

Play Us a Song: The Structure and Aesthetics of Music
in Video Games

by

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ABSTRACT

This work sets out to establish that video game music has many unique properties and has cultural significance as a distinct and influential form of modern music. To this end I have constructed a consistent lexicon of terminology and theory, examined a considerable number of interviews of influential video game composers and designers, read over previous research in the field, and done some original fieldwork on internet sites and directly with games whose music I feel to be a quintessential example of the unusual and interesting characteristics of video game music. In questioning what qualities of video game music are unlike those of other music and the reasons for these unique attributes, this examination uncovers several explanations for certain trends in video game music's aesthetic and structure and finds reasons for its growing cultural relevance. These properties imbue video game music an interesting aesthetic and structure and lend it singular capabilities. As the study concludes, several theories are provided on how the growth and development of video game music might impact other music.

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INTRODUCTION AND PURPOSE

When I first set out to compose this work, my intended focus was on interactive music, with the main idea being that trends in technology over the last several decades, just now coming fully into effect, were resulting in a new emerging musical paradigm with different structure and different focus.

Although a ghost of that broader topic remains, particularly in sections dealing with the technological development of video game hardware and in the presence of Harmonix, a music game development company which began as a germ of the discussions about interactive music taking place when the cofounders were students at MIT and was instrumental in helping the music game to ascend to its current level of popularity (Rigopoulos, Amrich), I have narrowed the focus to music in video games. This topic is still broad, and the conclusions remain the same: Music in video games, as one arm of technological progress, has introduced a new paradigm of music that is rapidly gaining relevance. However, I still feel it necessary to give some explanation as to why, in pursuit of this development, I chose to focus primarily on music in video games rather than on other interactive media.

One obvious draw to studying music in video games is that the field is still relatively new. In an article from the 2006 compilation *Playing Video Games*, Zehnder and Lipscomb regretfully remark that the study of audio in video games is “virtually unexplored” (Vorderer 254), while Zach Whalen and Laurie Taylor agreed two years later, in 2008, that there was a “dearth of

literature” on the topic (Whalen, Playing the Past). In some ways, this limitation of information has made researching the topic frustrating, since few academic or rigorous sources contain substantial information on the topic and, conversely, many sources with substantial information on sound and especially music in video games are neither rigorous nor academic.

Therefore, I found my most useful sources to be interviews with game designers, remarks by players, and my own observations from playing some of the games mentioned. I also relied heavily on YouTube videos and comments, keeping in mind the sources and subjective natures of these comments, to collect more ethnographic data on games and those who play them.

Another dimension that was lacking due to the relatively recent development of research on the topic was a unified bank of terminology on which to draw or a traditional approach to follow. To counteract this problem, I created definitions for a few terms, but for the most part I drew upon several sources until I found definitions that I felt preserved as much of the original information and intent from each source as possible without diluting the definitions gleaned from others. Furthermore, I found it necessary to devote a sizable portion of this work to developing and explaining that terminology so that the reader could follow the logical progression of this work with similar terms and ideas in mind.

This field being relatively unexplored, I chose to write rather generally, and the remarks herein touch upon a broad range of ideas. Each individual topic, including some that may appear in isolated sentences, would benefit from expansion. However, for the purpose of conveying my central thesis, they are given only as much space as is required to extract the most interesting and relevant bits of information. Hopefully, future studies will be able to make more detailed observations about some of these elements.

The need to expand research on the topic of music in video games has become increasingly pressing due to the enormous cultural significance that video games have acquired in recent years. A recent survey reports that sixty percent of U.S. households possess at least one game console. Three years prior, the attachment rate was only forty-four percent, and it likely continues to rise rapidly (Patterson). In a 2008 article, one game executive was quoted as saying that sixty percent of North Americans and forty percent of Europeans play video games and cited a survey claiming that Americans spend more time playing video games than they do watching television, listening to the radio, or watching rented DVDs (Collins, From Pac Man to Pop Music 14). The booming influence of video games has undeniably had a large effect on the music world, and in the music industry specifically, there is tremendous competition for artists to release their songs with a popular game, to the extent that "UK industry trade paper Music Week estimates between 3,000 to 4,000 songs were submitted by artists and labels around the world to

[Electronic Arts] in hopes of inclusion on the soundtrack to FIFA 2005” (Collins, From Pac Man to Pop Music 15). Electronic Arts also made the case with some statistics that the soundtrack to one of their popular sports games, over the course of its lifetime, “will have been heard about 500 million times worldwide... which is far more airplay ‘than a number one record around the world’ will receive” (Collins, From Pac Man to Pop Music 17). In fact, Electronic Arts has just recently begun to act as a record label, signing artists to compose music specifically for release through games (Schnur). Meanwhile, in the youth demographic, “49% learned about – and bought – a CD by a new artist after hearing a song in a game” (Collins, From Pac Man to Pop Music 17). Under the light of these sorts of compelling statistics and developments, it is clear that, at the very least, the business of video games is having a major impact on the business of music, and the people who develop video games are eager to expand this impact as much as they can.

Finally, and most importantly, it is impossible to do any serious study of interactivity and technology and music today without somewhere bumping into a mention of music and sound in video games. As Dominic Lopes explains in his essay “The Ontology of Interactive Art,” video games are a quintessential example of “strongly interactive” media, and interaction is the type token for interactive music (Lopes). In a sense, music in video games is part of the natural progression of the development of interactive music. In fact, one of the foremost developers behind the highly successful Guitar Hero franchise,

Alex Rigopoulos, recalls that “when [I and Eran Egozy] started back in 1995, we weren’t really thinking about video games. We were making interactive music-making, free-form creative experiences,” but when music video games appeared in 1997, “it really struck us that [video gaming] was the mass-market interactive medium” (Rigopoulos, interviewed by Stone). Video games, which are largely a function of their interactivity and also a vast market, are a natural focal point for ideas about and developments in interactive music.

These three conditions – the lack of research in the field; the large and rapidly growing cultural and commercial significance of video games in recent years; and the strong connection between the highly interactive medium of the “video game” and “interactive music,” which bears the type token of interaction – have led me to narrow my focus to interactive music as it has developed and continues to develop through video games. Even though the field is still somewhat broad, the lack of research on the topic makes it possible to say something new and significant while still being relatively general, or at the very least to bring together a few ideas from disparate sources in the interest of having a more informed discussion. While it has been difficult to put together the relevant information from a field that is still developing, the evidence that is out there does point to a satisfactory conclusion that music in video games, due to many factors inherent in dealing with interactive spaces, has many unique characteristics that are worth attention as games take on an increasingly large role in society.

The purpose of this work is to demonstrate the importance of video game music in the present day, discuss ways in which music in interactive game spaces is evolving and the ways in which it differs from other types of music, and explain the reasons for these differences. It is my view that music in video games has many unique qualities inherent to the medium that are worth studying and understanding and that video game music is rapidly gaining influence and beginning to have an effect on other music. In light of this trend, it is worth understanding the history of video game music, the challenges inherent in composing such music, and how these factors affect the nature of the music itself. To this end, I have constructed a solid theoretical framework and lexicon, which I build on using specific examples, ideas, and opinions of prominent and influential video game composers, leading into a discussion on experiencing this music firsthand based on my own research and the research of others interested in the field. I hope to demonstrate the aesthetics and structures particular to video game music and their reasons for being, as well as the importance of video game music and its effect on music as a whole.

METHODOLOGY

In constructing this work, I determined to first gain as much of a theoretical background in video games and game music as possible. There is not a large volume of literature currently available on video game theory and particularly on the theory of music in video games, but I was able to find a few books dedicated exclusively to these topics and observing them from a variety of approaches, including anthropological, psychological, and philosophical lenses. Taking a little from each of them, I constructed some definitions and ideas that I believe best reflect the current theoretical consensus for the purpose of building a stronger and more coherent argument.

Aside from these kinds of sources, I relied heavily on interviews of game developers, usually done by video game news outlets. I attempted to pick composers and developers from games of varying qualities and who collectively not only possessed a diverse set of ideas but also had unique and enlightening perspectives on music in games. These people included Koji Kondo, Alex Rigopulos, Eran Egozy, Kenji Eno, Masaya Matsuura, “Hip” Tanaka, and Keiichi Yano. The selection of interviews of game composers available on the internet was extremely helpful in accumulating useful information.

I did not only look at the opinions of composers, but I also paid special attention to the words of players when they were made available in articles such as Kiri Miller’s or Kristine Jørgensen’s. Another source that I consider to

represent game players is Jerry Holkins, influential player and writer of the video game comic strip *Penny Arcade*. Although he has taken part in game development, Holkins is best known as an avid player of games whose opinion holds much weight in the community of video game players. I also used the *Penny Arcade* forums, in which I posed a single request to list games with interesting music, with a disclaimer that I was looking for music on which I could focus my thesis. The response from the community was enthusiastic and provided me not only with some strong leads but also with lots of helpful notes about specific instances of interesting music in various video games.

Finally, for the last section of this work, I followed Kiri Miller's example and did an ethnographic examination of music in the *Legend of Zelda* games and of myself as I played through them. I also gained experience with the music games *PaRappa the Rapper* and *Rock Band*, scouring YouTube videos for relevant information about the surrounding culture and observing myself and my friends as we played together. Although steps up until this one allowed me to already determine the ways in which video game music shifts paradigms of musical composition and has many unique and interesting factors, it was this final hands-on experience with the games that gave substance to my findings and demonstrated that the musical structure, aesthetics, and culture of video games are beginning to merge into the larger musical world.

TERMINOLOGY

Since the field of music in video games is still relatively unexplored, there is a lack of standard terminology used to discuss critical elements of the music and the games themselves. Therefore, in the following section, I outline and define some of the terms that I will be using over the course of this work, using definitions that are as complete as possible, often drawn from several different sources.

Interactivity

Before we can talk about interactive music, it is essential to have a clear definition of what interactivity is. Barry Atkins regards reaction to be the essential characteristic of interactivity: A player and a game do not simply act, but they react to one another (Atkins 146). As Perron points out, many people attempt to define interactivity without using the “magic circle” that is the loop between the two things or people that are interacting, but including the notion of this “magic circle” is essential for any good definition (Perron 113). Chris Crawford provides a good starting point for such a definition in his book on game design: “A cyclic process in which two interactive agents alternatively (and metaphorically) listen, think, and speak” (Crawford 76). In another work on interactivity, he further outlines that what is being cycled in interaction is “information” and that, for successful interaction, the parties involved should trade information in roughly equal volumes (Crawford 69-70).

Nitsche further generalizes that successful interactivity requires ergodic input – that is, some sort of player action on the system – by the person experiencing the interaction; that is, one cannot interact by simply receiving information, but must also provide it (Nitsche 32). He sees interactivity in games as the process created by a “textual machine” between a person and a game, considering the interaction itself to generate a text – in this case, a game – through collaboration between the game and the player (Nitsche 31). He also breaks down the interactive loop into three stages: input, process, and output (Nitsche 31). The input is the information transmitted by the player, whether it is used or not, while the output is the result generated by the computer system. Bernard Perron explains that Daniel Cook further breaks down the element of “process” into two steps: simulation, the process by which the information generated by the player is fed through the game’s algorithm or rules and transformed into feedback from the game; and modeling, the player’s comprehension of his action (Perron 114). Perron, examining the models for interaction proposed by Crawford, Cook, and a few other theorists, concludes that they are too focused on the player of the game and that it is the computer algorithm that provides the first information by displaying some information to the player. He defines interactivity as a continuous repetition of a four-step process, the interactive loop: The algorithm processes input and generates information, the game conveys information to the player, the player perceives and analyzes this information,

and the player reacts to that information by providing his own information. Under this model, both systems are reacting to each other, rather than the player's actions serving as "action" while the game provides a "reaction" (Perron 119-121). Perron further points out that the player and the game will collect information about each other through the interaction, and therefore, as the accumulation of information brings them closer to one another, the interaction is better represented not as a repeating loop but as a spiral (Perron 115).

With so many theoretical elements in play, it is important to simplify and generalize our definition as much as possible without losing too much information. Therefore, we can abstract the elements mentioned above to form a concise definition. For the purpose of this definition, an "interactive system" will be anything with an algorithm that takes information as an input, reacts by processing it through an algorithm, and produces an output. That system can be a human, a computer, or even a musical instrument. Using this definition for interactive system, an interactive environment will be any environment in which two interactive systems are trading information. In this manner, it is natural that the systems will form an interactive cycle, gradually gaining information about each other and repeating the loop of analysis, decision, implementation, and change. We call this loop an interactive loop. The information exchanged between the two interactive systems, including changes to the environment, will be called interaction, and particular iterations

of the loop will be called an interaction. An environment with more interaction is said to have higher interactivity. Here it is worth noting that the burden of activity in a game is not only upon the algorithm but also upon the player. Under examination, this idea makes sense, since an environment in which a system, for example a game, receives no information from another system cannot be called interactive. As Chris Crawford demonstrates, it is necessary for both a game and a player to allow each other to provide and to analyze the greatest possible amounts information and for the speed of these interactions to be quick for an environment to reach a high level of interactivity (Crawford 80-81).

Space

In his book *Video Game Spaces*, Michael Nitsche gives a much longer and more involved look at space in video games, of which I will only provide the most rudimentary ideas. Game space, as defined by Nitsche, involves five planes: a rule-based space defined by the game's architecture, a mediated space defined by the information related to the player, a fictional space that is the one conceived by players, a play space that includes the player and the game, and a social space containing other players and their game spaces (Nitsche 15-16). In terms of our interactivity definition, the rule-based space is closest to the game system, the mediated space is information provided to the player, the fictional space is the player's analysis

in the interactive loop, the play space is like the interactive environment, and the social space is the collective interactive environments of all players.

When we refer to the game space, it is a space formed out of a combination of these categories. Particular game spaces, however, will refer to specific spaces from games, which are often attempting to create a phenomenological representation of some imaginary space.

Another way to look at a space is as analogous to a hypertext made up of Barthesian “lexia,” which are “brief, contiguous fragments... units of reading,” points of data that are related to both the reader’s perceived scriptons, which are “strings [of signs] as they appear to the readers,” and textons, which are “strings as they exist in the text.” Hypertext theorists currently consider it possible to break hypertexts – for example, interactive stories – into such lexia – individual data segments at certain nodes – and the links interconnecting them. Nitsche forges a comparison between hypertext and game spaces as large sets of data, wherein players can move between one state and another based on their input, as one would do in a hypertext. However, as Nitsche points out, 3D spaces, including game spaces, are nearly impossible to break down into distinct lexia, as even the smallest input from either the player or the game system will change the contents of the space, allowing for nearly infinite possible states (Nitsche 19-20).

Object

Anyone familiar with modern programming methods will also be familiar with the idea of object-oriented programming, in which programmers construct “objects” such as functions and sets of data and have them interact with one another via “methods.” If a game were programmed in object-oriented code, any pieces of information that interact, such as the status of the avatar or player input or any number of variables handled in the rule-based space, would be considered to be objects, and their interactions would be through methods. Similarly, video game spaces often include objects that can interact with the player. These objects go somewhat beyond the code used to generate them in the rule-based space, but they still have distinct properties, like an object would in the real world. For example, a gun that is fired will make a sound and a ball that is knocked will roll. However, since video games are the “first simulational media” (Wolf1 224), objects in video games must reflect not only their qualities, such as appearance, but also their behavior (Wolf1 223). It is here that the interaction of games becomes a factor, since an object must also have behavior and react to player actions, forming an interactive cycle. Although the examples of objects raised thus far are analogous to real world objects, a video game space could contain a new or unique object, such as those of the game *Electroplankton*, in which players can musically order different “plankton” in the game space to produce a kind

of sound, a process that blurs the distinction between instrument and composition (Collins, From Pac Man to Pop Music 111).

Avatar

So far, we have defined interactive spaces and filled them with objects. However, one might ask where the human presence is in the space. The answer is that the player of a game interacts through his avatar, a representation of the self in the game. The avatar in a game is both the self, since it is controlled directly by the player, and the other, since it is removed to the rule-based and mediated planes that are part of the game system, though the player, through cognitive process, will also allow it to manifest in the other planes of the game space. The avatar does not need to be human or resemble the player, but rather it needs to mirror the player's control and the information that the player provides (Wolf 107). A successful avatar should be identified and controlled by the player, but the player should also not confuse it with the self (Wolf 110); it merely stands to represent the self in the game space and to communicate one's actions to the mediated plane.

Immersion and Presence

When discussing games, it is common to use the term "immersion" to describe the feeling of being physically and mentally in the game space. In an interactive space, this quality extends to immersion in the interactive cycle,

which implies some measure of learning and interaction with the system. In fact, it is necessary for a player to have a nontrivial level of interaction with the system to reach true immersion. The definition of the term “immersion” has gotten ambiguous, however, as it has become something of a buzzword (Wolf 67-69). Therefore, I will at times be using the term “presence,” defined by Lombard and Ditton as “the artificial sense that a user has in a virtual environment that the environment is unmediated” (Wolf 72). Many factors can influence one’s feeling of presence in an interactive environment, and it is possible both for one to feel transported to the avatar in the game space or to feel the sensations of the game space transported around one’s physical body (Wolf 77). For the remainder of this work, the term “presence” will refer strictly to the sensation of being present in a video game sense. The word “immersion” will be less conservatively reserved for feelings of strengthening ties between the player and the game space. For example, looking at a humanoid avatar in a field, a player may feel that he is “present” in that field. He may also feel “immersed” in the field by the ability to cause the avatar to run around and a pull to be part of the fictional space that he perceives. However, it is also possible for a player to sense the game space around him and yet not feel a significant connection that would make him “immersed,” or for a player to be invested in and influenced by a game space that he readily perceives he is not physically a part of.

Player

Finally, it may be necessary to identify and define the “player” of a game. In an interactive environment, the player is the human interactive system. For the purpose of this work, we will not consider “computer players” or other nonhuman players. The player has a real world physical presence and is not to be confused with his avatar or a series of actions. Although players can act as interactive systems in an interactive environment, they are not divorced from their human qualities, including emotions and culture.

AESTHETIC DIFFERENCES

There are two main causes for the differences between music in video games and other music. One reason is that video game music and its aesthetics have developed out of a different set of conditions than other music, having to grapple with hardware and technical issues that created a different paradigm for how the music should sound, which holds in some ways to this day. Another reason is that the objectives of creating a video game are very different from the objectives of creating musical compositions.

Experimental focus groups used to determine the purpose for which people play video games came up with the following reasons: arousal, challenge, competition, diversion, fantasy, and social interaction (Vorderer 217-219).

While it is certainly possible for music to convey these kinds of effects – otherwise, music would have no place in video games – video game music is necessarily particularly targeted at these sorts of goals, since they are the goals of the game itself. In addition to this limitation, music in video games has to follow a different structure and accommodate different factors than music in other spaces so that it fits in the game. Some of these factors include accommodating for player action, accommodating for long periods of time spent in a particular part of a game, transmitting information about the environment, and manipulating player behavior. In the last case, at least, the music itself is interacting with the player. For these reasons, music in video

games is a very different form of composition from music in other environments.

Development of technology and ideas

To understand where some of the ideas and aesthetics behind video game music originate, it is important to look at the technological growth of video games over time and the original conditions in which composers wrote music for video games. Perhaps the most important element of this early atmosphere was that the first games did not include music but only included sound effects. Furthermore, early game creators did not seem to care much as to the quality of those sound effects. Many suggested to the creator of *Pong* that he include in his game a greater variety of sounds, but he eventually opted to use only the sine wave that plays when a paddle hits the ball (Collins, [From Pac Man to Pop Music 2](#)). In fact, no video game had music until the release of *Space Invaders*, and in that case the music only contained four notes. However, even this primitive game music foreshadowed the patterns of game music to follow, since the music changed tempo as the enemy units sped up (Collins, [From Pac Man to Pop Music 2](#)).

For those who did choose to write music for games, the conditions were harsh and frustrating. Early composers were actually required to meticulously construct the electronic mechanisms for their sounds by hand bit by bit, at first manually, then by writing out the actual binary code for the

sounds they were trying to make (Collins, Game Sound 12). Composer Hirozaku “Hip” Tanaka explained the situation thusly:

Most music and sound in the arcade era (Donkey Kong and Mario Brothers) was designed little by little, by combining transistors, condensers, and resistance. And sometimes, music and sound were even created directly into the CPU port by writing 1s and 0s, and outputting the wave that becomes sound at the end. In the era when ROM capacities were only 1K or 2K, you had to create all the tools by yourself. The switches that manifest addresses and data were placed side by side, so you have to write something like "1, 0, 0, 0, 1" literally by hand. Such prehistoric work makes me laugh every time I think about it. (Tanaka)

The systems for which game composers were writing had low memory, and therefore they could only write short tunes, which repeated without variation. They also wrote their music under high pressure to produce quickly so that games could be released in rapid succession (Collins, From Pac Man to Pop Music 1). The systems on which they worked had awkward and limited audio capabilities (Collins, From Pac Man to Pop Music 3). Therefore, in summary, composers were forced to write, extremely quickly and via cumbersome notation, short looping compositions containing little data that were expressed

by machines with weak audio rendering capabilities, when they were employed at all.

With the advent of eight bit video games, composers accumulated a few more liberties. Now, on consoles like the Sega Genesis, composers had four audio tracks, one usually reserved for sound effects, each of which was capable of producing a single tone at once (Collins, Game Sound 15), and the Nintendo Entertainment System actually had five audio tracks (Collins, Game Sound 25). Although irritatingly repetitive loops remained the norm (Collins, Game Sound 19), some video game composers began to find ways around these limitations. One particularly strong example is that of Frogger, the composer of which avoided the looping issue by constructing a piece of music that ran for the exact length of the game and therefore could not repeat (Collins, Game Sound 20). This kind of through composition of video game music, however, was not common.

At this time, video game composers were finding other ways to experiment. One of the early pioneers in this experimentation was Hirozaku “Hip” Tanaka, composer for the original Metroid game, although his innovations seem like a step backward. In a climate where games sported upbeat melodies regardless of content, Tanaka decided that he wanted to fight this trend (Tanaka). Therefore, he experimented with nonmelodic music, with the sound effects blending in with the melody (Collins, From Pac Man to Pop Music 4). The composer, who had no musical training beyond

elementary school piano lessons, stated that “I wanted to create the sound without any distinctions between music and sound effects” (Tanaka).

Coincidentally, one of Tanaka’s chief musical influences was dub (Tanaka), a Jamaican genre that focuses on production and includes clearly synthesized sounds.

Tanaka’s approach takes advantage of the fact that the line between music and sound in video games during *Metroid*’s era was not clearly drawn. In fact, though the Nintendo Entertainment System sported five channels for sound, the channel reserved for sound effects was frequently also used for percussion in game music (Collins, Game Sound 25-26). Meanwhile, many of the sound effects in early games were actually musical. For example, both Mario and the protagonist of *Metroid*, Samus, have jumps that are accompanied by a rising tone. Mario’s jump, in particular, is a glissando of exactly one octave. Similarly, the sound for Mario’s expiration at the hands of an enemy was actually a brief musical track that interrupted the actual game music, and almost any instance of item acquisition in *Super Mario Brothers* was met with a short but highly tonal musical phrase (Whalen, “Play Along”). Oddly enough, though Tanaka exploited the nature of the hardware for which he was writing in his composition, he also commented, “most importantly, I think we are required to have various ideas and techniques in order to cope with the living beings that we are targeting” (Tanaka), i.e. despite the

necessity of focusing on the technology of video games, the composer should primarily consider the player when writing music.

Another notable composer, Koji Kondo, took a very different approach. To Kondo, it was essential to create a good melody for any game for which he composed (Kondo, Bozon) and also to keep the sound effects as far from the game music as possible, so that the player could perceive what was happening in the game (Kondo, Kohler). Though Kondo despised the looping of early games (Collins, Game Sound 27), he composed looping music for the original Super Mario Brothers, which contained only six total pieces – at the time, quite a long composition for a video game (Kondo, Kohler). In Kondo's view, it was most important that the music "enhance the gameplay and make it more enjoyable," and he believed that game music should be part of the game and not just background. To this effort, he plays the games he is composing for before he begins writing and makes changes as development progresses (Kond, Kohler). Although Kondo's methods stand in contrast with Tanaka's, both composers at the time were aiming to do something similar: accommodate the hardware, create music that was well integrated with the game for which it was composed, and please the players. It is out of these kinds of desires that the first structures for video game music came forward.

Later on, a more sophisticated breed of computerized sound called MIDI was developed (Collins, From Pac Man to Pop Music 4). Although MIDI music was more complex and multilayered than previous game music, it still

suffered from the repetition and inability to react to player actions of earlier game music. However, the game studio LucasArts designed a system that would change the way that video game music functioned. The iMUSE system that they developed had two main purposes. Firstly, it provided an interface that made it easier for game composers to look at the scores to the music that they had composed and make changes. However, perhaps more importantly, it also allowed composers to work in transitions from one audio track to another (Collins, Game Sound 51). The iMUSE system used “decision points,” such as when a player’s avatar moves from one room in the game to another, to determine how to handle transitions. The iMUSE system included many functions for modifying particular loops of music. At decision points, the composer could choose to have the music turn on or off, transpose the music to a new key, jump ahead to a different part in the score so as to set up a better transition, delay the music, detune the music, pan the sound, and change the music’s speed (Collins, From Pac Man to Pop Music 52). In this way, the player could freely manipulate an avatar and hear gradual transitions in the music in reaction to his own actions, which raised the level of interactivity in the games. In the future, other games such as *Banjo Kazooie* would use similar effects to create more interactive game space, wherein the music changes gradually as the avatar approaches different locations, and gradually MIDI sounds with transitions in response to player behavior would become the norm.

Although it is possible to continue to chronicle hardware advancement after this point, it has little effect on what makes game music different from other music and the advances have generally been for more processing power, more complex music and transitions, and using higher quality sounds, sometimes even including orchestral recordings. In summary, the effects of early video game composition limitations on game music aesthetics include a compositional environment in which a weak distinction between what is music and what is simply sound is the norm, meticulous composition of short loops of audio, tailoring the music to be an integral part of the game, and focusing on increasing the level of interactivity through transitions between different parts of the music.

In addition to the history of hardware development, there are many other factors making game music unique that are integral to the structure and intentions of games. Since music in games intends to fit these structures and fulfill these intentions, it acquires some characteristics that set it apart from other kinds of music. In the following section, I will be examining the effects of creating an atmosphere, extended duration in a space, the non-linear narrative of games, the need for games to transmit information to the players, the need to sonically define the avatar's place in a space, the desire for high levels of immersion and presence, and the need to influence player behavior.

Atmosphere

Of course, the need to invoke an atmosphere is not unique to music in games. However, the type of atmosphere that game music creates and the purpose of this atmosphere are different from the type and purpose in other music. One school of thought states that the atmosphere invoked by game music should reflect the atmosphere of the game's setting. For example, in response to a question about composing music for *Super Mario Bros*, Koji Kondo commented that he composed the music for the underwater levels first because "It's easiest to imagine the kind of music you want for 'underwater'. But the above-ground music, that I had to write again and again" (Kondo, Kohler). It is also possible for music to reflect the social implications of a setting, and music in a town in a game space might reflect what would be realistically heard in that space in the actual world. For instance, in *The Legend of Zelda: Ocarina of Time*, Kondo designed the castle town music so that it was quieter in alleyways but louder in the more populated central area (Kaluszka). Kondo further comments that in the *Zelda* games, which take place in a fantasy setting, "I was trying to enhance the atmosphere of the environments and locations" (Kondo, Kohler).

Another possible motivation for manipulating the atmosphere of game music is to make the game more fun for the player. Music game developer Keiichi Yano commented, "The whole thing about a music game is that when

the music sounds good, it just feels so much better when you're doing well” (Yano).

There are also atmospheric elements in game sound that have evolved out of trends in the culture and are not necessarily tied to the actual structure of the games, such as a lack of dynamic range, silence, and general subtlety (Collins, From Pac Man to Pop Music 127). Much of early game music was also highly melodic, due to composers like Koji Kondo focusing on making catchy tunes to enhance the feeling of fun (Kondo, Kohler).

Of course, the relationship between the atmosphere of game music and the atmosphere of the game is not limited to music enhancing the mood and sensations of the game space. The conditions within the game can also bring out powerful effects in the music. One player on the Penny Arcade forums reported, “Space Panic on the Colecovision is the first game that scared me with music. As our oxygen supply ran out, creepy music would start to play. Quite frightening stuff, and it really made the game” (Youngdahl). However, the sound on the ColecoVision was limited to what could be done on sound chips used in early arcade games (Collins, Game Sound 24). As already discussed, these early sounds were extremely limited. Therefore, it is likely that the powerful emotions created by the music were enhanced by the avatar’s status as running out of oxygen. Another player commented similarly with respect to the drowning music in Sonic the Hedgehog (Youngdahl). This music is easier to find, and therefore it is

possible to outline it in this space. It consists of a trill that grows in volume accompanying the following loop, which speeds up: C2, C3, C#2, C#3. This piece of music lasts just over ten seconds (SilvaGunner), and while the interval from C to C# is dissonant, taken out of context, the music loses much of its effect. From my personal experience playing games, music meant to signify successes also carries a special charge from the feeling of accomplishment. Even when I hear this music outside of a game, the connotations of the music experienced in the game space trigger strong emotions. Over time, these motifs attain connotations of a certain atmosphere, shared by many players, resulting in a phenomenon recently mentioned by influential player Jerry Holkins: “[T]he experiences that games create form the basis of a coherent culture - that the bank of shared experiences, simulated but no less real, coalesce into a collective memory” (Holkins 2010 Mar. 29). In this way, game music overcomes a barrier mentioned by Steven Krantz, who determines that neither substitution nor comparison nor interaction can create a universal metaphorical bridge between a particular piece of music and a particular meaning (Krantz). While the music alone in games is not sufficient to convey a consistent metaphor to all who experience it, when combined with events in a game, it can create a metaphor common to all players.

Extended duration in a space

One of the unavoidable difficulties that arises in composition for video games is that games are often extremely long, transpiring over hours upon hours, and players will have to listen to much of the music in games repeatedly, especially if they wish to continue to play the game, unless they elect to turn off the music altogether or replace it. Worsening the issue is the fact that, since 1984, the trend in video game music has been towards looping audio (Collins, Game Sound 24). This looping is generally undesirable and irritating to listeners (Collins, From Pac Man to Pop Music 1). Over the years, video game composers have begun to come up with solutions to avoid incessantly looping audio. One solution that has already been mentioned is the solution from Frogger, wherein the music is through-composed for the length of the game (Collins, Game Sound 20). However, this method is less feasible when dealing with open-ended games that do not have any strict time limits. For instance, in *The Legend of Zelda: Ocarina of Time*, a player could ostensibly spend weeks running around a single space. Therefore, composer Koji Kondo found a unique and interesting solution to this issue: furniture music. The music in *Zelda's* "overworld" consists of twelve phrases of music played in a random order that all transition seamlessly into one another, in such a way that "the player may not even be consciously aware of the change" (Kaluszka).

Non-linearity

Typically, the paradigm of musical composition is linear, and at the very least, Western art music tends to fall into a linear structure. Nintendo composer Koji Kondo stated in a talk at the Game Developers' Conference that music typically has three parts: an introduction, a bridge, and an ending. Game music, on the other hand, often breaks this paradigm (Kaluszka). Video games, however, are a kind of hypertext with a branching structure (Collins, From Pac Man to Pop Music 77) that depends on an additional dynamic variable: the actions of the player (Collins, From Pac Man to Pop Music 75). Despite the branching structure of the games, music will always take on a linear form (Collins, From Pac Man to Pop Music 77-78), since the ultimate form of music falls in one direction: forward in time. Therefore, a branching algorithm is necessary for the music to match the branching structure of a video game. Furthermore, through-composed music tends to have a specified length of time before repetition, but the amount of time spent in a game space is under the control of the player (Collins, From Pac Man to Pop Music 76). As Jonathan Kramer pointed out, music that is not linear, i.e. music wherein the current status is linked not to what has happened previously in the music but to some other factor, is more likely to be atonal (Collins, From Pac Man to Pop Music 78-79), a bias which certainly affects the tone of game music. It is also important for the tone of the music to be

able to change every time a player interacts with the system (Collins, From Pac Man to Pop Music 95-96).

Fortunately, like music, games are composed, and therefore it is possible to choose branching points where the structure changes depending on player actions, an ability that was developed through the iMUSE system. However, since game music is experienced in a hub and spoke structure, branching between player decision points (Collins, From Pac Man to Pop Music 78), and does not rely on causality, there are issues with how to present game music. Veteran Nintendo composer Koji Kondo has come up with many answers to these problems. In Super Mario World, for instance, when the player's avatar rides on a "Yoshi" dinosaur, a drum track is added to the music. This "gives the players indication of a powered-up state without breaking the flow of the music," allowing for the player to repeatedly move the avatar on and off of the dinosaur without sabotaging the game music. In a level of Super Mario 64, as the player progresses throughout the stage, strings and percussion are similarly added to the track (Kaluszka). This technique of vertical movement along the score – that is, adding and subtracting particular lines instead of going to another part of the music – is useful in overcoming the branching issue, and therefore it frequently occurs in video games as a player's avatar moves between different parts of a game space or experiences some status change. Kondo also noted during the same talk that while video game composers could not depend on the linear

structure of music to provide consistency in a composition, “Combining motifs found throughout the game, or even throughout an entire series leads to a unifying consistency and familiarity” (Kaluszka). Therefore, game composers also frequently employ a technique of attaching specific motifs to specific states and locations in the game space as part of their compositions. For this and other reasons, it is better to look at the music for a game as one long work with a non-linear structure, rather than as a set of distinct pieces. Koji Kondo himself stated that “all of the pieces should be considered one work, not individual compositions” (Kaluszka).

Transmitting information

One of the most difficult challenges to overcome in creating a video game is that, although there are physical limitations to observing the mediated space through a computer or a television, the player must be able to perceive all of the information that the game system is providing at the same time in order to act effectively (Vorderer 19). Sonneschein states that communication is the essence of music (Vorderer 243), but game music must communicate specific information about the state of the game space. If each object is producing too much sound, it can cause confusion, but there is also a great deal of information that the game must communicate (Vorderer 248). Creating audio that effectively communicates to the player is therefore one of the major difficulties of composing for video games.

In fact, it is frequently more important for game audio to relay information to the player than it is for the visuals for a game. The eyes can only focus on one element of the action at a time, and therefore checking the game space through the visual interface can be a slow process. However, players can receive and react to large amounts of data in real time if it is provided through the game's audio (Collins, *From Pac Man to Pop Music* 168). Furthermore, the sound in video games allows the player to “detect what cannot be seen” (Collins, *From Pac Man to Pop Music* 167), providing vital information about the space that other senses cannot render.

Of course, the information related by game music could be as simple as hostile presences in the surrounding environment, but it could also let the players know that they are on the correct path towards accomplishing major objectives via the sorts of audio cues discussed in the section on non-linear structure (King 86). Two examples of games with this kind of audio cue are *Final Fantasy X* and *Lord of the Rings: The Two Towers*. In the latter game, the music is presented in such a way that there is a great deal of silence, which increases the contrast of situational music that plays when the avatar enters a dangerous area, enhancing that music's effect and making the change more noticeable so that the situation is conveyed to the player more effectively (Vorderer 249). Unlike in many other musics, the player in video games must carefully employ a large amount of the kind of “causal” listening that allows him to pick up on these sorts of informational cues (Vorderer 244).

A composer must take into consideration many factors to make sure that game music provides relevant information to a player and does not interfere with other information that the game system is trying to send. Koji Kondo suggests that “[t]he pitch of sound effects should not interfere with the pitch of the music, and similar considerations are taken with positioning,” to make sure that the background music in a game space does not interfere with audio cues (Kaluszka).

There are many specific examples for how game music can provide a player with information. For instance, in the game *Guitar Hero*, the guitar track of a song will only play when the correct buttons are pressed, allowing the player to know whether or not he is striking correctly even during long passages with quick action that are difficult to visually process (Harmonix). Another common technique for transmitting information to a player is to speed up the music, as was done in *Space Invaders*, the first video game to have composed music (Collins, [From Pac Man to Pop Music 2](#)). Koji Kondo also used this technique for the original *Super Mario Bros.*, with the music speeding up as the time approaches expiration (Kaluszka). In a later Mario game, *Super Mario Sunshine*, the character of Shadow Mario runs away from the player’s avatar across the game space and quickly goes out of sight of the player (Nintendo EAD). During this sequence, “a different music track emanates from the location Shadow Mario’s current position relative to Mario. This track allows players to spatially locate their adversary in a three-

dimensional environment.” With the advent of surround sound, Kondo was able to communicate even more information about the relative positions of the avatar and a hostile character, and so in the game *The Legend of Zelda: The Wind Waker*, “In *The Wind Waker*, the ideas of dynamic music and dynamic surround were combined in the battle with Shadow Ganon. The spatial changes allow players to locate the enemy while the music increases pitch and intensity when engaging in back-and-forth volleys of an energy ball” (Kaluszka). Music in game spaces is also useful for outlining time (Collins, *From Pac Man to Pop Music* 83), which can increase a player’s performance.

To test exactly how important sound was in the role of transmitting information between video game systems and their players, Kristine Jørgensen ran an interesting experiment wherein she had players play the games *Hitman Contracts* and *Warcraft III* for fifteen to twenty minutes with sound and then an additional ten to fifteen minutes with no sound. The actions of the players were recorded, and Jørgensen also interviewed the players after playing, focusing on how the lack of sound related to their actions (Collins, *From Pac Man to Pop Music* 165). Both games include important audio cues for players. In *Hitman Contracts* the sound alerts players to gunfire and dramatic music lets the player know if the avatar has been detected by hostile elements of the game space. The game’s music also relates an atmosphere that keeps the player alert. In *Warcraft III*, the sound gives the player information about the many processes he is managing

at once (Collins, From Pac Man to Pop Music 166). Players in the study felt a loss of control and ability when the sound of the games went off. Without sound, the ability of players to play the games was crippled and their focus was shifted away from important elements in the game. Unable to perceive beyond what they could see, players lacked crucial information (Collins, From Pac Man to Pop Music 166-167). In addition, with the information from the games being processed only through visual channels, the information was less likely to be received by the players (Collins, From Pac Man to Pop Music 170).

On the other hand, in the 1990s, developer Kenji Eno created a game titled *Enemy Zero*, in which the enemies were invisible, forcing the player “to depend on audio cues and sonar pings to locate [his] target” (Fleming). The game actually contains very little music, the soundtrack having been composed by the English minimalist composer Michael Nyman. Although the game is considered difficult to play, it is not impossible (Eno), and the difficulty of the game is actually not related to the lack of visual information but to the frustrating control mechanism through which the player attacks enemies (jakcgordon38). Eno is also notable for producing another game with a strong audio focus, titled *Real Sound: Kaze no Regret*, which contains no visuals whatsoever, when he learned that blind people in Japan played video games, despite the video game’s image as a visual medium (Eno).

Defining the avatar, defining the space

One role of video game audio, lying somewhere between providing information and providing immersion, is creating a strong feeling of the avatar and the space. In fact, Sue Morris argues that a successful player must perceive all 360 degrees of the game space, information that is provided mostly by the game's audio. She even goes so far as to say that the purpose of audio in certain games is "to provide an audio complement to action on the screen... and to create a sense of a real physical space" (Whalen, "Play Along"). King and Krzywinska explain that "Diegetic sound in 3D games is also designed to centre on the player's in-game perspective" and that sound is particularly important in simulating the "feeling that game world is surrounding, since sound is spatially tied." They use as their example a situation in the game *Unreal II*. In it, the avatar is "under attack from enemies coming from several different directions. A high level of attention to sound cues is required to judge the proximity of enemies, enabling players to choose the directions in which most effectively to focus their firepower. Spatial organization of the sound field strengthens the impression of being surrounded by the game-world and increases the sense of danger created by the game" (King 107). This kind of perception not only provides information to the player but also gives the player a feeling of being in the game space, being the avatar, and the nature of the avatar's situation.

Immersion and presence

As Zehnder and Lipscomb point out, “Music also serves an important role in the cultivation of the sense of perceptual or psychological presence in the video game” (Vorderer 249). In Jørgensen’s experiment, she discovered that when players lost control due to the lack of audio information, they also found the games less engaging (Collins, From Pac Man to Pop Music 166). More significantly, a large portion of this loss of immersion was tied to the music itself. With the music off, players lost their emotional connection to the games, playing them in an emotionally detached and systematic fashion (Collins, From Pac Man to Pop Music 172-173). One player was even quoted as saying that “when there’s no sound, it’s just like two animated figures standing there, shooting each other.” Furthermore, the absence of music stripped the players of an association with the space, in which the music would usually be audible, and without the music’s emotional impact, players felt detached from the game world (Collins, From Pac Man to Pop Music 171). Another subject commented that, with the sound off, “the immersion in that chaos [of the game] was equal to zero.” Generally, players acted in a much more systematic fashion and did not feel connected to the game space (Collins, From Pac Man to Pop Music 172-173). With these findings in mind, the impact of the music on immersion in games is impossible to ignore. It would be interesting to explore whether this experimental effect could be used intentionally to cause players to play a game in a certain fashion.

Controlling behavior

One more purpose of video game audio, which will perhaps seem more obvious than the others, is to control player behavior. As has already been discussed, by setting a certain mood, adjusting a player's focus, and creating a sense of immersion, game audio is already controlling player behavior in many significant ways. Although it is arguable that it is impossible for a piece of music to generate consistent emotional effects in players, an experiment by Zehnder and Lipscomb reported that, at the very least, music in video games created a consistent differences in the way that both male and female players from different age groups perceived the games (Vorderer 253-254). It is also notable that previous study in music education theory has determined that people can be taught using musical cues via a kind of interactive spiral called the IRF exchange: initiate, response, feedback (Hellerman). Therefore, game audio can certainly teach players to act in a certain fashion in response to audio stimulus, especially with the added reinforcement of the game space.

In games such as *Silent Hill*, music can be used to heighten tension by including sounds that players find disturbing, and since music in games is connected with time, it is possible for music to create additional tension in situations where the player is competing against the clock (King 103-104). Since music can control perception of time, as Kellaris and Kent discovered, simply putting the music in a different mode can have an effect on the player's

sensations of speed and passage of time, thus altering his behavior (Kellaris, “The Influence of Music on Consumers' Temporal Perceptions” 372). Tonality and texture of music can also induce feelings of pleasure or displeasure (Kellaris, “An Exploratory Investigation of Responses Elicited by Music Varying in Tempo, Tonality, and Texture” 392), which can be used to reinforce or discourage different behaviors.

In 2002, Ryan Ulyate and David Bianciardi constructed an interactive dance club, a large real-world interactive environment wherein dancers could interact with music and visuals. The experimenters set up the club with a number of zones for individuals and groups, wherein some factor of the music for the club would change based on the actions of those in the zone controlling that element of the music. Among the conditions they established for their experiment were “participant’s actions elicit an immediate and identifiable response” and “actions receive aesthetically coherent responses” (Ulyate 45). Significantly, by presenting a familiar and accessible environment and not allowing participants control over the most basic structures of the music, the experimenters managed to create a coherent and enjoyable experience for a large number of participants sharing a space simultaneously (Ulyate 48).

One question that occurs to me in light of this analysis is to what extent player behavior should be controlled. There is currently some debate in the video game community as to the virtues of a game with a predominantly linear

narrative as opposed to the virtues of “open-world” games, in which players are encouraged to explore the game space and choose their own paths. However, there has also been an increasing trend of developers of open-ended games meticulously crafting game music to cue and direct players to act in a certain fashion. In this case, although the player perceives that he is in control and making his own decisions, the game developers have actually erected powerful psychological restrictions on his behavior. It is impossible at the moment to answer how much control through music is appropriate, and the amount certainly varies from game to game, but for the purpose of richer experiences in the game space, it may be desirable to construct cues that encourage a player to engage with the game without implying that a direct route is the best path by which the game is experienced.

Conclusion

For these and other reasons, video game music is based on a fundamentally different paradigm than other kinds of music. This change in paradigm has many effects on the aesthetic and structure of game music. Some of these effects, such as a tendency towards looping, are easy to anticipate, once one knows the history out of which game music evolves. Another obvious effect is the branching structure of video game music, which focuses on having a variety of smooth transitions and includes a lot of vertical motion in the score. Others, however, are subtler. For example, due to the

nature of early sound designs and the limitation on sounds in early games, from their inception games did not clearly distinguish the difference between music and sound effects. Even today, many diegetic elements of video games are musical and much of the ambient sound is not particularly tonal and arguably not music. However, as Zach Whalen points out, “The differences between game music and game sound can be subtle,” and therefore it is better not to distinguish between the two when talking about music in video games (Whalen, “Play Along”). With the focus on player interaction and the historically narrow dynamic range, game music evolved in such a way that it did not incorporate many subtleties. To some extent, despite the intentions of composers like Koji Kondo and “Hip” Tanaka, game music is tied firmly to the structure of games and not so much to a human audience. Indeed, composer Masaya Matsuura complains, “I mean the music is a tool to communicate with others, but currently much interactive music is just the result of communicating with the computer. This paradigm is very bad for the musician, “and he also made negative comments about the electronic aesthetic that still runs through much of video game composition (Matsuura2).

In addition, since audio in games has the heavy burden of providing a player with information and a feeling of interaction with the game system, the music must not interfere with this transfer of information and be able to include cues for causal listening that will alert the player as to the state of the avatar and use the sound to define the parameters of the game space.

Therefore, composed video game music must include compositional elements for all aspects of the game space, including diegetic sounds, and it is necessary for the game music to mimic real world spatial elements in the game space that are otherwise absent from the interface and the player's perception, since the player is not actually physically in the space.

Another attribute that is particularly strong in game music is the prevalence of reliance on thematic material as a way to give a score coherence. As some music serves to convey information, it may appear at several otherwise disjoint portions of the score. Therefore, the music for video games is better conceived as a single large work, rather than a set of individual compositions.

For these reasons, we come to what is perhaps the most startling feature of video game music: Masterful video game composition means composing entire spaces, complete with all diegetic and non-diegetic sounds, spatial awareness, a series of motifs with variations and transitions that serve as a single large composition, and in some cases even the culture of locales within the game. These musical pieces serve to convey not only emotions and bits of information but the sense and composition of the space that they inhabit as a whole. The composition of music in a game might include birdsong, weather patterns, music that is popular among characters in the game space, and the sounds of objects in the game, in addition to the motifs and variations and transitions that tie the individual spaces of the game

together into a unified composition that includes the player as a dynamic agent. In this way, game music is more like modern sound installations than like other music, although with different variables. In the following section, I will be using this viewpoint to analyze the 3D games in the *Legend of Zelda* series and the contrasting music games *PaRappa the Rapper* and *Rock Band*.

THE *LEGEND OF ZELDA* SERIES AND COMPOSED CULTURE

Before I can start this section that acts as an ethnography of myself as a player and of the worlds delineated by the *Legend of Zelda* games, it behooves me to mention Kiri Miller, whose article “The Accidental Carjack: Ethnography, Gameworld Tourism, and Grand Theft Auto” laid the groundwork for this kind of an approach to a game space. In the article, Miller explored the possibility of doing an ethnography on a single-player game experience. Approaching the game as both a tourist and as an ethnographer, she discovered that, despite the difficulties provided by controlling an avatar rather than one’s self in the game world, the experience of playing games had much in common with tourism as well as with acting as an ethnographer. Ultimately, her research concluded that these kinds of ethnographies about a game space and its culture are sufficiently analogous to ethnographies in the “real world” and give rise to enough intriguing questions to be worth doing (Miller, “The Accidental Carjack”). I would also like to reinforce her argument by again mentioning Jerry Holkins’ quotation, cited earlier on in this work but worth repeating here: “[T]he experiences that games create form the basis of a coherent culture - that the bank of shared experiences, simulated but no less real, coalesce into a collective memory” (Holkins). Here, Holkins refers not to a community of avatars in the virtual world or even an imagined community that shares experiences and therefore feels a connection across distance, but a community of actual players who come together in the real

world and rally around the shared experiences they have accumulated through playing video games. Examples include Penny Arcade's own Penny Arcade Expo, or PAX, an enormous convention of players who come together to celebrate video game culture, and the Video Games Live concerts, through which players can hear live orchestral performances of classic video game music. With regards to the particular case of studying the culture in video games, Holkins' quote holds the implication that by playing single player games, the ethnographer is taking part in a shared culture between players – the social space – and even though other players' avatars are not simultaneously occupying the same game space as the ethnographer's, all players are still undergoing shared experiences and sharing the game space, despite the fact that they do not interact directly. This fact can hold no truer than it does for the *Legend of Zelda* games, which consistently sell extraordinarily well, receive top marks from game critics, and have earned the adoration of players around the world. In fact, a quick search of YouTube under the term "Zelda music" generates over thirteen thousand results, many of which are videos of players performing music from the *Legend of Zelda* games, which themselves have earned thousands of views. One of these videos had even acquired 2,423,155 views by the time that I made my search ("YouTube – zelda music").

The first 3D *Legend of Zelda* game was *The Legend of Zelda: Ocarina of Time* for the Nintendo 64 game system. The music for this game was

composed by Koji Kondo, famous for his use of memorable themes in other Nintendo games, including the original theme of the *Legend of Zelda* series, and the game wastes no time in presenting them. Even the screen on which one creates a game file contains music that later on in the game is associated with safe spaces. In the game's opening cinematic, we are similarly treated to the theme of the game's antagonist, Ganon, and the through-composed sound of a storm, which occurs at many points throughout the game. Already, the player is made to associate these themes with nightmares, darkness, and fire, with which they are juxtaposed.

After this point, the player has to read through a great deal of text in dialogue boxes to progress in the game. To move through this dialogue, the player must press a button to confirm that he has read the text, at which point the game makes a highly tonal noise, which Kellaris's study points out as pleasing to the player, thus helping him to move through the dialogue and keep up the pace of the game. There are other tonal noises for picking up certain items in the game, and thus the player is encouraged to seek out money and certain power-ups, even when he is not in need of them. I often found myself running around looking for spare rupees, the universally accepted currency in the game, even when my avatar could hold no more currency.

The game is careful to make sure that the player is able to identify with Link, the avatar, and so he is given a treatment quite unlike the one that Kiri

Miller noted the avatars in the *Grand Theft Auto* series received. Link never talks in any of his games and rarely makes any noise at all. Furthermore, to increase interaction between the player and the avatar, Link's every step and motion is Mickey-Moused. When the player causes the avatar to run or to swim, a sound is immediately generated to correspond to that action, even if the visual change is minor. Causing Link to swing his sword also results in a swooshing noise accompanied by a shout. Furthermore, Link's actions in the game are fairly straightforward and sympathetic, so the player can easily identify with his motives.

Even at the beginning of the game, the player very quickly runs into some hostile objects. Although the objects are stationary and do not pose a threat, a sudden change in the music at their appearance acts as a sort of danger motif, which is established early on and continues to feature throughout the game. In the following sequence, the player enters an area with many hostile objects. The music accommodates this environment by dropping in volume and containing only a few pitches. With such quiet music, it is easier to figure out what is going on, but the silence also heightens one's alertness. Although this part of the game was not difficult for me, I frequently found myself on my toes, especially when music indicating danger began to play, and I imagine that the effect would have been even stronger had I been intimidated by Link's surroundings. At such a level of alertness, one could easily sense the surrounding presence of hostile objects by listening causally

for music indicating their presence. In addition to playing the danger music, the game plays a sound for each enemy object to let the player know what kind of an enemy he is facing. All of this contrasts with the unexpectedly tonic and optimistic music that one hears upon defeating an important enemy or finding a treasure chest containing a useful object, which heightens the feeling of success that those accomplishments bring. This pattern persists for the many hostile zones in the game: a quiet background music accompanied by diegetic noise and danger music to alert the player of the avatar's surroundings, mixed in with a few highly tonic passages when one accomplishes a major goal. In these game spaces, we also observe some of the best examples of the close blending of diegetic sounds and music that is so common in game music composition. In some such spaces, it is unclear whether the sounds are meant to be diegetic and reflect the surrounding environment or meant solely as background music, and in a few it is even true that the sounds of hostile objects and atonal ambient noise are the only sounds in the space whatsoever. This trend creates an eerie effect when later in the game, in similar spaces, one hears a chorus of disembodied voices in the musical score. In other spaces throughout the game, when MIDI vocals were used, I was often able to identify their origin as a particular singer. Being able to identify the singer would allow me feel relief due to the certainty of the sound's source and the familiarity of the scene of a person singing. By contrast, these voices were not tied to any visible source. Since

the sounds in these spaces are potentially a reflection of the environment, it frequently gave me the feeling that I was being watched or that secret enemies were lurking around the corners, although when I focused I could tell that these MIDI imitations of vocal sound were merely part of the composed background music. With such consistent and characteristic musical patterns, these spaces clearly mark themselves as being different from the rest of the game space, so that even when my avatar was in peril in other spaces, I did not feel the same sense of foreboding than I experienced in more openly hostile zones.

After passing through this part of the game, I was able to go to one of the largest spaces, the “overworld,” which acts as a sort of hub between different locations in the game. During the daytime, the overworld was quite pleasant and I felt free to run around without constraints. However, at night the music would drop out, leaving only diegetic sounds and signifying danger, and hostile objects would appear wherever I went. Therefore, even though my skill level was sufficient that this hostile presence was not a threat, I felt compelled to hurry to different locations in the game and explore them, rather than continue to run around the overworld for an extended duration.

As I continued to play the game, I began to make cultural connections between different spaces and their music. The lively tunes of the castle town and its rabble, the song of the royal family, and the ambient tunes of the nearby village and ranch became embedded in my memory. More interesting

to me, however, were the contrasting sounds that I heard in different cultural settings. Different cultures seemed to favor different instruments: The forest favored bowed strings, high woodwinds, and low brass; the people of the mountains lived in an environment with highly percussive music that also included shouts of a tone that matched the sounds that they made when I talked with them, and the river civilization music sounded like some sort of mix of xylophone or chime, angklung, and plucked strings.

In the first of these settings, one could also occasionally see instruments being played by game characters. When Link ventured to the deepest part of the forest, I discovered that one of the major characters was responsible for playing the music that was filling that space. This catchy tune, when I learned it, won Link an audience with the leader of the mountain people; as it turns out, in the culture of the mountains, imported music from the forests was a hot commodity. In this old game world, which I had only begun to explore, I was shocked to encounter this kind of trading of culture. Different ethnic groups in the game had developed preferences for different instruments and sounds, and then those sounds traveled across cultural boundaries and attracted other groups' attention and praise. I felt that my role in the game, beyond fulfilling a quest, was bridging these cultural gaps by traveling across borders and communicating cultural information such as the song that I had learned.

In addition to identifying distinct cultures, the composition of sounds in the game marked some objects as sacred. Without even noticing it, at some point I picked up an association between a certain high ringing sound and the divine. It was not until I observed that important plot items in the game resonated this sound when approached that I realized I was subconsciously making this connection. Even though the game only briefly alludes to a world religion and does not even go so far as to imply its universality, I had attached a religious context to certain items, events, and even items that my avatar was able to use. Furthermore, one of these items was actually a musical instrument.

Throughout the game, the player learns a number of songs that he can play via the game interface on an ocarina in the game space. The songs always carry connotations linked with particular spaces and motifs in the game, and they generally cause major events, such as a storm breaking or teleportation. By being forced to learn to play these motifs on the virtual ocarina, I found myself giving them a stronger presence in my mind. Not only did this shape my opinion of the game space as I interacted with it, but it also gave me the feeling that other people who had played this game would also happen know these songs, as if they were established folk tunes, and that I was interacting with this large community of players at a distance.

In many ways, the ocarina is the most versatile and useful item in the game, changing night into day, overcoming obstacles, and calling forth helpful

objects. Furthermore, even outside of the context of interacting with the game, I discovered that the ocarina could produce sound ranging over an octave with optional vibrato and the possibility to bend the pitch. Despite having stumbled upon a fantastic toy – a virtual instrument capable of producing many pitches that could be easily played with the fingers – I found myself spending more time using the ocarina to generate in-game effects than to amuse myself with the instrument itself. However, a tip-off from a friend alerted me that there are several videos on the internet of people playing various songs on the game’s virtual instruments besides the short themes that generate effects in the game. Searching YouTube, I found many examples, particularly several renditions of the Simpsons theme song (“YouTube – ocarina of time simpsons theme”). Throughout the game, my avatar used the instrument to interact with other characters, to move or disable hostile objects, to move around more effectively, to overcome challenges, and for many other purposes. In the game space’s culture, musical instruments are important and sacred in a profound way.

In this fashion, as I progressed through the game, I felt that I grew to understand a kind of musical culture that was actually developed by the game’s composers. I also felt that this culture valued musicality and musical instruments in a significant way. Having adjusted to this musical culture and the themes that embody it, I turned my attention to the next 3D *Legend of Zelda* game in the series: *The Legend of Zelda: Majora’s Mask*. Part of the

appeal of this game was that it presented a world that was touted as an alternate universe version of the one to which players had grown accustomed in *The Legend of Zelda: Ocarina of Time*. In *The Legend of Zelda: Majora's Mask*, I ran into many of the same musical patterns that I had observed in the previous game, such as variations on the castle town theme in the game's central and analogous "Clock Town." Most noticeably, the same musical rules applied to danger zones and to nightfall as I had observed before. Meanwhile, some cultural information of this game world also mirrored that of the previous space: The river people continued to enjoy the guitar, the mountain people played the drums, and the forest people had narrowed their focus to the horns exclusively. Noting the connections between musical culture in this game world and the game world of *The Legend of Zelda: Ocarina of Time*, along with some of that game's themes, allowed me to feel that the cultures of those two worlds were somehow linked, even though the spaces appeared to be quite different.

Somehow, in this game musical culture was even more prevalent than it had been in the previous one. One of the songs I learned was a lullaby with an imaginary folk history behind it, such that everyone in the mountain civilization knew the tune. There was also a developed popular music scene, including a new musical group that was at the top of the charts. This band was clearly a parody of real world rock bands, with a stereotypical lineup of a drummer, a bassist, a guitarist, a keyboardist, and a lead singer.

Furthermore, this band had a gig coming up at the annual carnival, and they even had a manager who arranged shows for them.

Over the course of the game, the avatar was given control over four instruments: the ocarina and one instrument corresponding to each of the other three musical cultures. Link also had chances to perform the music for other characters in the game periodically, sometimes as part of a band and sometimes on his own. These incidents increased my feeling of being a musician and musicality in the environment.

Unfortunately, this aspect was reduced in the following game, *The Legend of Zelda: The Wind Waker*, but as if to compensate, that game also included a meticulously crafted overworld. Whereas in the previous games the avatar would have to spend time walking into a different section of the overworld to hear the musical idioms associated with that section, in *The Legend of Zelda: The Wind Waker*, the music accompanying certain locations would gain in intensity as they drew closer. Using audio cues, one could locate hostile presences and changes in the weather. A vast range of diegetic sounds, from wind to ocean waves to distant splashing, are audible as the avatar traverses the space, and though the sounds at night were nothing more than the gentle washing of wind and water, I could not help but feel that they constituted composed music as much as the sounds I experienced during the daytime. In fact, I frequently found myself spending

time at night doing nothing with my avatar but having him sit in a boat as I listened to the gentle sound of the waves.

Although there are only three active civilizations in *The Legend of Zelda: The Wind Waker*, there is some attempt to set them apart musically. The most interesting example is a civilization of bird people whose musical style was influenced by Andean and Incan music, with a heavy emphasis on pan flute and guitar. The character of this music contrasted sharply with the Irish-influenced music heard throughout the rest of the game (Nintendo Power). In this case, rather than picking specific musical instruments and patterns to employ for the purpose of establishing a musical culture, the composers of the game took their inspiration from musical culture that already existed in the real world. Later on in the game, other characters would be able to use a harp and a violin, and musical instruments were still considered sacred items, but the emphasis on musical culture in the game was much weaker than in the other two games previously mentioned. In the following game, *The Legend of Zelda: Twilight Princess*, the player-controlled musical instrument would disappear almost entirely, though hopefully not for good, reduced to the ability to whistle through certain kinds of grass.

Still, while playing the games, I did get the feeling that I was experiencing foreign cultures as I traveled around and observed different musics. During *The Legend of Zelda: Majora's Mask*, I even felt a sense of musicianship at times and perceived that the world contained a musical folk

culture that I would not be able to completely grasp – Link is, after all, a tourist in that game, as much as the player is in games in general. Seeing the way that different cultures valued music and how music in the game often mirrored musics in the real world gave some credence to the notion that video game composers could construct not only spaces but also musical cultures to fill those spaces, complete with discourse and popular music. Although this trend appears to be subsiding, it remains part of the shared cultural experience of a generation of players.

MUSIC GAMES: MUSICIANSHIP IN *PARAPPA THE RAPPER* AND *ROCK BAND*

For the final section of this work, we will be looking at the games *PaRappa the Rapper* and *Rock Band*. Seemingly similar – both games ask players to press buttons in rhythm to prerecorded tracks and gauge their accuracy – these two games actually represent two opposing schools of music game design.

Surprisingly, both artists started their projects with a similar vision in mind: allowing non-musicians the chance to play and perform music. Masaya Matsuura, who created *PaRappa the Rapper*, commented in an interview with Brandon Sheffield that “I always try to make games so that everybody can experience of being a musician” (Masaya). Meanwhile, in an interview with David Stone, Alex Rigopulos, half of the pair that started the Harmonix company that has been responsible for the *Guitar Hero* and *Rock Band* franchises, “Playing music is, I think, one of the most fundamentally joyful experiences that life has to offer,” however, for non-musicians it is “too difficult to learn to play music the old-fashioned way.” Therefore, he and partner Eran Egozy “created this company to try to invent new ways to give music-loving non-musicians—the millions of passionate air-guitarists in the world—[a chance] to play music.” He went on to say that, when he and Egozy started Harmonix, they were not focused on making video games but simply on “making interactive [music making], free-form creative experiences,” and it

was not until *PaRappa the Rapper's* release in 1997 as the first music game that it occurred to them that “[video gaming] was the mass-market interactive medium” (Rigopulos, Stone).

Rigopulos is actually a fan of Matsuura's, and in the same interview he brought up, unprovoked, the lesser-known Matsuura title *Vib Ribbon*. “It's one of my favourite games of all time,” he remarked. “Matsura's a very close friend of mine.” He went on to say that the music in Matsuura's games have a good kind of detachment from the gameplay (Rigopulos, Stone). Matsuura agrees with the importance of detaching music from the game, stating that “I really keep thinking about how the music should be independent from the interactive experience, like playing *Guitar Hero*. It's a totally opposite way to think about the music-based game” (Matsuura1). Here Matsuura is implying that *Guitar Hero* weaves the game music too closely with the game interaction, and therefore achieves a less genuine musical experience. In his games, he prefers to have the music communicate with the people, rather than having the music too closely intertwined with the game system (Matsuura 2). Actually, Rigopulous agrees with Matsuura's principle, and he discusses how he trimmed down the level of player interaction to improve the music-making experience of the games. While he considers Matsuura's model of music detached from gameplay to be a more successful method of crafting a music game, he also confesses that the games his studio produces are predominantly rhythm games, in which the player's actions are tied down

by the beat. Players who gained skill in his studio's music games were capitalizing on skills of reaction and rhythm that they had acquired through other games (Rigopulos, Stone), which he hopes he can evolve into some kind of rudimentary musicianship through playing the *Guitar Hero* and *Rock Band* games.

Thus, we are presented with two games using opposing methods in an attempt at the same goal: to give players feelings of making music. In *Guitar Hero* and *Rock Band*, the music is tied tightly to the game system, whereas in *PaRappa the Rapper*, the music is loosely tied to the game and the player interacts with both the game and the music relatively separately. While it is counterintuitive to assume that a music game in which the interactive system and the music are weakly intertwined will be more immersive and generate stronger feelings of musicianship and performance, both developers seem to agree on this point, feeling that tying the music too closely to the game system creates an undesirable aesthetic and distances it from the player.

What follows is an examination of how the games *PaRappa the Rapper* and *Rock Band* bridge the gap between music in video game spaces and music in the real world through their drive to provide feelings of musicality and performance to non-musicians. It will focus on the way that the games overcome the obstacles and utilize the properties inherent to video game music to reach this goal, their level of success, and the impact that the paradigms of video game music are having on the real world, as well as how

existing musical ideas return influence to the music of the games. In this way, it can be said that the music of video games and other music are engaged in an interactive loop.

PaRappa the Rapper

On the surface, *PaRappa the Rapper* would seem to fit the paradigm of a rhythm game perfectly: The player is given a pattern by the game and asked to repeat the pattern with a corresponding sequence of button presses in a straightforward call-and-response style. However, this is only the surface level of the game. Although the player is penalized for failing to press the required buttons at the required time, there is no algorithm in place preventing him from hitting buttons at any other time. Therefore, although he is given a basic structure, the player is free to improvise over it, a feature that is generally absent from rhythm games, wherein one's interaction with a game occurs only at points when the game specifies an interaction (NanaOn-Sha).

Since the player is moving along a track of specified length, the problem of non-linearity in the game is not difficult to overcome. However, branching music does emerge through the process of controlling player behavior. If a player performs poorly, the player will alert him to this fact with a sound effect, but also by lowering the tonality of the background music (GrooveTon), which, as previously discussed, influences the player to change his behavior. Therefore, even though the player is free to improvise and hit

wrong buttons and they will register the corresponding sound, providing the sort of instant feedback that connects to high interactivity, the game system will still keep the player under certain restrictions.

Despite the fact that the sounds are all tracked and the only control that the player has is through his choice of button presses, it is still possible to craft surprisingly creative improvisations. This ability has resulted in some YouTube users posting videos of their improvisations on the site for others to view and critique. One user in particular, RaisukeFukaga, has produced many such videos. Interestingly, during his performance, this player does not seem concerned by his performance as rated by the actual game, but instead focuses on trying to create interesting patterns while maintaining the level of correspondence with the game necessary to keep the backing track in a major key. Although one could dismiss the video as a series of button presses that trigger a very limited palate of sounds controlled by an amateur musician, the video actually received overall positive ratings and is quite fun to listen to, despite the expected level of YouTube vitriol found in the comments. Several commentators even requested an MP3 of the performance. At the same time, one of the more recent commentators complains that the player doesn't know what he is doing (RaisukeFukaga). Disregarding the performance's fidelity qua performance and the quality inherent in the music produced, one thing is clear: Commentators are able to

form strong opinions based on taste and many enjoyed or respected the performance.

For those who have already satisfactorily completed all of the game's songs, there is a level of freer improvisation that is unlocked called "U Rappin' COOL." Once players reach this mode, they are essentially able to freestyle over a more prominent backing track so long as they press a button on beat a sufficient number of times per measure. There are many videos of this type of performance on YouTube demonstrating a high level of creativity. In one video, by user zoton27, I observed the player's development of a number of patterns. YouTube comments were surprisingly positive, with one commenter calling the player "awesome" and several others praising the performance (zoton27). I also found the performance engaging to listen to, despite the fact that the player could only trigger four tracks at any given time and that he had no control over what they were.

Although the "U Rappin' COOL" mode allows for a high degree of freedom, it would be inaccurate to say that it encourages a completely freeform performance. As stated previously, the interactive loop can be seen as a method of teaching the player about the content of the game. In this case, since the player cannot access the freer "U Rappin' COOL" mode until he has completed all of the songs to the game's specifications, the game teaches him to conform to the rhythm and play on beat before granting the freedom to improvise more freely. Furthermore, the game system still checks

to make sure that the player is frequently landing on the beat. Therefore, although the player has a great deal of improvisational freedom, the game is influencing him with the relatively rigid and causal structure of its specified interactions, encouraging a particular style in the improvisation. However, this limitation on the player's creative process as a performer also provides much-needed structure.

At the very least, Matsuura has succeeded in arousing feelings of musicianship and performance in his audience, as seen through the YouTube videos and their responses. Although the music in the game is not completely divorced from the game itself, as Matsuura might wish, it is still fairly free, and it communicates to the player a certain amount of the game system's structure and gradually teaches the ability to stay on rhythm during an improvisation. In fact, it is not enough to say that the game arouses feelings of musicianship, since the players are actually creating highly original improvisations and performing them for others. Since the game system continues to provide information to the player, one can actually consider the game to be a tool for interactive composition (Chadabe). Therefore, this game actually provides an example of players creating and performing music for a real world audience through the game system, which through the interaction with the system translates some of the aesthetics and structure inherent in the game itself.

Rock Band

The game *Rock Band*, made by Harmonix, is an evolution of the *Guitar Hero* series by the same developer. Unlike *PaRappa the Rapper*, the *Guitar Hero* games are rhythm games and have very little room for improvisation. Perhaps this is the reason that, in her article on schizophrenic performance, Kiri Miller discovered that players “generally don’t feel creative when they play, and they often indicate that the question irritates them: The games don’t reward creativity, so why would this even be an issue” (Miller, “Schizophrenic Performance” 29)? Thus, Matsuura and Rigopulos’s fears about rhythm games are made manifest: Despite the fact that the *Guitar Hero* games were highly interactive and are certainly capable of simulating performance, as demonstrated by such phenomena as a Cambridge bar with a successful weekly *Guitar Hero* performance night (Zezima), and genuine feelings of virtuosity (Perron), they fail to simulate the creative aspects of musicianship.

Fortunately, with *Rock Band*, creators Egozy and Rigopulos came closer to their goal of summoning “the sensation of playing music as genuinely as possible” (Rigopulos, Amrich). One helpful new element is the addition of the less abstracted drum kit controller and the addition of vocals sung through a microphone, which are not at all abstracted but mirror the sound input by the players. Another useful addition is a new atmosphere of group play. Players are highly encouraged to play the game in groups as large as four, with each player taking on a different instrument.

During my time playing the game, I noticed that the group atmosphere provided a highly musical feel. As players, we were encouraged to communicate with each other and time our actions so that we would receive bonuses simultaneously. Sometimes, when one member of the group was struggling, players would switch instruments in the middle of a song. This kind of group mentality added a lot of extra energy to the performance, some of which was certainly communicated to the game as player input, since players' performance improved surprisingly quickly throughout the session. There was also a great deal of unnecessary player input that the game would not read that was generated by the group environment: multiple players singing along to certain parts of certain songs, dancing and movement, and occasional whoops and improvised lines for vocalists who had no guidelines for part of a song or when the singer either did not know or did not care to follow the lyrics of a particular section. In addition, there were some drum fills during the songs and group fills at the end of some songs that allowed for a small amount of improvisation. The most startling event, however, was one almost entirely divorced from the game mechanics, which occurred when two of the players got into a competition to see who was the better vocalist according to the game. At one point, when one of the players had fallen far behind, he accused the other of being able to succeed only because he sang the notes accurately but without any "soul." To hear such a term used in reference to a music game that was, in reality, controlled by a computer

algorithm, was extremely surprising, and it demonstrated that, as the creators intended, the music of the game disconnected from the game itself and took on a life of its own. In a sense, players were immersed in the game, but in fact the game was using this interaction as a medium to pull them closer to the music and musicianship.

Despite player sensations of musicality, some of which certainly match up to genuine music performance happening in the real world, it remains true that *Rock Band* uses prerecorded tracks and demands that player actions match fairly rigidly to the button commands presented on the screen. *Rock Band* in this way highly resembles a more restrictive version of *PaRappa the Rapper*. Therefore, it follows that *Rock Band* exploits the interactive loop to teach players how to play in rhythm. However, with the light abstraction of the *Rock Band* drum kit and the actually accurate representation of the vocals, which the game makes sure correspond to the correct pitch and rhythm of each song, the game also trains for some actual musicianship that can be applied in the real world (Rigopoulos, Amrich). In fact, Harmonix had long been exploiting the link between player skills and musicianship, although previously the company had focused on using players' already practiced game skills as a means to engage in the musicality of the company's earlier music games, rather than worrying about to what extent those skills translated to real-world instruments. According to Alex Rigopoulos, he saw that players of these games, using the experience and skills that they had accumulated

from playing video games in general, “would realize that what they're really doing is making music, and what they were having is a music-making experience. Gamers have an incredibly deep and dedicated skill set that nobody gives them any credit for, which they've developed through gaming” (Rigopoulos, Stone). Elements of *Rock Band* such as the drum kit are more extreme manifestations of this idea. Some University of Florida students actually performed an experiment to test whether the skills that players accumulated through playing the *Rock Band* drums could translate into playing an actual drum kit for the same songs. A student who had achieved the highest level of playing on the *Rock Band* drum kit but had never played the actual instrument was put in front of a television playing the game’s visuals for certain songs and given a real drum kit to play along with the other parts of the song. The results were surprisingly successful, and although the student experienced a little difficulty in the transition, he played accurately, for the most part (dharcha1). Hypothetically, an aspiring musician could use the game as a teaching tool to pick up basic musical skills and export them into real world music. In fact, the student recommended *Rock Band* drums as “a good start” for those who aspired to play real drums, after his experiences (dharcha1). Indeed, as I played the game with my friends, I noticed that people’s rhythm and vocal intonation improved and they gained confidence in their abilities.

Another way in which *Rock Band* could impact music, and perhaps a more significant one, is by affecting the way that people listen to music. In Kiri Miller's article, one of the subjects she interviewed stated that, through *Guitar Hero* and *Rock Band*:

I've learned to listen to music differently. Whereas before... I would typically listen to a song as a whole, I now find myself picking out the various individual instruments and assessing their particular contributions to the music. I'm thoroughly convinced that the method these games use to "reward" good play (playing the particular instrument's soundtrack when you do well, and cutting it off when you don't) is directly responsible for this increased sensitivity to the individual instrumentation of songs. (Miller, "Schizophonic Performance" 17)

I and my friends also noticed some changes in the way that we listen to the songs that we have played in *Rock Band*. A large amount of this difference probably stems from the differences between causal listening and passive listening. Whereas passive listening allows the listener to feel the atmosphere and mood of the music, the causal listening caused by interacting with the music as part of the game system requires a player to look for particular cues in the music (Vorderer 244). This kind of listening will allow one to hear more details and zero in more tightly on a particular instrument than one would through passive listening, and since the environment in which

one listens is interactive, one will actually learn more about the song in general through the interactive spiral of a player engaging with the music. Alex Rigopulos suspects that, in the future, playing a game on Rock Band will become a major form of music consumption.

In 3 to 5 years people are going to expect to be able to play with music as the normal way that they experience music that they love. If you have a favorite band that releases a new album, sure you'll buy the CD but you'll also want to go onto the Rock Band server the game levels based on those 15 new songs to experience them as an active participant in the music-making. But this is how people are going to come to expect to experience the music that they love. So for us the Rock Band hardware and software application are a music entertainment platform. Once you've bought it and trained yourself on it, it's the environment you'll expect to go to absorb all the music that you love and experience it in that way for years to come.

(Rigopulos, Amrich)

Of course, there is no guarantee that Rigopulos's vision will manifest, but with the current success and proliferation of Rock Band, it seems likely. If playing music on Rock Band were truly to become a prevalent mode of listening, then this kind of interactive listening would change the way in which consumers hear popular music, which would certainly have an effect on taste.

Keiichi Yano, developer of the game *Elite Beat Agents*, noticed this phenomenon in relation to his own game, stating that “one of the things about a music game, a lot of people have told me through *Elite Beat*, is that, for example, [Sk8ter Boi by] Avril Lavigne, which a lot of people hate that song, but they play it and then you don't hate it as much” (Yano). Since causal listening promotes greater attention to detail, rather than attention to overall mood, it is likely that music in the mass market would become denser and more focused on instrumental lines to appeal to consumers who are listening in this way.

There is another dimension to consider, which is that if playing music games becomes a major source of profit for musicians and music companies, then it will become profitable to make songs that are not only fun to listen to, but fun to play. With that in mind, all of the particularities of video game music aesthetics and structure come flooding back: forming a powerful atmosphere by playing the events of the game off of the music's tone, making songs that stay fresh after long periods of repeat listening, giving informational cues, and making sure that lines of the song are distinct to avoid player confusion. With time, musicians may try composing more specifically tailored game spaces, in which case problems of branching and transitions due to non-linear structure, defining the avatar, and focusing on making a larger work out of distinct themes with particular associations will arise, causing music that previously had no connection to video game structures to begin to feed off of the ideas

and trends inherent in video game music composition, making a major impact on the aesthetic of other musics. Thus, despite its status as a rhythm game, due to its style of group play and its true-to-life instruments, Rock Band, through its enormous popularity, may not only inspire feelings of musicianship, but also change the face of music as a whole.

CONCLUSION

Through games like *Rock Band*, video game music is having an increasingly large impact on the music world as a whole. As game music's influence grows, it becomes increasingly important to understand the structural and aesthetic paradigms particular to video game music and their sources. Due largely to its interactive nature, video game music must take on different considerations and fulfill different purposes from other music. As a result, it develops many peculiarities. The history of video game music also accounts for many unusual trends in sound design.

Composing music for video games is also a different exercise than composing other music. Due to the branching structure caused by player interaction and the need to compose for spaces and to frequently compose large amounts of diegetic sound, video game scores are best viewed as single large compositions with many repeating themes and minute details. For this reason, video game composers are often not so much writing musical pieces as they are musical spaces, in which players in disjoint locations can accumulate shared experiences of hearing themes and linking certain musical elements to certain connotations of the game space, thus formulating common culture among players who have never interacted directly. Furthermore, composers can construct surprisingly complex musical cultural norms in their spaces that players can successfully explore as tourists or ethnographers.

Game music has many powerful attributes to offer to composers, such as linking a sound to a particular state, using the avatar's status to increase the effect of the music, and forcing the listener to employ causal listening to grasp details that might otherwise go unnoticed. There are also issues to resolve, such as bad habits of irritating looping and the tendency of the music's closeness to the game system to keep it from communicating with the players. As this music gains prominence, composers come up with interesting ways to tackle game music's unique challenges and to exploit its strengths, creating interesting effects.

If current trends persist, it is likely that music in video games and other music will become increasingly close, with each one influencing the other. Due to new ideas and technological developments, as well as increased interaction with outside music, video game music is already constantly changing form. As game music continues to exert an influence on other music, it will be interesting to watch which of its particularities become more common and which composers choose to avoid.

Many of the topics addressed here would benefit from further research and study. In particular, it would be interesting to see a firmer theory develop around the idea of composing music in interactive spaces and for composing music that immersed a player in an interactive environment. Also, a deep psychological study on the specific differences between what people hear through causal listening and passive listening, which I am not capable of

producing, would be not only interesting but useful to anyone writing music intended for a game such as *Rock Band*. Also, although this paper aims to examine problems in video game music composition rather than to solve them, I expect that we will see more and more interesting solutions to problems of non-linear play, extended duration in a space, controlling player behavior, and other major issues of video game music design in the future.

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