuki
Programmers: Y. Takasaki, Buttaku99, Masumura
Tool programmer: Hiroaki Torii
Chief designers: Y. Yonezawa, T. Nagakubo
Designers: Masato Miyoshi, Michitaka Ishida, Yuko Hara, T. Hirokawa, Matsumoto
Kiyoshi, Sho Tabira, kyo Yamanaka
Sound designer & music composer: Masahiko Hataya

Prehistoric Isle in 1930 / Genshi-Tou 1930's (SNK, 1989)
Producer: Eikichi Kawasaki
Director: Yah!
Programmers: Takoguti Kamen 001, Itsam Matarga
Designers: Wara Wara, Megadeth Nakamoto, Yokochan, Tomomi
Sound: Yoko. O, Tarkun
Hardware: Yoneda, Ebapa

Progress (Chuo.L.H. Co., 1984)

Psyvariar - Medium Unit (Success, 1999)

Psyvariar 2 - The Will to Fabricate (Success, 2003)

Psyvariar Revision (Success, 2000)

Pulstar (Aicom, 1995)
Nenko, M. Yoshida, T. Nagakubo, Naomi, Daikiti, K. Katoku, K. Urahama, K. Okabe,
Toshio. I, Yamadasan, Shion, F. Ryuze
Music composed by: Harumi Fujita, Yasuaki Fujita

Rabio Lepus (V-System, 1987)
Main programmer: T. Honda
Sound, music: K. Okuda, E. Murakami, Y. Ishida
Designer: Shin Nakamura

Radiant Silvergun (Treasure, 1998)

Rafflesia (Coreland/Sega, 1986)

Raiden (Seibu Kaihatsu, 1990)
Music composed by: Akira Satoh

Raiden DX (Seibu Kaihatsu, 1994)

Raiden Fighters (Seibu Kaihatsu, 1996)

Raiden Fighters II (Seibu Kaihatsu, 1993)

Raiden Fighters Jet (Seibu Kaihastsu, 1998)

Raiden II (Seibu Kaihatsu, 1993)
Music composed by: Gou Satou
Raiga - Strato Fighter (Tecmo, 1991)

Rapid Hero (Media Trading, 1994)
Main programmer: Kochi
Program super visor: Oredayo
Sound programmer: Tommy
Object designers: Arita, Ikezu Kenzi, Asaku, Ning Mei, Seki Kate, Midori, OK Kitamura
Scroll designers: Nishimura, Kawauso Mama
Art work designer: Big Robo
Sound composer: Hide Kaz, Santard, Mustard Papa
Planner: Morio

Raycrisis (Taito, 1998)

Rayforce (Taito, 1996)

Ray Storm (Taito, 1996)
Producer: Yukio Abe
Director: Tomohisa Yamashita, Yukio Abe, Tatsuo Nakamura
Music: Tamayo (Zuntata)
Sound effects: Mu-Nakanishi (Zuntata)
Sound direction: Tono (Zuntata)
Hardware: Katsumi Kaneoka
Design works: Mihoko Sudoh

Rezon (Allumer, 1991)
Programmer: Jun Ichikawa
Assistants: Kenji Kikkawa, Hiroshi Yamanaka
Graphic designers: Yoshiyuki Shikano, Yukie Sugimoto, Manabu Namiki, Noriaki Yamaguchi, Tadahiro Negome
Music & sound: Hideyuki Ueno
Hardware: Noboru Kohno

R-Shark (Dooyong, 1995)

R-Type (Irem, 1987)

R-Type 2 (Irem, 1989)

R-Type Leo (Irem, 1992)
Game planners: Hirogon, Akikaze
Programmers: Denden, Yuki, Drunker, Shaka
Graphics designers: Sakotan, U.W.F., Maccoy, Kimi, Hidarin, Kakapo, Yassy
Sound: Hiroshi, Aiai

Ryu Jin (Taito, 1993)
Programmers: T. Kaki, T. Kim!!, K. Hirano
Sound: H. Tsuda, T. Inohaya

S.R.D. Mission (Taito, 1986)

S.S. Mission (Comad, 1992)
Graphic designers: T.C Choi, W.H Seo, J.A Park, K.Y Chang
Producer: K.S An
Manager: H.N Yee
Game designer: M.W Kim
Programmers: J.S Na, Y.M Park
Scenario writer: J.V Kim
Sound creator: Y.J Youn

Sagaia / Darius II (Taito, 1989)
Please refer to “Darius II” (Taito)

Saint Dragon (Jaleco, 1989)
Music composed by: Shizuyoshi Okamura (Sizzla), Tecchan

Salamander / Life Force (Konami, n.d.)
Game programmers: Hiroyasu Machiguchi, Mitsuo Takemoto, Toshiaki Takahori, Ikuko Minowa
Video graphics designers: Jun Sakurai, Miki Yoshikata, Ikuko Bando
Sound editors: Yoshiaki Hatano, Miki Higashino
Engineer: Yasushi Furukawa

Salamander 2 (Konami, 1986)
Producer: Tango
Director: Qchan
Graphic designers: Satoyan, Masato Hijima, Sonshi Sdr, Kaori Nishimura, Yas, Motohisa Ando
Sound designers: You Takamine, Naoki Maeda
Hard designer: V Kobe Yzz
Develop assistant: Takaaki "Q" Kumemura
Product designer: K. Iwashita
Programmers: Qchan, Yamamoso Type2, Takeaki Hasegawa

Samurai Aces / Sengoku Ace (Psikyo, 1993)
Staff: Shinnosuke., Rick Johnson, O.Senbei, Hiromin, Shiori., Ukon Zakura, Minsk, Dozi, Tall Man, Ayanokouji Reimu, Iron Champ, Studio Avi

Sand Scorpion -Sasori (Face, 1992)
Game designer: Ghost
All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

Programmers: Nak, Maruyaman  
Graphic designers: N-Phantom, Satoshi.N, Higeta-K, F.Dij!, Nob

Sauro (Tecfri, 1987)

Scramble (Konami, 1981)

SD Gundam Neo Battling (Banpresto, 1992)

Section Z (Capcom, 1985)  
Programmed by: Toshio Arima  
Music by: Tamayo Kawamoto

Sen Jin - Guardian Storm (Afega, 1998)  
Hardware designer: Cho Nam Jung  
Programmer: Oh Gyeong Hun  
Background designers: Park Kyong Su, Kim Eun Jin  
Animation: Kim Young Mi, Le Hoan Ki, Kim Jin Young  
Sound: Park Chi Ho

Director: Ryou Hai Sung

Sengeki Striker (Kaneko / Warashi, 1997)  
Directed by: Sho  
Programmer: Tsutomu Tabata  
Character designer: Nozomu Oda  
Game designer & 3D models: Taichi Shigemura  
Planner: Norihide Yamaguchi  
Character graphic designers: Taichi Shigemura, Nozomu Oda, Tama  
Background graphic designers: Nozomu Oda, Tama, Masaki Ohno  
Sound track & Sound effects: Yukihiko Murabayashi

Sengoku Blade : Sengoku Ace Episode II / Tengai (Psikyo, n.d.)

Sexy Parodius (Konami, 1996)  
Programmers: Chichibinta Tsukasa, Ohji, Paiman  
Character designers: Shuzilow.Ha, Magrou, Natsumi Bouike, Misugi Inagaki, Kaori  
Nishimura, Galaxy Namikoshi  
Music composers: Mayuko Kageshita, Ary  
Music advisers: Izumi, Sita-Ru Senoo  
Sound effects: Ary  
Hard designer: Yoshikazu Matsui  
Product designer: Poper Takashi  
Radio actors: Joshua Popenoe, Kumike Watanabe, Nobuyuki Hiyama, Yuko Nagashima

SF-X / Skelagon (Nichibutsu 1983)

Shienryu (Warashi, 1997)  
Director and programmer: Tsutomu Tabata  
Game and graphics designer: Nozomu Oda  
Graphic designers: Shige-P, Tama (Magitec)
Sound tracks and effects: bAsHEE, Yuki
Planner: Hiroaki Sato
Advertisement: SHO
Lead tester: Takeshi Ohbuchi
Executive producer: Noriyuki Takasaki

Shikigami no Shiro (Alfa Systems, 2001)

Shikigami no Shiro II (Alfa Systems, 2003)

Shippu Mahou Daisakusen - Kingdom-Grandprix (Raizing / Sing, 1994)
Music composed by: Hitoshi Sakimoto, Masaharu Iwata

Side Arms - Hyper Dyne (Capcom, 1986)
Game designers: Poo & Kihaji Okamoto
Object designers: Dekachin & Kawamoyan
Scroll designers: Toride No Yas & Mikichan
Supplement: Uhe Uhe & Kurichan
Sound: Tadanomi Surozoo
Music: Ayako Mori
Hardware: Punch Kubozoo
Software: Mr.

Silk Worm (Tecmo, 1988)

Sky Adventue (Alpha Denshi, 1989)
System programmer: Eizi Fukathu
Main programmer: Hiroyuki Ryu
Programmer: Hideo Kamoda
Hardware: Shinichi Tamura
Designer: Kenichi Sakanisi
Music: Tambourine Yuka
Sound: Hiroaki Simizu
Producer: Akira Usizawa

Sky Alert (Metro, 1992)

Sky Fox / Exerizer (Jaleco, 1987)

Sky Kid (Namco, 1985)
Music by: Junko Ozawa

Sky Kid Deluxe (Namco, 1986)
Music by: Junko Ozawa

Sky Skipper (Nintendo, n.d.)

Sky Smasher (Nihon Systems, 1990)

Sky Soldiers (Alpha Denshi, 1988)
Slap Fight / Alcon (Taito, 1986)
Sound composer: Masahiro Yuge

Sol Divide - Sword of Darkness (Psikyo, 1997)

Soukyugurentai / Terra Diver (Raizing, 1996)
Sound: Manabu Namiki, Hitoshi Sakimoto

Space Odyssey (Sega, 1981)

Space Trek (Sega, n.d.)

Stagger I (Afega, 1998)
Hardware designer: Namjun Cho
Sound: Junghae Seo
Background graphic designer: Hyonmi Kim
Graphic director: Bongwon Son
Program director: Haiisung Ryou

Star Force (Tekhan, 1984)

Star Jacker (Sega, 1983)
Hardwork by: Hideki Sato
Secured by: Masatoshi Mizunaga
Programmed by: Hirohi Nakayama, Katsuya Kazihara, Katsunori Kanazawa
Designed by: Eiro Nagata, Shozo Takihi
Sound by: Hideo Kume
Creator: Takaya Ida

Star Soldier - Vanishing Earth (Seta, 1998)

Stargate (Williams, 1981)
Staff: Larry DeMar (LED), Sam Dicker (SAM), Steve Ritchie (SSR), Eugene Jarvis (DRJ)+(EPJ), (JER)

Storm Blade (Visco, 1996)
Programmers: Nadu.S, N Joy and Cu, Manaby The Gambler
Graphic designers: Wep, Zero Nyan, Oda, Yayopin, Skip, Jack, Tuna, Hase Meg, Yukopon
Character designer: Tajiman
Music composer: Light Link Music
Producer: Tetsuo Akiyama
Director: Don Gabacho, Mr. Doo
CAST:
Lucky: Shinichiro Miki
Alex: Kiyoyuki Yanada
Camel: Keiko Onodera
Kamikaze: Mahito Tsujimura

Strike Gunner S.T.G (Athena, 1991)
Written and designed by: Undead Tama
Screen play by: Undead Tama
Sound by: Sho
Produced by: Shin Nakamura
Directed by: Undead Tama

Strike Force (Midway, 1991)

Striker 1945 III / Strikers 1999 (Psikyo, 1999)

Strikers 1945 (Psikyo, 1995)
Staff: Jun-ichi Niwa, Shin. Nakamura, R.J. Bashmet, Hyoue Ogawa, Wataru Yamazaki,
Hideyuki Oda, Youko Tsukagoshi, Hiromi Tanegashima, Masaki Izutani, Ikuya
Yoshida, Norikazu Takemori, Toshinori Sugita, Seiki -SSS- Sato, Shiori Saito, Yusataro

Strikers 1945 II (Psikyo, 1997)
Staff: Yoshiyuki Takami, Shin Nakamura, Hiroshi Yamada, Shiori Saito, Naozumi
Yorichika, Hideyuki Oda, Yoko Tsukagoshi, Masaki Izutani, Norikazu Takemori, Emi
Taniguchi, Keisuke Takagi, Hideto Kamioka, Keizo Fujita, Kunio Asahara, Kenichi
Fujita, Kunihiko Nogomi

Strikers 1945 Plus (Psikyo, 1999)

Super Cobra (Konami, 1981)

Super Real Darwin (Taito, 1987)
Music by: Yoshida Hiroaki

Super Spacefortress Macross / Super Spacefortress Macross (Banpresto, 1992)
Music by: Yoshida Hiroaki

Super Spacefortress Macross II / Chou-zikuu Yousai Macross II (Banpresto, 1993)
Software: Ore~, Tommy
Sound: Hide-Kaz, Abraham, Manabu Namiki (Taro), Mr. Takami
Graphic designers: Gaku, Mingmei, Midori, Kate<3Seki, Zangi Eisaku, Ikezu Kenzi
Planner: Mor, Mug
Supervisor: Yukichan
Producers: Toshifumi Kawashima

Super-X (NTC, 1994)
Syvalion (Taito, 1988)
Produced by: Hisayoshi Ogura (OGR)
Music composed by: Yasuhisa Watanabe (YAC)
Staff: Fukio Mitsuji (MTJ), (T.S), (M.F), (G.K), (TSM), (NGI)

**Tengai / Sengoku Blade - Sengoku Ace Episode II (Psikyo, 1996)**
Please see “Sengoku Blade – Sengoku Ace Episode II” (Psikyo)

**Terra Cresta (Nichibutsu, 1985)**
Staff: Shigeki Fujiwara, Isao Shiki, Hisaya Tsutsui, R. Yamada
Music composed by: Kenji Yoshida

**Terra Force (Nichibutso, 1987)**
Game designer: Shigeki Fujiwara
Game programmers: Kakefu, Shinya Okuda
Character designers: Takanori Tanaka, Yuki Yasuda
Title designer: Shinji Kubota
Sound composer: Noburu Yoshida
Sound programmer: Yoshinori Mitta
Hardware engineer: Isao Shiki

**The Game Paradise! - Master of Shooting / Game Tengoku - The Game Paradise (Jaleco, 1995)**
Program leaders: Akiyama->417, Nozomu->Love
Programmers: Z-Donguri, Benriya Kenchan
Graphic leaders: Mr. Kamikaze & Mr. Hasegawa, ....Ya....., .....Ei....
Graphic designers: Watanabe Teruhiko, Takarod, RF4K
Music: Sawa Kazuo
Sound Manipuler: Nis
Voices: Kanai Mika, Shina Hekiru, Nishihara Kumiko, Chiba Shigeru, Seki Tomokazu
Cast management: Ishihara Ryuuta
Recording: Hoshino Toshiaki, Yano Satoshi
Publicity: Morita Kachisato
Illustration: Souma Tatsuya
Second direction: Kazaana Takanori
Production and direction: Arai Masahiro

**The Last Day (Dooyong, 1990)**
Directed by: J. S. Hong
Main software: J. H. Park, H. S. Ryou, D. C. Jeong
Hardware designer: C. D. Kim
PCB artwork: S. W. Lee
Character designer: M. R. Oh
Animation designer: M. S. Lee
Background designer: S. G. Kang, K. H. Choi, I. S. Yi, H. C. Sin
Music: I. G. Kang
Sound effects: S. H. Lee
Music software: Y. C. No

**The Next Space (SNK, 1989)**
Boss: Eikichi Kawasaki
Producer: Shochan
Main programmer: Shochan
Sub programmer: Data Tada
Advisers: Bucho, Tama, Koyan, Konny
Graphic designers: Fujita, Ken, Mituzo, Ishimochi, Tsukamichi, Buri, Fujiwara, Yokochan
Sound: Kidon
Hardware: Ebara
Character designers: Shochan, Tsukamichi

Thunder Cross (Konami, 1988)
Soft technicians: Kalcium Wada, The Great Utamaro
Team consultant: Beauty Hide
Production supervisor: K. Hiro
Animation character: Moriyanma 24
Set visual artist: M. Sunachan
Sound designers: Nyanpy J-Kane, Prophet Fuka
Processing to Hard: Taka
Package designer: Maya 2095

Thunder Cross II (Konami, 1991)
Producer: T. Nakagawa
Programmers: K. Tokunaga, K. Kano
Nakanishi, T. Nakanishi, T. Nakazawa, M. Tohyama
Assist: Y. Suzuki
Sound designer: Metal Yuhki

Thunder Dragon (NMK/Tecmo, 1991)
Producer: Yukio Tomonari
Director: Yosuke Ono
Game designer: Merry Tamio
Programmer: Lieut. Col. Ore
Scenario writer: Ikezu Kenzi
Sound creator: Hide-Kaz
Graphic designers: Ikezu Kenji, Giant Ama

Thunder Dragon II / Big Bang – Power Shooting (NMK, 1993)
Planner: W.W. Miyakawa
Programmer: Ore-Dayo
Co-programmer: Ryu Kikuchi
Graphic designers: Ikezu-Kenji, Kate Seki, Gaku Arita, Aniki Nisimura, Uisaku Origami
Sound creator: Manabu Namiki (Taro)
Sound adviser: Hide-Kaz

Thunder Force AC (Sega, 1990)

Thunderjaws (Atari, 1990)
Designed and programmed by: Russel Dawe (Rusty)
Tiger Heli (Taito, 1985)
Music and sound created by: Tatsuya Uemura

**Tokio / Scramble Formation (Taito, 1986)**

Transformer / Astro Flash (Sega, 1986)

Truxton / Tatsujin (Toaplan, 1988)
Music composed by: Masahiro Yuge

Truxton II / Tatsujin Oh (Toaplan, 1992)
Music composed by: Masahiro Yuge

**Turbo Force (Video Systemm 1991)**

Turtle Ship (Philco, 1988)
Director: Han Sang Ho
Programmer: No Young Ho
Graphic designers: Nam Han Hee, Jang Kye Sook, Kwak Woo Jong, Song Hae Jung
Scenario & Music: Lee Jae Kun, Lee Jung Kyu
Technical supporters: Park Hee Jang, Ryoo Sook Ja
Board designers: Hong Jong Rim, Choi Seung Li

Twin Bee Yahhoo! Fushigi no Kuni de Oo-Abare!! (Konami, 1985)

Twin Cobra (Toaplan, 1987)
Music and sound created by: Tatsuya Uemura

Twin Eagle - Revenge Joe's Brother (Seta, 1988)
Produced by: Jun Fujimoto
Game designed by: MTY, Yam
Game programmed by: MTY
Game sub programmed by: K. Nakanishi WLZ
System programmed by: H. Kobayashi, K. Yoshii
Graphic designed by: Sachiko
Character designers: K. Sato, A. Kumura, M. Kasajima, M. Takeda
Music direction: Goblin Sound
Sound edited by T. Suzuki and T. Hasegawa.
Allugataya system: T. Hasegawa, T. Suzuki, K. Okuda
Game advised by: J. Narita
Graphic editer designed by: M. Watanabe
68K Chan: K. Ishikawa
Board designed by: N. Nonaka
Pcm 16: K. Oiyama
Vdc: T. Iwata, K. Oiyama
Vrc: N. Nonaka
Sound filter: Shyachou, M. Tanaka
Eigiyou: T. Ishikawa, Y. Ota
Jimu: T. Watanabe, T. Hiroi, K. Komura, M. Tanaka
Koubai: M. Harada, M. Iwata
Koumu: Y. Ikegai
Seizou: A. Aranaga, T. Sasho, K. Tominaga
Character model maked by: M. Takeda, K. Nakanishi WLZ, S. Tanaka

Twin Eagle II - The Rescue Mission (Seta, 1994)
Programmers: Noboru Harada, Takashi Kitabayashi
Graphics designers: Kozo Igarashi, Katutoshi Hiruta, Shingo Aoyama
CG Designer: Yasuhiko Kikuchi
Hardware engineer: Masahiro Yamaguchi
Soundtrack: Opus Corp.
Executive producer: Jun Fujimoto

Twin Hawk / Dai Senpuu (Taito, 1989)
Sound composer: Osamu Oota

TwinBee (Konami, 1985)
Music by: Shigeru Fukutake, Yoshinori Sasaki

Twinkle Star Sprites (SNK / ADK, 1996)

Producer: Tetsuo Akiyama
Assistant producer: Keisuke Usami
Director: Don Gabacyo
Programmers: IDEB 77Kg, ON0721-ST, M. Nakajima, AD-26255417J
Character designers: K. Takahashi, T. Takahashi
Music composers: K. Fukumori, Space Creative

U.N. Squadron (Capcom, 1989)
Planners: Mako P, Parazoll Shono, Poo
Direction: Kihaji Okamoto
Character designers: Manbou Shintan, Gokkun Kuratani, Rekite, Unicorn Mayumi,
Traveller Kuramoyan, Holiday Kakkun, Haru San, Powerful Konomi, Fukumoyan,
Femme Hana
Music composer: Chan Chakorin
Hard design: Kucchan
Programmers: Blbon, Takako

Ultra X Weapons / Ultra Keibitai (Banpresto/Seta, 1995)
Planner: Takehiko Hoashi
Programmer: Noboru Harada
CG designer: Yasuhiko Kikuchi
Graphic designers: Kozo Igarashi, Shingo Aoyama
Hardware engineer: Masahiro Yamaguchi
Video chip designer: Kenji Oiyama
Sound: Opus Corp.
Music: Masanao Akahori
Sound effects: Jun Enoki, Satoshi Ohta
Supervisor: Tsuburaya Pro., Hiroshi Funai

US AAF Mustang (UPL, 1990)

Vapor Trail - Hyper Offence Formation / Kuhga - Operation Code Vapor Trail (Taito, 1989)

Varia Metal (Excellent Systems, 1995)
Programmers: K Ishiguri, F Satou, Unko
Producers: T Yamanaka, D Yamada, K Osabe
Graphic designers: T Yamanaka, S Iwaya, T Kanou, D Yamada, M Tezuka
Sound: T Inoue

Varth - Operation Thunderstorm (Capcom, 1992)
Planners: Vally Dack Kelbon, Natural Sai Sai, Nijiken Mouri, Odds Maker Maetake
Scroll designers: Kintaro, Kuramoyan, Maru Chan, Mon Chan
Object designers: Kurata N, Manbou, Hanisawa, Ume
Programmers: Ohuchi, Meijin T, Hac, Okosama Ecchiro, Komorichie Darkside
Sound: T Yomage, P, Bull
Directors: Kihaji Okamoto, Poo, Nin
Producer: Kihaji Okamoto

Vasara (Visco, 2000)

Vastar (Semami Japan, 1983)

Vimana (Toaplan, 1991)
Music composed by: Toshiaki Tomizawa

Viper Phase 1 - New Version (Seibu Kaihatsu, 1995)

Viper Phase 1 (Seibu Kaihatsu, 1995)

Vs. Gradius (Konami), 1986
Please see “Gradius” (Konami)

Vs. Super SpyKid (Namco, 1986)

Vulcan Venture / Gradius II - GOFER no Yabou (Konami, 1988)
Game programmers: T. Takatori, K. Tsutsui, T. Horimoto, A. Suzuki, Takehiko Fujii
Graphic designers: Miki Yoshikata, H. Ashida, M. Iwamoto, A. Nonami, Kuniaki Kakuwa
Sound editors: S. Tasaka, Motoaki Furukawa, K. Matsubara, S. Hukami
Engineer: K. Hashima
Title designers: F. Shinuya, J. Tanaka

Vulgus (Capcom, 1984)
Staff: T. Toyohara, M. Kimura, Y. Morita, A. Fukada, S. Okada

War of Aero - Project MEIOU (Yang Cheng Electronic, 1993)
Programmer: J. Ichikawa
Graphic designers: Y. Sugimoto, H. Kanemaru
Character designers: J. Ichikawa, H. Kanemaru
Sound programmer: H. Yamanaka
Sound: Y. Ogawa, H. Shiomi
Director: J. Ichikawa

Wild Pilot (Jaleco, 1992)

Wonder Planet (Data East, 1987)
Game designer: K. Kubota
Graphic designers: J. Matsuda, R. Takahashi, H. Nomura
Programmers: M. Sano, K. Takahashi, T. Sasagawa, Souichi Akiyama
Music editors: Azusa Hara (AZUSA), Tatsuya Kiuchi, H. Kowastu, H. Yoshida

X Multiply (Irem, 1989)

Xevious (Namco, 1982)
From highscore table: Masanobu Endoh (Evezoo End), Masaya Nakamura (M.Nakamura), Eirry Mou, Shin-ichiro Okamoto (S.Okamoto), Shin-ichi Kojima (S.Kojima)
Music by: Yuriko Keino

Xexex (Konami, 1991)
Directed by: Tom Murchie
Program design by: Tom Murchie, Baumann, Wady Teits
Graphic design by: Mickey, James K kark, Cha Heifetz
Sound designers: Carol Queen, Michael Oldriver, Rosetta Stone, Shanghai Manmos
Hardware design by: Jean Simons
Title design by: Nissy Balvoa
Character design by: Ken.Heine
Art directed by: Maguro Banda
Special design by: Nori Tama
Special effect by: Screaming (Mt.Fuji)
Sub special effect by: Tamaya Jp
Screen play by: Coszo Gi Ken
Planning produced by: Studio Sumomo

XII Stage (Triangle Service, 2002)

XX Mission (UPL, 1986)
Game designer: Tsutomu Fuzisawa
Software designer: Satoru Kinjo
Character designer: Tsutomu Fuzisawa & Akemi Tsunoda
Sound: Tsutomu Fuzisawa & Kiyoshi Yokoyama
Data: Takashi Hayashi
Zaviga (Data East, 1984)
Game programmer: Akira Sakuma

Zed Blade / Operation Ragnarok (NMK, 1994)
Software: Ore Dayo
Graphic designers: Kate Seki, Ikezu Kenzi, Big Usi, Uisaku, Saiyer Kitamura, Mingmei
Sound: Manabu Namiki

Zero Gunner (Psikyo, 1997)

Zero Gunner 2 (Psikyo, 2001)

Zero Hour (Universal, 1980)

Zero Wing (Toaplan, 1989)
Music and sound created by: Tatsuya Uemura

Zing Zing Zip - The Shooting (Allumer / Tecmo, 1992)

Zoar (Data East, 1982)

Zodiack (Orca, 1983)
Appendix

Nostalgia and Age 2004 Findings and Experiment Overview

Three video game related web forums were surveyed to ascertain if there was any correlation between birthdates and their particular period of nostalgic interest. The choices of video game eras were based around a five year cycle which includes all commercial viable home consoles of the time.

Although there is some overlap, the in the periods, all major home consoles were represented in then respective generation. Period One was based around Pre-Eight bit machines that were dominant in the early eighties and late seventies. This period includes the Atari 2600, Atari 5200, Colecovision and Odyssey. Period Two is the Eight-Bit period which was dominated by the Nintendo NES (Famicom) as well as the Sega Master System (SG-3000), Atari 7800 and other 8-Bit home machines. Period Three is the Sixteen-Bit era which includes the Super Nintendo (Super Famicom), Sega Mega Drive (Sega Genesis), Neo Geo AES, PC Engine (Turbo Graffix). The Sixteen bit era ran from approx 1989/1990 until late 1995.

The early 32 bit era consists of mainly “failed” consoles like the 3DO, CDI and Atari Jaguar. Although this period overlaps the sixteen bit era, it was important to represent these consoles as they have a time frame from around 1993 until 1996. The next period, the 32bit era signified the introduction of proper 3D graphics into the home market and consists of the Sony Playstation, Sega Saturn, Nintendo 64 and Sega Dreamcast. This period runs from 1995 until around 2002, mainly due to the Dreamcast’s later introduction. There was some debate about where to place the Dreamcast as it sits in-between the 1995/2002 generation and the current generation. The last period is the current generation of machines consisting of the Nintendo Gamecube, Sony Playstation 2 and Microsoft Xbox.
## Nostalgia and Age Revisited (Findings From Aussie Arcade, 2008)

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### All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

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### Shmups as a Source for Better Game Design

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All of Your Base Are Belong to Us? Shmups as a Source for Better Game Design

1993

- **Batsugun** (Toaplan)
  - Blue Hawk (Dooyong)
- Cybattler (Jaleco)
- Daioh (Athena)
- Chimera Beast (Jaleco)
- Eco Fighters / Ultimate Ecology (Capcom)
- Super Spacefortress Macross II / Chou-zikuu Yousai Macross II (Banpresto)

1994

- **Aero Fighters 2 / Sonic Wings 2** (Video System)
  - Eight Forces (Tecmo)
  - Darius Gaiden - Silver Hawk (Taito)
  - Fantastic Journey / Gokuiyou Parodius! - Kako no Eikou wo Motomete (Konami)
  - Zed Blade / Operation Ragnarok (N MK)
- **Gunkzel** (Taito)
- **Gundam**
  - Mazinger Z (Banpresto/Dynamic Pl. Toei Animation)
  - Nebulasray (Namco)
  - Rapid Hero (Media Trading)
  - Super-X (NTC)
  - Twin Eagle II - The Rescue Mission (Seta)
- **Aero Fighters 3 / Sonic Wings 3** (Video System)
  - P-47 Aces (Jaleco)
  - Desert War / Wangan Sensou Pulstar (Aicom)
- **Don Pachi** (Atlus Cave)
  - The Game Paradise! - Master of Shooting / Game Tengoku - The Game Paradise (Jaleco)
  - Gekirindan (Taito)
  - Kyukyoku Tiger II (Taito)
  - R-Shark (Dooyong)
- **Strikers 1945** (Psikyo)
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<td></td>
<td>Captain Tomoday</td>
<td>Visco</td>
</tr>
<tr>
<td></td>
<td><strong>Change Air Blade</strong> (Sammy)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guwange</td>
<td>Atlus/Cave</td>
</tr>
<tr>
<td></td>
<td><strong>Giga Wing</strong> (Capcom)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psyvariar - Medium Unit</td>
<td>(Success)</td>
</tr>
<tr>
<td></td>
<td><strong>Striker 1945 Plus</strong></td>
<td>(Psikyo)</td>
</tr>
</tbody>
</table>
### MAME Statistics

The following data was derived from examining games emulated within MAME version 0.81b to determine the occurrence of particular genres of arcade games. The data looks at original games only and omits clones or revisions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Games</th>
</tr>
</thead>
</table>
| 2000 | 1944 *The Loop Master* (Capcom)  
Dimahou / **Great Mahou**  
*Daisakusen* (Raizing)  
Dragon Blaze (Psikyo)  
*Mars Matrix - Hyper Solid Shooting* (Capcom)  
Psyvariar Revision (Success)  
Vasara (Visco)  
*Do DonPachi 2 : Bee Storm* (Cave) |
| 2001 | *Ikaruga* (Treasure)  
Gunbarich (Psikyo)  
Night Raid (Takumi)  
Shikigami no Shiro (Alfa Systems)  
Zero Gunner 2 (Psikyo)  
*Do DonPachi 3 / Do DonPachi Dai-Ou-Jou* (Cave)  
*Ketsui / Kizuna Jigokutachi* (Cave)  
*XII Stage* (Triangle Service) |
| 2002 | *EspGaluda* (Cave)  
*Psyvariar 2 - The Will to Fabricate* (Success)  
*Shikigami no Shiro II* (Alfa Systems) |
<p>| 2003 | <em>Chaos Field</em> (Able) |
| 2004 | |</p>
<table>
<thead>
<tr>
<th>Genre</th>
<th>Total Games</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shooters</td>
<td>640</td>
<td>26.41%</td>
</tr>
<tr>
<td>Baseball</td>
<td>44</td>
<td>1.92%</td>
</tr>
<tr>
<td>Basketball</td>
<td>19</td>
<td>0.76%</td>
</tr>
<tr>
<td>Bowling</td>
<td>12</td>
<td>0.50%</td>
</tr>
<tr>
<td>Boxing</td>
<td>15</td>
<td>0.62%</td>
</tr>
<tr>
<td>Brawl</td>
<td>103</td>
<td>4.26%</td>
</tr>
<tr>
<td>Breakout</td>
<td>32</td>
<td>1.32%</td>
</tr>
<tr>
<td>Defect</td>
<td>19</td>
<td>0.76%</td>
</tr>
<tr>
<td>Driving</td>
<td>141</td>
<td>5.62%</td>
</tr>
<tr>
<td>Exposure</td>
<td>18</td>
<td>0.74%</td>
</tr>
<tr>
<td>Fighter 3D</td>
<td>26</td>
<td>1.03%</td>
</tr>
<tr>
<td>Fighter</td>
<td>119</td>
<td>4.51%</td>
</tr>
<tr>
<td>Football</td>
<td>20</td>
<td>0.83%</td>
</tr>
<tr>
<td>Golf</td>
<td>29</td>
<td>1.30%</td>
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<tr>
<td>Hockey</td>
<td>8</td>
<td>0.33%</td>
</tr>
<tr>
<td>Mahjong</td>
<td>158</td>
<td>6.44%</td>
</tr>
<tr>
<td>Matching</td>
<td>67</td>
<td>2.77%</td>
</tr>
<tr>
<td>Maze</td>
<td>104</td>
<td>4.18%</td>
</tr>
<tr>
<td>Misc</td>
<td>86</td>
<td>3.56%</td>
</tr>
<tr>
<td>Music</td>
<td>8</td>
<td>0.33%</td>
</tr>
<tr>
<td>Pinball</td>
<td>19</td>
<td>0.41%</td>
</tr>
<tr>
<td>Platform</td>
<td>313</td>
<td>12.92%</td>
</tr>
<tr>
<td>Pool</td>
<td>14</td>
<td>0.58%</td>
</tr>
<tr>
<td>Puzzle</td>
<td>115</td>
<td>4.75%</td>
</tr>
<tr>
<td>Quiz</td>
<td>68</td>
<td>2.61%</td>
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<tr>
<td>Soccer</td>
<td>42</td>
<td>1.73%</td>
</tr>
<tr>
<td>Sports Misc</td>
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<td>2.18%</td>
</tr>
<tr>
<td>Tennis</td>
<td>15</td>
<td>0.62%</td>
</tr>
<tr>
<td>Tetris</td>
<td>19</td>
<td>0.76%</td>
</tr>
<tr>
<td>Track</td>
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<td>0.45%</td>
</tr>
<tr>
<td>Wrestling</td>
<td>19</td>
<td>0.74%</td>
</tr>
</tbody>
</table>

Total: 2423