

The Heart of Battle: The Ludomusicology and Musicking of Fighting Games

by

Philip Clippinger

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This thesis was presented

by

Philip Clippinger

It was defended on

April 20, 2023

and approved by

James P. Cassaro, Professor of Musicology

Michael C. Heller, Associate Professor of Jazz Studies

Thesis Advisor: Dan Wang, Professor of Musicology

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Philip Clippinger, MA

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This piece applies the framework of ludomusicology to fighting games, a genre of video game which is underrepresented in the field. My goal is to determine where the genre fits within this epistemology through established analytical binaries: categorizing music and sound as diegetic versus nondiegetic—as well as adaptive or interactive—is one aspect of my approach. Writing about games requires exposition and context, so I also rely on my own experiences as musician, musicologist, and gamer. It is this perspective that lends itself to unpacking the musical qualities of playing fighting games. By examining how these games work and what they do differently from other genres, I contemplate how music and sound synergize with these design choices. These factors contribute to a gaming experience driven by dynamic composition and foley work. Audio in games reacts to what is happening onscreen, compelling the player to react in a certain way. I review how ludomusicologists treat game music from a general and theoretical standpoint before modifying my scope to consider how they treat combat. This allows me to zero in on how battles in fighting games are scored and sonically understood. For general framework of ludomusicological analysis, I turn to scholarly work with Nintendo's *The Legend of Zelda* series, which has been favored by researchers due to its musical world-building. I then contemplate how this framework is compatible with fighting franchises such as *Street Fighter* and *Tekken*, which will also elucidate the embodied parallels between playing an instrument and “playing” a controller. Fighting games are powerful mediums for exploring this intersection because, much like in musical performance, playing them well requires mechanical prowess, perfect timing, and

virtuosity. The 2013 reboot of *Killer Instinct* contains a fascinating example of musicking¹ through the game's "Ultra Combos." A player who wins can perform a long string of attacks on their opponent to showcase their skill. The game matches the instrumentation and sound world of the stage to the rhythm of the player delivering the beatdown, creating music. During an Ultra Combo, the role of instrument is extended to include both controller and avatar.

¹ Musicking is a term coined by Christopher Small pertaining to activities related to music. Small expands upon this concept extensively in *Musicking: The Meanings of Performance and Listening*.

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1.0 Introduction

In this thesis, I apply the epistemological framework of modern ludomusicology to fighting games. It is the duty of the ludomusicologist to act as an ambassador, perhaps even more so than with other species of musicology and media studies. On one hand, I have the responsibility of communicating why these games offer a ludic and musical experience that is worthy of close inspection. On the other hand, I must represent fighting games as faithfully as possible, impressing upon my readers both how they work and why people love them. Although my audience is both academic and musical, I cannot presume anything of their involvement or aptitude when it comes to video games.

Fighting games originated from and gained traction during the arcade era in the eighties,² but the nineties brought an unprecedented surge of innovation and entries in fan-favorite franchises such as *Tekken*, *Street Fighter*, *Mortal Kombat*, *Marvel vs. Capcom*, and *Dead or Alive*.³ This genre of video game tends to be mechanically and mentally demanding, requiring players to invest a substantial amount of effort and time into practice before they see results. Part of the legacy of fighting games is the steepness of the learning curve, and the extent of this difficulty can be hard to understand for those who have never played them. By its very nature, this genre begets a fanbase that is motivated and competitive. It is equally fitting that there is a massive, thriving esports scene for fighting games where the best players in the world compete for prize money, ranking, glory,

² Stanway, Glen. "Top 10 Fighting Games From the 1980's!" Kung-Fu Kingdom. <<https://kungfukingdom.com/top-10-fighting-games-from-the-1980s/>>. December 5, 2016.

³ Allen, Dominic. "8 Best Fighting Games From the 90s." The Gamer. <<https://www.thegamer.com/best-90s-fighting-games/#marvel-vs-capcom-clash-of-super-heroes>>. December 27, 2022.

and their love of the game. Thrilling to watch and to play, these games capture the hearts and minds of their target audience, creating legendary moments where entire venues erupt in collective amazement! It is difficult to articulate the ins and outs of both fighting games and the fighting game community (or FGC for short) without being deeply involved with them, which is one reason why I believe this genre is underrepresented in the ludomusicological canon. Additionally, the writing in this line of work tends to be more concerned with video games that have readily apparent musical qualities, which is further explored in my literature review.

My personal experience as musician, writer, and fighting game player puts me in a unique position to provide commentary on both the music and the musicking of the genre. As such, although I draw upon literature, essays, and sources from distinguished ludomusicologists, I must also rely on my first-hand “field experience” to explain core gameplay concepts, the mental side of fighting games, the importance of timing, and how playing them could be considered a musical act. From there, I unpack the ways that the music and sound design of this genre generate a compelling experience for the player by reacting to gameplay and onscreen interactions. This, in turn, generates a reaction from the player, compelling them to play or feel a certain way. I showcase proven ludomusicological approaches to analyzing and categorizing game music and sound; the diegetic/nondiegetic and adaptive/interactive binaries are particularly helpful. Although these games tend to be glossed over in the study of sound and music, these strategies reveal that the sonic realm of the fighting game is deep and distinct.

My love for both music and video games grew simultaneously throughout my childhood. Much of my free time was—and still is—spent on one or the other. Writing and talking about the music of video games is something that I just love, and reading what other ludomusicologists have to say is endlessly fascinating to me. Due to this—and the fact that my journey with these games

has changed me as a person—I seek to contribute to this discourse by revealing what the study of fighting games can add to the ludomusicological canon. In my efforts to improve at these games, I have been forced to make peace with parts of myself that I did not love or even like. One of the best ways to get better at fighting games is to lose... *a lot*. As someone who has spent most of his life with an inability to cope with failure, improving at fighting games has given me opportunities to face myself, reflect deeply on my issues, forgive myself for them, and set boundaries to better manage my perfectionist tendencies. To that end, I feel the need to express my sincerest gratitude to this genre, and what better way to pay tribute than through writing?

I am also acting upon an urgent desire to show the world how deep the connections between musicianship and gaming are in terms of the tactile, the psychological, and the progression of skill. My experience as both musician and fighting game player lends itself to recognizing and explaining the parallels between the two activities. Perhaps my readers have already drawn some unconscious connections between the two; after all, as all serious musicians know, continuous effort on the basics is an essential part of improvement. As someone with a bachelor's degree in violin performance, I have dedicated countless hours of careful practice to scales, etudes, and various exercises that allowed me to navigate my instrument with efficiency and minimal strain. This is all for the purpose of consistency! A musician who forms a habit of practicing the basics will have an easier time learning and performing pieces, both for soloist and ensemble. When a violinist practices a scale in a certain key, they are training their muscle memory so that when they inevitably encounter a piece in said key, it will be easier for them to move around the fingerboard and play with proper intonation. So, is there an equivalent to scales and etudes for fighting games? I believe so. I would even go so far as to say that there are pedagogical approaches to learning and

playing them! In order to discuss this, I will have to tell you about the “instrument” of a fighting game player.

While fighting games can be played on all sorts of platforms such as arcade machines, computers, and video game consoles, they all require a controller; the means through which the player interacts with the game. The type of controller available to the player is largely dependent on what the fighting game’s platform is compatible with. For example, one might play on a computer with a keyboard, but if there is an HDMI hookup or an adaptor for other options, they might use an arcade stick or a standard controller. Arcade sticks and standard controllers both have a control stick on the left-hand side that moves in eight different directions, maneuvering a character around a screen. Where they differ is that an arcade stick has eight or more buttons on a flat surface while standard controllers tend to distribute them differently- it is common for four of them, “face” buttons, to be on the right-hand side while the rest, “shoulder” buttons, are on the top left and right. Face buttons are usually pressed with the right thumb while shoulder buttons can be pressed with the left and right index fingers. This also means that the left thumb manipulates the control stick on a common controller, whereas arcade stick players are free to use their entire left hand to move their character. Actions such as attacking, defending, special moves, and grabbing are usually assigned to face and shoulder buttons. It is common for people to use arcade sticks when playing fighting games out of respect for the genre’s arcade roots, but in the end, controller choice is down to the individual player’s comfort and preference. For example, consider the *Guilty Gear Xrd* player Michael “Initial T” Ajison, who bought a wheel controller compatible with racing games before being urged by friends to try it out with fighting games. Ajison placed fifth at the Canada Cup 2018 tournament, making massive upsets over some of the world’s best players.⁴

⁴ “Initial T, the Steering Wheel Warrior.” Uploaded by Core-A Gaming, November 7, 2018, https://www.youtube.com/watch?v=n_irh1VNkKM.

There is also Mike “BrolyLegs” Begum, a *Street Fighter* professional living with arthrogryposis. Since his condition limits the movement and dexterity of his hands, Begum uses his mouth on a standard controller to make his character move around, attack, and defend.⁵

Generally speaking, specific attacks in fighting games are done by combining a direction on the control stick with one or more attack buttons. There are also command inputs, in which multiple motions on the control stick are combined with one or more attack buttons. Command inputs will perform attacks that are stronger and more useful than the average move, such as *Street Fighter*’s classic Hadouken, a fireball belonging to several characters including protagonist Ryu. When facing right, a Hadouken is performed by pressing down>down-right>right and then a button that punches on the controller. When facing left, the motion is down>down-left>left, then punch. The Hadouken moves across the screen with variable speed depending on how long the player holds the punch button. By design, this move prevents other fighters from simply walking up to Ryu into the range where they can attack him, meaning that they will often jump instead; a pattern that Ryu players look to exploit by hitting opponents out of the air.

It is not enough, however, to know moves and how to do them. One of the most important aspects of fighting games are combos; specific sequences of attacks that, when strung together, an opponent cannot escape from. This is where the parallels between playing an instrument and “playing” a controller become relevant. One might compare a fighting game combo to a challenging passage in a concerto: both require extensive amounts of muscle memory training, not to mention a keen sense of timing and rhythm. In addition, the final goal of practicing this passage is to see it fully realized as part of a performance, or in the case of fighting games, to make a combo usable against an actual opponent. Not only do fighting games offer training modes for players to

⁵ “BrolyLegs: The Fighter.” Uploaded by Street Fighter, February 11, 2016, <https://www.youtube.com/watch?v=s1MYSgy4QMw>.

refine combos against practice dummies, the online presence of the FGC means that there are a wealth of tutorials and guides made to help out gamers of all levels. One content creator who specializes in this is Justin Wong, an American FGC veteran known for his cerebral and defensive gameplay. In one particular YouTube video, Wong gives advice on how to practice combos for consistency by breaking them up into beginning, middle, and end. Essentially, Wong isolates specific moves to piece together, giving him a chance to get comfortable with small chunks of inputs. After that, he recommends putting the beginning and middle together, and then the middle and end.⁶ Musicians will probably recognize this “chunking” strategy as a common approach to practicing difficult passages.

Within the main body of this thesis, I provide more specific examples of how the music and sound design of fighting games work, as well as how they assist in creating a ludic experience that is distinct from other genres. This coalesces in an examination of how “Ultra Combos” from the 2013 *Killer Instinct* (Double Helix Games) serve not only as a way for players to demonstrate their prowess, but as a means to create “compositions” based on the rhythm and timing of a player’s attacks. In the case of *Killer Instinct*, the role of the “instrument” can be expanded to include not only the controller, but the fighting game character as well. In that respect, this piece is equally devoted to music in fighting games as it is to the musical qualities of playing them.

⁶ “How to practice EXECUTION.” Uploaded by Justin Wong, February 15, 2019, <https://www.youtube.com/watch?v=RjisPECfgWU>.

1.1 Literature Review

The ludomusicological canon is still relatively new. Most scholarship on the music of video games seems to have taken off from the late aughts onwards, with the University of Waterloo's Karen Collins leading the charge in 2008. That year saw the release of her book titled *Game Sound- An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design*, as well as a collection of essays by various authors edited and compiled by Collins- *From Pac-Man to Pop Music- Interactive Audio in Games and New Media*. *Game Sound* is an ambitious work that chronologically lays out the events and conditions which allowed video games to flourish from the late twentieth century into the early twenty-first. Collins provides context on why video games are worth a second glance from an academic perspective, how they became a recreational mainstay in our modern world, and how they are created, marketed, and consumed. Within this book is a stellar rundown of how game audio interacts with gameplay, the relationship between a game's genre and its soundscapes, the function of sound, and the affective side of gaming. It is evident from Collins' own commentary that her intentions as author were to move towards a more cogent epistemology on video game music, as she laments the "disagreements on terminology and theoretical approach" and the field's general lack of empirical research.⁷ *Game Sound* sonically historicizes the composition of video game music by acknowledging similarities between games and film, but Collins is also keen on pointing out ways in which the two mediums depart from one another.

The most essential difference between film and video games lies in the level of agency and control granted to the player. The person behind the controller is not merely observing a virtual

⁷ Karen Collins offers more of her perspective on the uncertain aspects of studying game audio on pp1-2 of *Game Sound*.

world; they are actively participating in one, which is a fact that sound designers and composers for video games must always keep in mind. Collins employs a different strategy in *From Pac-Man to Pop Music*, which, as previously stated, is a collection of essays. These individual pieces offer perspectives on topics such as the video game industry, games and sound on mobile phones, the composition of dynamic music in games, and how the gamer interacts with game audio. Again, Collins includes her own observations on the state of research here which, once again, contemplate what must be done to mature this field beyond its infancy. The study of dynamic music has been particularly instrumental for the development of ludomusicology: examining how music and sound can be adapted to how the gamer plays is one of the major ways that video games and films depart from one another, after all. The authors featured in *From Pac-Man to Pop Music* come from a variety of disciplines not limited to psychology, musicology, communications, computer science, and business.⁸ This should impress two facts upon the readers. Firstly, ludomusicology as we currently know it did not exist as recently as 2008. This is evidenced by both the scarcity of articles and the need for game audio research to be entrenched within other disciplines at this time. Secondly, *From Pac-Man to Pop Music* is a crucial collection for the development of ludomusicology because it was an attempt by Collins to bring these isolated perspectives together and put them in dialogue with one another. Incentivizing participation is one of the best ways to grow an epistemology, and the lucrative nature of the video game industry means that ludomusicologists have no shortage of content to study. Many hands make light work, after all!

Most ludomusicology literature since 2008 is presented much in the same way as *Game Sound* and *From Pac-Man to Pop Music*; there are longer books in which an author attempts to

⁸ Collins goes into greater detail on the state of games audio research circa 2008 on p6 of *From Pac-Man to Pop Music*.

historicize and expand upon the epistemology of video game music, and there are collections of essays from various authors that are curated and edited, sometimes to fit a specific theme. Collins would likely be quite pleased to see a more cohesive and social community form around the study of game audio; a trend which would result in the formation of the Ludomusicology Research Group by Michiel Kamp, Tim Summers, and Mark Sweeney in 2011. Summers is a particularly noteworthy scholar whose efforts to develop research methods are featured in his 2016 book titled *Understanding Video Game Music*. This germinal work equips the reader with practical approaches to analysis, making Summers one of the leading scholars on how to perform “fieldwork” in ludomusicology. This came to a head in 2021, during which Summers released *The Legend of Zelda Ocarina of Time- A Game Music Companion*, an impressive text of over 300 pages that is proof of just how exhaustively a driven musicologist can account for every aspect of sound in an individual video game. Summers provides background on the game franchises for which Nintendo is known, the composer Koji Kondo, what kind of music was possible to write for the Nintendo 64 home console, and how music works in *Ocarina of Time* (1998). He considers a multitude of different angles, writing extensively about all of the songs that Link learns on the ocarina, the interplay between music and location, character leitmotifs, how music sets up and reacts to gameplay, and the myriad sound effects and fanfares for which the *Zelda* series is known. In addition, his analysis is painstakingly tailored to every single piece of audio: Summers considers the cultural significance of instrumentation and musical style, beautifully weaving tethers between the music of *The Legend of Zelda* and that of the real world. He carefully selects figures and graphics that are appropriate for the occasion, at times making use of Western musical notation, and at times using spectrograms when his analysis requires a study of timbre. The way that Summers expertly synthesizes the perspective of the gamer with that of the music theorist

demarcates this book as an important milestone in ludomusicology. I consider this work a manual on how to conduct ludomusicological fieldwork in as much detail as possible.

While fighting games have a legacy as one of most important cornerstones of the arcade era due to their explosion of popularity in the nineties, there is surprisingly little written about them in the ludomusicological canon. Mention of fighting games is often relegated to lists of what types of games exist, which is the case when Collins includes them among the “supergenres” of the Entertainment Software Association.⁹ Summers briefly touches on how character theme songs in Capcom’s *Street Fighter II* (1991) carry cultural connotations, such as the bhangra influence in the theme of Indian yoga master Dhalsim,¹⁰ but his attention is predominately directed toward genres with more apparent connections between gameplay and music. For example, fighting games are almost never critically examined with the same level of fastidiousness afforded to games of the *Legend of Zelda* franchise. Musically, it is difficult for fighting games to compete with games that boast character leitmotifs, fully scored worlds with seamless transitions from location to location, and fanfares for collecting items, defeating enemies, and progressing the plot. Instead, fighting games feature a ludic experience where fighting is not only the main allure, but *the only* allure. How is it possible to compose adaptive music to two characters who can move around and hit each other at any possible timing? As Collins states, the compatibility of linear music with video games is contingent upon how temporally predictable they are,¹¹ and although fighting games are known for having a certain number of rounds in a match, there is no reason for those rounds to play out in the same way. Fighting games cannot be sonically choreographed in the same way as *Zelda* games, but their music and sound design can still be analyzed and explained through

9 There is more information on “supergenres” and the ESA on p124 of *Game Sound*.

10 Tim Summers has further commentary on *Street Fighter II* and its characters’ themes on pp62-63 of *Understanding Video Game Music*.

11 Collins provides more detail on how temporal predictability and unpredictability impact the composition of video game music on pp128-129 of *Game Sound*.

ludomusicological approaches such as the diegetic/nondiegetic binary. Through this thesis, I elucidate the unique nature of the musicking in fighting games- not just in terms of compositional approaches, but in terms of the latent musical aspects of the gaming experience.

2.0 Fighting Games 101

Before proceeding any further, it is crucial to go into more detail on the most common variations of fighting games that have proliferated over the years. Traditionally, fighting games pit the player against an opponent in a finite two-dimensional space where they can walk and jump around. These locations where fighting takes place are called “stages”. For example, in *Street Fighter II* (1991), a stage might be a Soviet pro wrestling ring, a bustling American military airport, or a crowded city street in China. There are two reasons why the finitude of these spaces is important. Firstly, having a limited amount of room to maneuver creates an incentive for players to fight one another instead of simply running away. Secondly, if a player is good enough at predicting what their opponent will do when their back is against a wall, they can completely take control of the game’s momentum: it is important to avoid being cornered. Though stages are physical places within the geography of an imagined world, they often feel quite separate from one another. You cannot travel seamlessly between locations, instead needing to navigate back to a stage select screen to “explore” the world.

Stages are a ubiquitous feature across all different kinds of fighting games, although they occasionally serve different functions relative to gameplay. For example, there are also three-dimensional fighting games, such as the ones in the *Tekken* and *Soul Calibur* franchises. This extra dimension adds a new layer of strategy: players of 2D fighters can only move left and right to avoid attacks whereas in 3D fighters, players can press up and down on the control stick to strafe around their opponents. This design choice obviously means that stages in 3D fighters need to work differently. Some games such as Namco’s *Soul Calibur II* (2002) implement a ring out feature where if you are knocked off the edge of the stage, you lose the round. The stages of Bandai

Namco's *Tekken* are particularly interesting because different ones impact the gameplay in unique ways. Some stages have firm boundaries reminiscent of 2D fighters, meaning that players who are effective at cornering opponents and predicting their next moves can thrive and perform well. *Tekken 7* (2015) features a stage called the Infinite Azure; a mirror of water that extends as far as the eye can see in every direction with no corners or boundaries. As such, it is more difficult to trap players here, meaning that fights are less prone to momentum shifts based on positioning. There are also *Tekken 7* stages with breakable walls and floors such as the Cave of Enlightenment. After knocking an opponent through one of these boundaries, the player gets a free opportunity to follow up with whatever attack they want. This means that a sequence of attacks that pushes an opponent into the corner can automatically be extended into another sequence, and as such, these types of stages reward players who are adept at difficult combos. Another noteworthy genre of fighting game is the platform fighter, a 2D style popularized by Nintendo's *Super Smash Brothers* series that more heavily emphasizes precise movement, jumping, and attacks that come from the air. What sets platform fighters apart from traditional 2D and 3D fighters is the primary win condition, which is knocking an opponent right, left, up, or down off the screen. The more damage that you accumulate, the further you are launched, and the more likely you are to be knocked out. As a result of this design choice, stages in platform fighters are often suspended up in the air with none of the boundaries or corners of traditional 2D fighters.

While the subject of win conditions is still fresh, it is important to touch on how they work in traditional 2D and 3D fighters. Games are played using a system of rounds. It is standard in *Street Fighter*, for example, for games to be decided based on the first person to win two rounds while in *Tekken*, the first person to win three rounds wins the game. Each player has a life bar that depletes when they are hit. The first way to win a round is to fully deplete your opponent's life bar,

and the second way is to have more life than your opponent when—and if—the in-game timer runs out. The vast majority of games allow the players to modify the timer to suit their preferences, and each competitive scene in the FGC decides what time limit is standard for their tournaments. On one hand, the timer is part of how fighting game developers incentivize interaction between players, but on the other hand, having good enough defense to run out the clock is also a viable option.

Beyond being a destination for battle and defining the gameplay of fighting games, a stage is also a portrait of the fighter it represents, which is an idea that can be represented both visually and musically. I have already called attention to Summers' commentary on Dhalsim's stage music in *Street Fighter II*, which leans heavily on classical Indian tradition through the use of sitar. Here, instrumentation is used to evoke Dhalsim's ethnic background. As fighting games have evolved over the years, so has the music that proliferates throughout the genre. Several of the theme songs of *Killer Instinct* (2013) express greater narrative weight and purpose through their lyrics, which impart context about their respective characters' backstories, demeanors, and philosophies regarding combat. This is expounded upon further along in my thesis, but for now, let us return to *Street Fighter II* and consider the aforementioned Soviet pro wrestling ring (see Figure 1).



Figure 1- "Big Factory"

Upon closer inspection, the ring is located within a factory. The sign right above the fire extinguisher reads “attention,” the ones on the chain-link fence in the foreground read “exit,” and there is a banner in the background that translates to “it is forbidden for children to watch.”¹² A tremendous hammer and sickle adorns the floor. It is surrounded by chain link fences, a fire extinguisher, and a pulley system attached to an enormous chain, and as such, the presence of metal is felt all throughout the stage; from the bright red steel beams to the scaffolding on the ceiling. There are over a dozen spectators, the majority of whom are nested within the rafters on the left side. Two remaining people watch from on high, presumably keeping vigil over the massive generators in the background... well, at least before they became distracted by the fighters! This is the home turf of Zangief (see Figure 2)- a brolic, battle-scarred, hairy, and profoundly muscular wrestler from Soviet Russia.

¹² “What are they saying in Street Fighter 2? - DuelScreens.” Uploaded by Duel Screens, April 14, 2018. <https://www.youtube.com/watch?v=GI7Cfjn3KeM&t=204s>.



Figure 2- Zangief

In the gameplay of *Street Fighter II*, Zangief's slow movement means that he is not particularly difficult to outmaneuver, and his hulking frame means that he is rather easy to hit. This is not to say, however, that he is outclassed in every way: if Zangief grabs his opponent, he can perform a devastating spinning piledriver that takes away one third of their life bar. If you allow Zangief to grab your character more than once, it goes without saying that things will get out of hand *very* quickly. On a basic level, fighting games can be thought of like rock-paper-scissors; blocking defends against attacking, grabs work regardless of whether an opponent is blocking, and attacks beat grabs. With this in mind, what can be done about Zangief's spinning piledriver? Standing around and blocking is asking for trouble. Attacking seems like the way to go since it will stop him from grabbing, but the assumption that a Zangief player will only fish for grabs is ripe for exploitation. At this point, Zangief players can start mixing in attacks before or after those of their opponents. A frustrated player might default to blocking these attacks, only to fall victim to the deadly spinning piledriver all over again. This is a classic example of how fear of a powerful move can create an effective gameplan, but it also demonstrates that fighting games have a cerebral, strategic side. Fighting game players must collect data on their opponent in real time, perform calculated maneuvers based on this information, and adapt to the tempo and cadence of an opponent who is focused on counter-adapting. This is more than just pressing buttons- it is something akin to chess, but with each player taking their turns simultaneously. This, to me, is part of what makes fighting games so exhilarating.

Spinning piledriver aside, what does Zangief's stage tell us about him as a character? For starters, the centerpiece of the room—the massive hammer and sickle—provides quite a bit of insight into Zangief's priorities and beliefs. He is a proud Soviet patriot from head to toe, evidenced by his crimson wrist bands, boots, and briefs. On top of this, the ring is located in a factory, which is

inherently connected to labor and is literally the Marxist means of production. While we never see anything being made here, it is safe to assume that the factory is operational due to the presence of not only the generators, but the fire extinguisher. Why is it placed in the middle of a ring, and in such close proximity to the hammer and sickle, at that? If anything, having a fire extinguisher laying around in the middle of a fight would be a great way to accidentally stub your toe. Obviously, the redness of the appliance mirrors the Soviet flag, but its presence implies that *this is not a place that can afford to be lost*. This is no mere shut-down factory that has been transformed into a battleground; it is a place of community, effort, and business with precautions in place to prevent accidents. Indeed, this stage seems to be a fully operational factory that hosts Zangief as a fighter.

So, why would Zangief fight here? Perhaps he wants a public place where the Russian people can watch him perform, so that he might ignite and impassion their national pride. Based on Zangief's character lore, this is an accurate assessment. Apparently, Zangief was asked by the president of the Soviet Union to show the nation's power and glory to the world, and the publicness of the factory allowed him to reach a wider audience while also celebrating the working class.¹³ By studying his stage, we can unveil Zangief's *raison d'être*: performance, spectacle, and patriotism. In addition, the presence of the banner forbidding children to watch his violent battles shows that Zangief aspires to set a positive example for future generations. The extent to which he loves his people and they love him in return is genuinely touching, but this can be difficult to stop and appreciate when you are trying to avoid spinning piledriver number three.

¹³ "Big Factory". Street Fighter Wiki, Oct. 7, 2020. <https://streetfighter.fandom.com/wiki/Big_Factory>. Accessed 11/27/2022.

So, what aspect of Zangief's identity is revealed through his stage's music? A driving bassline in four serves as an undercurrent to an accompanying kick, snare, and clap, while a synth meanders through the middle to high range with slick dotted rhythms. A brief intro in half time with the bass and percussion heralds in the synth, after which the track becomes more active; the bassline flows in rapid sixteenth notes. The harmony pivots from I to VII throughout the A section. As the bridge into the B section arrives, chimes kick in and the harmony thickens, which generates an atmosphere of heroism and heightened drama. My narrative interpretation of this piece is that, rather than emphasizing his ethnicity, it is a complement to Zangief's pro wrestler persona. The emphasis on the bass speaks to his size and weight, and the progression of the form and harmony represents his showmanship and passion for performance.

2.1 “Pedagogy” & “Theory”

The rosters of fighting games are designed to accommodate a wide variety of playstyles and in-game objectives, with certain fighters excelling in certain situations. Zangief is hardly the only slow, large fighting game character to be heavily rewarded for landing his grabs. He is a classic example of the character archetype known as the “grappler;” a high-risk, high-reward playstyle that focuses on closing distance and grabbing opponents for massive damage. There are also “zoners,” which are characters that keep their opponents at a distance with long-ranged blows and projectiles. They shut down substantial portions of the stage, forcing their foes to navigate around their ranged attacks with limited options. It stands to reason that grapplers and zoners are natural enemies: grapplers fall prey to the potent keep-away game of zoners due to their size and poor mobility, but if a grappler finds a way to get up close and personal, that zoner is in *big* trouble.

Another character archetype worth mentioning is “rushdown,” which involves smothering an opponent with a rapid onslaught of close-ranged attacks that are difficult to interrupt.

I am making an effort to mention these archetypes because, much like musical instruments, fighting game characters have idiosyncratic affordances that impact how they are “played.” A trombone’s slide makes it naturally suited for glissandi much in the same way that a grappler is built around grabs. The warm, middle register of the bassoon is more comfortable to navigate than the often pinched and strained upper register. As such, the bassoon has a preferred range of notes, much like zoners have a favored distance from their opponents that allows them to attack without fear of retaliation. That said, the trombone is not limited by the fact that it has a slide, nor is the bassoon confined exclusively to its middle range. Instruments and fighting game characters are so much more than their best and worst features; theoretically, their utility and potential are limited only by the prowess of those who play them. This connection is not completely unexplored in musicology. In the introductory passage of *Understanding Video Game Music*, Tim Summers contemplates a cartoon that explicitly considers the parallels between playing a fighting game character and playing an instrument. David Soames draws *Street Fighter*’s Ryu using his signature Shoryuken punch and a variation of his Hadouken fireball, along with the buttons required to execute these attacks. The punchline comes in the form of Ryu seated at a grand piano, accompanied by a slew of buttons that feature more variety and complexity than any of the previous moves. Summers highlights how the comic portrays “the similarity between the combinations of moves in fighting games and musical proficiency.”¹⁴ One advantage of approaching this genre from a ludomusicological angle is that the embodied experience of playing

¹⁴ Summers explores the ludic and musical implications of David Soames’ comic on pp1-3 of *Understanding Video Game Music*.

an instrument versus playing a game can be visually communicated- music has notation, and fighting games have buttons. It is possible to learn a fighting game combo from studying sequences of button inputs much in the same way that studying a piece's score can reveal how it is performed and heard. The success of both musician and gamer is dependent upon skill, timing, precision, and practice, and this is one of the many reasons why I believe in the potential of fighting games as a medium for personal and artistic expression.

I previously compared fighting games to rock-paper-scissors, but would you believe me if I said that with enough skill and dedication, there are ways for paper to beat scissors, for rock to beat paper, and for scissors to beat rock? This is where the "theory" and "pedagogy" of fighting games come into play. Naturally, there is no substitute for the muscle memory gained from regular practice, but much like how accumulating knowledge of music theory can refine a performer's instincts and musicianship, studying specific interactions in fighting games can be incredibly advantageous. The closest concept to music theory in fighting games would have to be "frame data." In a nutshell, it is standard for video games to run at sixty frames per second, meaning that every sixtieth of a second will contain one drawing that makes up part of an animation. Frame data refers to how many frames of animation elapse before a character is able to perform a specific action. An attack that becomes active on frame six, for example, will come out in one tenth of a second after its button is pressed. Frame data also accounts for the duration of an animation, which has a substantial impact on both the rhythm of a character's moves and how difficult it is to react to them. If music theory can be thought of as a means to measure and understand music through patterns and notation, then frame data is a means to mathematically quantify how a video game character interacts with their own world, and in the case of fighting games, with the world of an

adversary. Having knowledge of this concept means being intimately familiar with the rhythm of the game.

So, what can studying the “theory” of frame data do for the player? For starters, it can allow them to attack a blocking opponent safely. Depending on how quickly the animation of a move ends after it hits a guarding opponent, a player may have time to move their character out of range to avoid retaliation, put up their own guard, or attack again. Players who use rushdown characters often employ this strategy, making it extremely difficult to find a window to fight back. Rock beats paper! Now, consider this: player one correctly guesses that player two will block, so they grab. What can player two do? If they hit the same buttons that their opponent used to perform the grab within a certain frame window, the animation will be interrupted. This is called “breaking” a throw, and it is a technique that is programmed into many traditional fighting games to prevent grabs from being too powerful. Keep in mind that the exact window to break a throw may differ from game to game. In any case, paper beats scissors! Although this is not immediately relevant to frame data, there is a way for grabbing to beat attacking. If a character stands right outside of an attack’s range and grabs their opponent’s extended limb, they will be thrown right out of their move. Scissors beat rock! In order to pull this off, the player must be cognizant of both positioning and the rhythm of their opponent’s attacks.

2.2 Timing & the Limits of Skill

Timing-dependent interactions are not solely limited to fighting games. There is a genre of video game where this type of activity is the primary form of gameplay. Enter rhythm games! The object of a rhythm game is for the player to synchronize their button presses or special controller-

based maneuvers with music, repeating or otherwise reacting to on-screen sequences.¹⁵ There is generally a visual component that precedes these sequences, such as the arrows that scroll vertically down the screen in *Dance Dance Revolution*, or the blocked notes that descend down the frets of the on-screen guitar in *Guitar Hero*. Excellence is currency in these games. Players are rewarded with more points for performing long strings of uninterrupted perfection. Accuracy is meticulously tracked during gameplay, and at the end of each play session, the player is graded on their performance. In the *Guitar Hero* series, for example, the player can earn a rating between zero and five stars. Although this laser-focus on accuracy urges players to replay songs for the sake of polishing their gameplay, it also eliminates the need to quantify musicality, which is beyond the scope of possibility for these games. *Guitar Hero* is played with a special controller modeled after a real-life guitar with buttons in place of frets, but there are some aspects of instrumental performance that cannot be replicated when gamified, at least for the time being. Who knows what the future holds?

In his writing on Nintendo's *Rhythm Heaven* series, a franchise where button presses are matched with on-screen visuals in musical minigames, Peter Schultz categorizes said minigames into three processes. Firstly, the player responds to audiovisual cues with precisely timed button inputs. Secondly, the player will observe rhythmic demonstrations given by other characters with the end goal of memorizing patterns and repeating them back. Lastly, the player will move along at a steady groove that is periodically switched up to keep them on their toes.¹⁶ These principles carry over into fighting games, albeit with greater freedom and variability. The process of observing the timing of an opponent's preferred options is what makes the difference between

¹⁵ Collins goes into more detail on rhythm games and provides examples of them in *Music in Video Games*.

¹⁶ Schultz further elaborates upon these three categories and how they are employed in the *Rhythm Heaven* series on p259 of *Music Video Games: Performance, Politics, and Play*.

victory and defeat. Attacking, blocking, or moving too soon or too late can have absolutely damning consequences. Each player is wholly responsible for the what-and-when of the maneuvers that they choose, and as such, fighting games demand perfect equilibrium between mental focus and physical execution, lest the elusive beat where victory is possible slips away. Where fighting games depart from rhythm games, however, is in the balancing of reactability: if rhythm games do not provide their cues for the player with early enough notice, they go from challenging to outright unfair. In fighting games, a player can press any button at any time, meaning that if their opponent wants to win, they must watch for certain patterns and preferences, hone their senses for reaction, and make educated guesses based on observation and experience. “They will want to jump out of the corner... now!” Given the inherent challenge in reacting to an opponent’s moves in fighting games, developers tend to program in mechanics that provide handsome rewards for nailing a player’s timing.

At the absolute apex of fighting game skill, a realm where mind and body are seamlessly connected and tempered with perfect timing, virtuosity and genius truly manifest. In my research for this thesis, I have been particularly drawn to Elisabeth Le Guin’s work on the embodiment of musical performance in *Boccherini’s Body: An Essay in Carnal Musicology*. Within, there is a fundamental attention to the tactile; to what it takes to physically generate sound on a stringed instrument. What Le Guin presents—the physical and affective inner dialogue that unfolds while performing Boccherini’s music—is strikingly compatible with the mental and carnal dimensions of playing video games. Her scholarly work draws attention to how personal and subjective it is to write about this process, what with each individual’s approach to posture and musculature as their body naturally—or unnaturally—transitions from position to position. I am moved by Le Guin’s bold commitment to encapsulate the embodied experience of the self, not just because it expands the

boundaries of standard writing practices in musicology, but because my work with the musical qualities of fighting games necessitates a similar approach. I feel that this passage from Le Guin's work succinctly captures the essence of playing fighting games at the highest level: "Virtuosity would seem to be the epitome of unity between inner impulse and outer execution: performative perfection."¹⁷ To further contemplate this concept relative to both music and gaming, as well as how fighting game developers reward precisely timed buttons, I have an anecdote for you.

Timing is as instrumental to music as it is to fighting games. A sharp and savvy player will be able to tap into the rhythm of their opponent much like an orchestral musician understands how to respond to the ictus of their conductor; visual stimuli, knowing what to expect next, and sheer, visceral feeling. If an orchestra were a fighting game, however, the conductor would win by making the timing of his baton irregular and impossible to follow! Alas, there are no winners or losers in an orchestra, and ensembles achieve the desired results of their performances through cooperation. When a fighting game player can find their opponent's "ictus," it becomes possible to do something called a "parry;" a special type of block that rewards the player by nullifying all received damage, preventing them from being pushed back, and allowing them to act significantly faster than if they had blocked normally. In order for me to regale my readers with one of the most exciting stories from the FGC—if not esports and competition at large—I must first set the stage. This tale contains a demonstration of utterly masterful timing in the face of high stakes and impossible odds. It blurs the line between competition and performance, demonstrates the latent musical qualities of playing fighting games, and remains one of the single most impressive achievements in competitive gaming, full stop. Let me tell you, dear reader, about the Daigo parry.

¹⁷ Elisabeth Le Guin elaborates further on the embodiment of musicianship, the challenges of writing about this subject, and the nature of virtuosity on p5 of *Boccherini's Body: An Essay in Carnal Musicology*.

The year is 2004, and the best fighting game players in the entire world have gathered in Pomona, California to participate in an annual super-tournament called the Evolution Championship Series (Evo for short) for prize money, personal glory, and their love of video games. Early in the bracket for Capcom's *Street Fighter III: Third Strike* (1997), two absolute legends are squaring off. The first is the clever Justin Wong, an American bastion of patience and defense. Justin plays Chun Li, a nimble kung fu master with long ranged kicks to keep aggressive opponents at bay. The second is the legendary Daigo Umehara, a Japanese veteran of the FGC whose masterful hands pilot Ken, the flashy American karate expert with burning fists. Now, in *Third Strike*, parries work as follows: the player taps forward to block high and medium attacks, and for low attacks, the player taps down. If this input is done within roughly a tenth of a second before an opponent's attack, the parry will be successful. If an opponent's attack were to come on a downbeat, a parry would be timed as though it were a grace note at the end of the previous measure. Another important aspect of *Third Strike* is that a character who blocks attacks will still take some damage and be pushed back, incentivizing players to make use of the parry system if they wish to seamlessly transition between defending and attacking. As such, there are many situations in *Third Strike* where finding an opponent's "ictus" can be the difference between life and death. This was to be the case in this particular bout: Justin used the range and safety of Chun Li's kicks to gradually pick away at Daigo's Ken, quashing his momentum and eventually leaving him with a mere sliver of health. Justin simply had to hit Daigo once, and regardless of whether his opponent blocked, he would win the round. The air in the venue was electricity. The grainy footage of Justin and Daigo's match instills the gameplay and atmosphere with a nostalgic fuzziness, energetic vibrations of the early aughts; a bygone era when recordings were far less ubiquitous, let alone with beautiful resolution.

Another crucial aspect of *Third Strike* is that as the characters fight, they build up a gauge that, when full, allows them to use a powerful attack called a "super art." Chun Li's super art is a flurry of fifteen consecutive kicks, making it the ideal way for Justin Wong to finish off Daigo's Ken. There is only one way to victory for Daigo, and that is for him to flawlessly parry every single blow. This would require nerves of steel, superhuman concentration, and the skill to place fifteen inputs a tenth of a second ahead of each attack. As a member of the enormous crowd cheers Justin on, he moves in for the kill. Chun Li's tempest of kicks is about to collide with Ken, and if Daigo messes up even once, he loses. What happens next is the stuff of legend: Daigo parried all of his attacks. Every single input, requiring precision down to a fraction of a second, was executed immaculately. One, two, three, four, five, six, seven. Eight, nine, ten, eleven, twelve, thirteen, fourteen. Fifteen. Each were effortlessly brushed aside by the palm of Ken's hand as the crowd, understanding the staggering skill and poise required to accomplish something so impossible, erupted with roars of amazement. Their exaltation was compounded further when Daigo jumped before his final parry, allowing him to land a kick that would combo into his own super art and finish off Justin's remaining health. It was virtuosic, it was visceral, and it was one of the greatest comebacks of all time. This is what is possible when fighting game players reach their full potential.

So, what is musical about Daigo snatching victory from the jaws of defeat? The parries are impressive, but so what? The reality is that Chun Li's fifteen kicks do not come in even beats; rather, she will deliver seven kicks, pause for a beat, kick seven more times, pause for another beat, and then finish off with an elegant roundhouse to launch her opponent skyward. If every blow happened back-to-back with no pauses—say, as a constant stream of sixteenth notes—Daigo would only need to find the timing for the first kick, as the rest would be rendered temporally predictable.

This was not the case. In order for Daigo to pull off this sequence of parries, as well as the follow-up combo that clutched out the game, he needed to have prior knowledge of the pauses and rhythmic patterns of Chun Li's super art. The Daigo parry reveals just how similar the pedagogical and theoretical components of playing music are to playing video games. In order to parry Chun Li's kicks, it is first necessary to intimately understand their timings, much like a musician will study a score and listen to a piece of music in order to tackle a difficult passage. Thus, studying the frame data of Chun Li's super art is equivalent to understanding a piece's rhythm, constituting a preparatory step to playing said rhythm with pinpoint precision. From that initial brush with timing, the player is free to experiment with the actual embodiment of the music, coming up with the most effective methods to realize it through performance; a down bow here, a shift to third or fourth position here, this note will be the high point of the phrase, this note will get extra vibrato, and that one will get less. It is this experimental process that most likely resulted in Daigo jumping for the final parry, since a top player of fighting games is always looking for ways to optimize their damage output in any situation. The sequence of parries, as well as the specificity of the combo that Daigo used to make the comeback, speak to the levels of intellectual and physical preparation required to pull off such a maneuver, as well as how inherently musical this type of preparation can be. While the Daigo parry does not deal with pitch content in the same way as the Ultra Combos of *Killer Instinct* (2013), it reveals the compatibility of musical pedagogy and theory with fighting games.

3.0 The Music & Sound of Combat

In order to unpack the unique qualities of the music and sound design of fighting games, it is essential to take a step back and look at these two relative to video games as a whole. Although video games share some of the dramatic and multimedia characteristics of cinema, they depart from films in one major respect: interactivity. The extent of the distinction between “observer” and “player” cannot be understated. This is not to say that video games are more immersive than movies, since immersion is subjective and fundamentally personal. What I *will* say is that there are types of immersion that are exclusive to gaming experiences, due in large part to the participatory nature of being a “player.” According to Collins, some of the conditions that must be met for media to be immersive are as follows: there is the sensory, in which an audiovisual experience overrides the sights and sounds of the real world and captures the focus of the player or observer. There is also the imaginative, through which an individual emotionally engages with the setting, world-building, and characters. The condition that departs the most from film and is most relevant to video games is challenge-based interaction, which entails a comfortable equilibrium between the skill of a player and the level of the obstacles they face.¹⁸ In order for music and sound design in video games to contribute positively to the immersive experience, they must be created with these conditions in mind. The music must grab the attention of the player and make sense for the setting of the game, but it must also be flexible enough to adapt to what the player is doing. Elizabeth Medina-Gray’s writing contemplates the individualized nature of the

¹⁸ Collins’ *Game Sound* contains more detail on the conditions and terminologies of immersion on pp133-134.

gaming experience, citing the medium's propensity for creating audiovisual experiences that progress and unfold differently based on the whims of the player. As a result, immersion is dependent upon how well the game keeps up with the myriad possibilities. The order and timing at which the gamer's actions influence musical cues means that, in the words of Medina-Gray, a video game soundtrack must be composed and arranged to account for "likelihoods:" the music must be ready to travel parallel to the player, mirroring the patterns and priorities of their play session.¹⁹ It would not do for the wrong cue to play at the wrong time. The immersion would be ruined! Although the gamer is put into a world with rules and boundaries—consider the finite, two-dimensional stages of traditional fighting games—they are ultimately in charge of what they want to do, when they want to do it, and where they want to go. The game may or may not reward them for these actions. Regardless, it is the duty of the game's music and sound design to react to these choices, generating an experience which is ideally seamless, compelling, and immersive. A game that fails to do so runs the risk of boring or annoying its player-base: a stale sound world reveals—and often exacerbates—the inherently repetitive nature of video games. While I have framed this as a responsibility or perhaps even as a limitation, it is important to keep in mind that this type of auditory experience would be nearly unthinkable in other forms of media, film or music. Although ludomusicologist Neil Lerner traces the origins of dynamic audio all the way back to the live music of silent films, he notes that video games have come into a league of their own when it comes to matching music to onscreen action.²⁰ My expectations may be high, but that is only because I have played many video games that have been able to exceed them.

¹⁹ Medina-Gray writes more about individualized experiences and "likelihoods" on p106 of *Music in Video Games*.

²⁰ Neil Lerner elaborates upon video game music's unique temporal and personalized qualities on p1 of *Music in Video Games*.

Audio generates atmosphere and contributes to a game's narrative, but it also provides the player with information, meaning that it plays equally important roles in immersion and practical game design. As such, it is inevitable for gamers to deal with repetition; maybe in the form of a fanfare that plays when picking up an item, a flourish that plays when finishing a battle, or the leitmotif of a recurring character. According to Kristine Jørgensen, the golden rule of sound design in games is to prevent the player from succumbing to irritation or ennui in the face of this repetition.²¹ In the right doses, it can be comforting and familiar, but in excess, it can be distracting and infuriating. For an example of the latter, consider the theme music for Kaepora Gaebora in *The Legend of Zelda Ocarina of Time* (1998). Kaepora Gaebora (see Figure 3) is an owl that appears on several occasions throughout the game to speak directly to the protagonist, Link. His role is to provide exposition and a sense of direction, meaning that he indirectly speaks to the player as well. The issue is that Kaepora Gaebora is profoundly long-winded and has a tendency to show up right when the player is about to explore a new area. In order to get past the owl's barrage of monologuing as quickly as possible, the player will repeatedly hit the A button on their controller, but every time Kaepora Gaebora reaches the end of his soapbox, he will ask the player a question. One might expect it to be "do you follow?" or "did you understand?", but no- he asks the player if they want him to repeat himself. If you do not scroll down to "no" and continue mashing the A button in hopes of getting rid of this pesky owl, you will automatically select "yes", and he will start all over again from the top! Kaepora Gaebora's theme song consists of a short ditty in binary form, with each section repeating a single time. The A section emulates the sound of a bassoon being accompanied by plucking strings, and the B section features an electronic

²¹ Kristine Jørgensen provides more commentary on the usability of sound and the golden rule of game sound design on p163 of *From Pac-Man to Pop Music*.

approximation of an oboe and a harp. At the end of the B section, the piece repeats from the top. On its own, this music is not irritating- as a matter of fact, it is full of rustic charm that begets a helpful, wise character. The issue is that the entirety of the song plays out in approximately forty-five seconds and, given Kaepora Gaebora's penchant for carrying on and on, the repetitive quality of the music soon becomes obnoxiously apparent, especially if the player mistakenly agrees to listen to him a second time. As a result, the woodwind leitmotif that indicates the owl's presence is often met with groans of annoyance, since it means that the player will be prevented from playing the game for some time. Part of why the sound design in the Zelda series is so appealing is that it knows when to get out of the player's way. Finding treasure is generally accompanied by a leitmotif that includes four rising half steps- a brief fanfare that barely disrupts the flow of the game. The case of Kaepora Gaebora is an unusual instance wherein an otherwise brilliant game fails to deliver upon Jørgensen's golden rule.

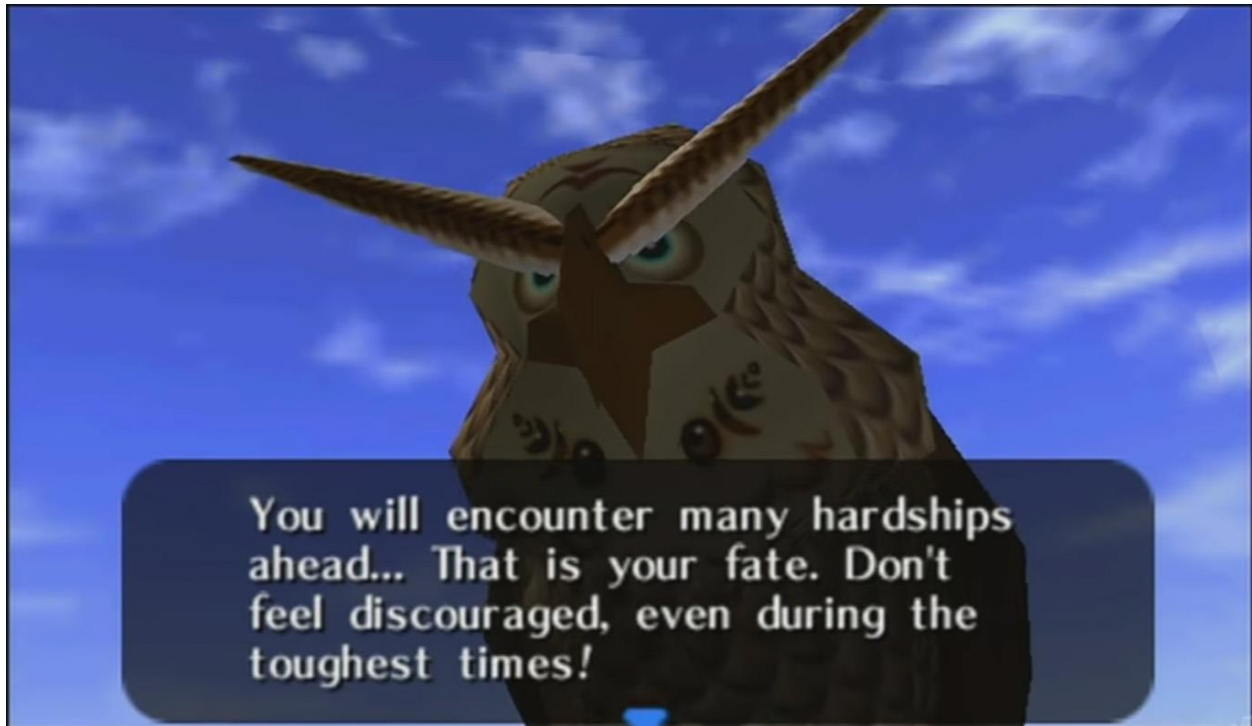


Figure 3- Kaepora Gaebora Gives Link Some Encouragement

One constant in video games is that different situations merit different music. Consider, for example, the geography of virtual places. Many video games will situate their protagonist in a world with an abundance of biomes; sprawling deserts, frigid peaks, verdant grasslands, and glistening coastlines are exceedingly common to find in games across all genres, not to mention all of the settlements and civilizations nestled into these locations. Is this in order to prevent the game's overworld from being too full of the sameness which gamers abhor? When a virtual world resembles our own, does this allow the player to imagine themselves inhabiting these places? Perhaps. The *Pokémon* series is particularly concerned with giving its players a variety of biomes to explore, especially because certain Pokémon—the animals of this virtual world—dwell in certain places. A cave system would be a fine place to search for a bat-like creature, a living stone, or even a dragon. On the other hand, checking out some desert ruins would be ideal if you are looking for

a walking cactus, a sand-dwelling rodent, or a clay artifact granted sentience by psionic powers. My point is that varied locations allow for a variety of interactions between the protagonist and their world, which extends to vicariously include the player.

The boundaries between these places are not only geographical- they are *almost invariably musical*. This is an essential component of Tim Summers' work with *Ocarina of Time*, where locations are so deeply inseparable from their pieces of music that they cannot be understood without them.²² Towns have their own themes, characters have their own leitmotifs, and transitions between different areas and game-states necessitate changes in music, *especially* when it comes to encountering enemies. Lack of music in *Ocarina of Time* has a jarring effect on familiar places, which is intentionally used by the developers when day turns to night. If protagonist Link is away from civilization when this occurs, an ominous howl is heard from afar and the jaunty, courageous music accompanying his adventure is replaced with the ambient sound of insects and bird calls. The wholesome elements of the fantastical are completely lost with the setting sun, and what remains is isolation and a lingering fear- "I am not safe here."

One dilemma that composers of video game music face is when to score the environment versus when to score the narrative. Although this often comes down to the discretion of the developers, Summers has noted that in the role-playing game (RPG) genre, Japanese composers tend to focus on the narrative while Westerners generally gravitate toward environment.²³ Both are compelling for different reasons; the first allows the player to become attached to the characters and plot, whereas the second influences the player's connection to the setting. Together, these

²² More information on the relationship between location and music in *Ocarina of Time* is available on pp78-80 of Tim Summers' *The Legend of Zelda Ocarina of Time- A Game Music Companion*.

²³ For more information on the compositional trends in RPGs based on region, consult Michiel Kamp's writing on p141 of *Music in the Role-Playing Game- Heroes & Harmonies*, where he contemplates some of Tim Summers' research.

constitute the imaginative and the sensory conditions that allow for immersion. I am not attempting to treat the two as mutually exclusive since they harmonize quite extraordinarily with one another, but even so, I find that treating environment and narrative as a binary is helpful for the classification of individual pieces. That said, it is always worth considering whether a musical passage reflects the narrative and environment in equal measure, especially when it comes to the stage music of fighting games. In *Street Fighter II* (1991), Dhalsim's stage music uses Indian traditions and instrumentation to emphasize his ethnicity, while Zangief's stage music complements his status as an entertainer. While the first example could arguably represent both environment and narrative—Dhalsim's heritage influences his fighting style, and the stage's music indicates the location of the battle—the second is purely driven by narrative.

Some of the most essential and useful methods to analyze music and sound in video games were established by Karen Collins in *Game Sound*. On one hand, there is a diegetic or nondiegetic binary, and on the other hand, there is an adaptive or interactive binary.²⁴ To those who study the music of mediums such as staged productions and films, diegetic and nondiegetic will be familiar terms. Essentially, nondiegetic music is heard only by the audience, whereas diegetic music is heard by both the characters and the spectators. The adaptive versus interactive binary, on the other hand, is something exclusive to gaming. Adaptive music occurs as a result of changes in the game that are not directly caused by the player. Like its namesake, interactive music is the consequence of interaction between the player and the game, meaning that any interactive musical cues occur based on the player's actions. As such, video game music can be adaptive diegetic, interactive diegetic, adaptive nondiegetic, or interactive nondiegetic. An example of adaptive nondiegetic

²⁴ Collins expounds upon diegetic vs. nondiegetic and adaptive vs. interactive music and sound on pp125-127 of *Game Sound*.

music would be the theme that plays in *Ocarina of Time* when dawn comes, the night passes, and the sun begins to rise. A piccolo pierces the darkness and gentle strings play as the world begins to stir. While the player is privy to this information about the changing time, Link is excluded. An example of interactive nondiegetic in *Ocarina of Time* is when Link opens a treasure chest. He then proceeds to hold its contents aloft, showing them to the player while accompanied by the item fanfare, four ascending half steps. It goes without saying that adaptive diegetic music is much more common in video games than interactive diegetic music, with the exception of games that are explicitly designed around rhythm and music. Any encounter with a character who plays an instrument or sings counts as adaptive diegetic, but unless the protagonist directly plays music or otherwise participates in musicking, interactive diegetic music in video games is a rare category. If we expand video game music to include sound design, however, the interactive diegetic category suddenly becomes far more broadly applicable. The avatar's footsteps, breathing, and the clang of their sword hitting an object all count as interactive diegetic sounds. An example of interactive nondiegetic sound design would be the sound that a cursor makes selecting "yes" or "no" in a dialogue box or navigating around the pause screen. It follows that interactive nondiegetic sound generally has more to do with the functionality of a game than world-building.

Music in video games can be a tool to assign deeper meaning to virtual places, functioning as an audio signpost that accompanies the visual. In addition to this, it can function outside the dimension of the visual as a means of forewarning the player of impending danger. Summers describes it as a "sixth sense:" when Link encounters enemies in *Ocarina of Time*, the music of the current area will be interrupted by a theme that rumbles ominously with rapid snare drums, string tremolos, and low woodwinds. In many cases, the battle music is audible before the player is aware of an enemy's presence, prompting the player to scan their surroundings and be on their

guard.²⁵ Providing the player with enough time to react to a potential fight is essential for balancing challenges for fairness, which is one of the major reasons why audio cues in video games are so ubiquitous and important. In the midst of a battle, sound design is also a way to communicate to the player that their attacks are effective: the crisp sound of a blade hitting its mark is encouraging and satisfying, whereas the *clang* that accompanies a sword hitting a shield implies that the player ought to change their timing or approach. Reactability of certain attacks is also contingent upon sound design. An enemy might telegraph their next move by raising their weapon or having a substantial windup animation, but they might also let out a grunt or a battle cry that indicates to the player that it is time to dodge or defend. In fighting games, it is common for specific moves to have specific voice lines. For example, in the *Street Fighter* games, characters that can throw a Hadouken fireball will shout “Hadouken!” This provides players fighting against these characters with an audiovisual stimulus to assist with their decision-making and reaction speed. In fighting games, a player’s attacks can be as unpredictable as they desire, so the sound of an attack’s preparation balances the competitive gameplay experience.

While the sound design of attacking and being attacked can provide players with useful feedback, it can also be used to make the experience more exciting or aesthetically rewarding. Consider the 2002 Nintendo Gamecube *Legend of Zelda* installment *The Wind Waker*, where hitting an enemy with Link’s sword creates a melodic flourish that “harmonizes” with the battle music.²⁶ Each time the B button on the controller is pressed, Link will swing his sword once. The game allows the player to swing four times in a row: the final attack is a heavier strike which, upon

25 To read more about Summers’ perspective on game music as a sixth sense and the enemy encounter theme in *Ocarina of Time*, consult p223 of *The Legend of Zelda Ocarina of Time- A Game Music Companion*.

26 Tim van Geelen shares more of his insight on how the sound design of *The Legend of Zelda The Wind Waker* contributes to compelling, musical combat on p94 of *From Pac-Man to Pop Music*.

being used, prevents Link from attacking again for a moment. In terms of duration, if the first three attacks are quarter notes, then the final swing is a half note. This choice to make combat encounters so musical becomes especially apparent when Link squares off against dungeon mini bosses, which are stronger enemies that guard rare items and block the player's advance. Although the music emulates an entire orchestra, the writing for this virtual "ensemble" is surprisingly barren: the lower register is dominated by sporadic bursts of strings, brass, and percussion while the higher register features soaring woodwinds. It just so happens that the musical flourishes of Link's swordsmanship fit conveniently within the empty middle register, meaning that through combat, the player contributes to the composition, albeit with certain limitations. For instance, the flourishes are randomly generated, so there is no way to guarantee that a certain kind of sword swing will result in a specific sequence of notes. Secondly, mini bosses spend a lot of time guarding or being knocked over, both of which will prevent Link from landing a blow. As such, the melodic and rhythmic qualities of these flourishes cannot be controlled as absolutely or freely as a musical instrument.

In fighting games, the sound design of a blow's impact has an equally practical and aesthetic function. In *Game Sound*, Collins sheds light upon the inherently metaphorical nature of video game foley work; a creative decision that deepens the impact of the audiovisual and tactile experience.

[In] games, reality in sound design is never an "original" recorded production-space sound, and rarely a raw recording of a "real object," but usually a make-believe construction of sounds and synthesizer patches—a simulcrum of the real. For instance, if I need a monster roar for my game, I cannot use a production "monster" recording. I may take a gorilla's scream and a human recording of a yell, put them

together, add some bass, add some overdrive, perhaps a high-end scrape to sweeten it further.²⁷

Fighting games, especially those that are primarily built around hand-to-hand martial arts, must heavily take advantage of sound as metaphor to avoid staleness and violating Jørgensen's golden rule. After all, there are only so many ways to design realistic-sounding punches, kicks, and throws before the dreaded immersion-destroying sameness sets in. This is not to say that a realistic-sounding blow is always unconvincing. Anyone who has seen footage of prime Mike Tyson will notice how the sound of his punches echoes and carries throughout even the loudest arenas; a terrible thwack, like a ball being dropped over the edge of a stairwell from the highest floor. The issue is that in fighting games, different blows have different functions. Consider, for example, counter-hits. A counter-hit is a move that, upon interrupting an opponent's attack, gives the player a larger-than-usual window to start a combo. One of the most iconic types of counter-hits comes from the *Street Fighter* series- the crush counter. To make this game-state apparent to the player, a successful crush counter will be accompanied by an electrical burst that pulses outwards from the character who is attacked. If this move doesn't interrupt an attack, this effect will be absent. Beyond the visual, there is also an audio stimulus that makes successful crush counters obvious to the player; a staccato, crackling smack that buzzes with electricity. Not only does this metaphorical sound design make timing a crush counter immensely satisfying, it also functions as a cue that, if reacted to properly, allows the player to follow up with a devastating combo; practical and fulfilling.

²⁷ Collins provides further commentary on sound as metaphor in game design on pp135-136 of *Game Sound*.

3.1 Sonic World-Building in Fighting Games

In order to create a fighting game, there must be some narrative catalyst that leads characters into conflict with one another. If the imaginative component of immersion is to be respected, fighting games must have a satisfactory answer for the following question: “why are they fighting?” One tried-and-true plot device that will always be relevant to the genre is a worldwide tournament to decide the strongest fighter. This trope has been used in *Tekken*, *Street Fighter*, *Killer Instinct*, *Mortal Kombat*, and all manner of other fighting game franchises for good reason: with the title of world’s strongest comes reputation, influence, and resources, but it is also a means to an end. What does each character seek? Glory? Affluence? Violence? Vengeance? Maybe they are simply hoping to test the limits of their abilities. A tournament is a fantastic way to put a diverse cast of characters in dialogue with one another while also allowing us to suspend our disbelief about them fighting, which, as players of fighting games will know, is what advances the plot. In real life, cross-style matches between martial artists are rare, but in fighting games, we get to see how boxers fight sumo wrestlers, how karate experts fight kung fu masters, and occasionally, how human beings fight against animals and robots. Beyond providing a platform for styles and disciplines to square off, tournaments also allow for clashes of ideology and philosophy, which is part of what makes them narratively compelling. Perhaps this is why tournament arcs are such popular tropes in manga and anime! Another way to answer the question of why characters are fighting comes from NetherRealm Studios, the company that is currently at the helm of the popular *Mortal Kombat* and *Injustice* fighting game franchises. In *Mortal Kombat X* (2015), *Mortal Kombat 11* (2019), and *Injustice 2* (2017), characters will always have a brief dialogue before they fight. Character one will open, character two will play off of their opponent’s opener, and character one will respond with some kind of remark that ushers in the battle. While

this approach is formulaic, it has endless potential for contextualizing conflict while also being tons of fun. It is so entertaining to watch characters talk smack, playfully quip, wear their hearts on their sleeves, and generally get under one another's skin before they duke it out.

For the first minute or so of booting up a fighting game, the audiovisual experience is much like any other genre: there are a few screens with logos and jingles for the companies involved in the game's production. The first moment that a player becomes truly acquainted with the game is through the opening cinematic. These collages of animated scenes and gameplay serve several purposes, the first of which is that they are quick introductions to the cast of characters, their personalities, and what they can do. In Namco's *Soul Calibur II* (2002), for example, the opening cinematic explores rivalries between certain characters such as Maxi, a nunchaku master, and Astaroth, a ferocious golem wielding an executioner's axe. Secondly, the narrative role of these introductions cannot be overstated. A quote from the announcer of *Soul Calibur II* opens the cinematic: "Transcending history and the world, a tale of souls and swords eternally retold." From this, the player can glean that *Soul Calibur II* is a fighting game about armed combat, that the scope of the adventure includes the entire world, and that the story of the series is cyclical. In terms of how the music matches up with the choreography of the animation, this game's introduction is about as iconic and exciting as they come. The tempo and demeanor change several times to suit what is depicted onscreen. Noble and stately brass accompanies the presence of Cassandra, a pious Byzantine swordswoman praying before the statue of a Roman god. A solo flamenco guitarist plays over a scene of the fencer Raphael, taking care to stay out of sight as he wanders the sullen, damp streets of medieval France. A searing guitar riff pierces the atmosphere as Taki, a ninja sworn to exterminate evil, uses her secret arts to repel her opponent's blades with a surging explosion. The spectator becomes acquainted with the cast through this experience- their demeanors,

strategies, and weapons are all revealed to the player, who already has some idea of which fighters they find compelling, compatible with their style, or just plain cool. After these introductions, the title screen will appear, and the player can press start to begin the game. Opening cinematics can also be skipped if the player is itching to fight, but letting them play out adds a layer of affective context, building anticipation for the cathartic payoff of being part of this virtual world.

When it comes to picking a character, the presence of cultural tropes in fighting games is also worth mentioning; a ninja character will generally feature a mobile and elusive playstyle, for example. In franchises that emphasize hand-to-hand combat such as *Tekken* and *Street Fighter*, the interplay between martial arts and nationality can be a potent tool for world-building. Both series riff on this concept by juxtaposing Japanese and American practitioners. In *Street Fighter*, Ryu is the introspective Japanese karateka wearing a white gi who lives in pursuit of spiritual balance and personal growth through martial arts. For contrast, Ken is Ryu's American counterpart. His gi is red, reflecting a personality that is confident, extroverted, and focused on style and showmanship. Although both fighters can use the Hadouken fireball, Ryu has better control over his, allowing him to throw powerful projectiles with varied speeds. On the other hand, Ken is more conducive to a fast-paced playstyle, getting up close and personal with his swift kicks and burning fists. This motif of American fighters being presented as brash bruisers is also featured in *Tekken* via Paul Phoenix. Paul is an all-rounder martial artist who enters the fray by knocking down brick walls with his tremendously powerful right straight punch. He is proud of his strength, reflected through his larger-than-life high-top hairdo and leather jacket decked out with stars and stripes. Paul is one of many examples of how Americans are depicted in Japanese media, and although he is hilariously over-the-top, he is also portrayed as the real deal; a genuine contender with power and determination worthy of respect.

Let us return to *Soul Calibur II* (2002). In this game's menu, movement of the cursor around the screen is indicated by the sound of a percussive hit. When the player presses A to confirm that they want to try out a certain game mode, a more pronounced cymbal impact and scrape will be played, and when they press B to exit said mode, a legato stroke on what sounds like a wooden block can be heard. The metallic and percussive sounds of *Soul Calibur II*'s menu serve to remind the player that this is a game about fighting with weapons! Inevitably, the player will arrive at the character select screen, where the cinematic, orchestral background music finally kicks in. When selecting a character, the announcer will say their name and the chosen fighter will say something ranging from a battle cry to a catchphrase. Masked fighter Yoshimitsu, for example, will exclaim "irrelevant!" with a delightfully playful roll on the double R's. After the stage is selected, the announcer will pose the two fighters in opposition to one another and say their names ("Voldo versus Astaroth!") before the game loads the stage and a brief, poetic passage is read to contextualize the conflict between the characters. "The man from the black mist bore the light of madness." The music of each stage varies to suit their culture of origin, as well as the narrative of the fighters that they represent. When a game is won, the winning character will say a few words about the fight as a victory interlude plays. This is a typical soundscape in fighting games.

The presence of battles is something that *The Legend of Zelda* and fighting games have in common, but the manner in which the games prioritize and arrive at these battles is fundamentally different. Whereas *Zelda* games seamlessly shift between adventuring and enemy encounters in the overworld, fighting games require a sequence of preparatory tasks to arrive at the fighting. Selecting a game mode. Selecting a character. Selecting a stage. There is a firmly defined barrier between preparation and gameplay, and the navigation across this border is mediated by sound and

music. The metallic hits and scrapes that accompany moving the cursor around the menus of *Soul Calibur II* gently nudge the player towards gameplay. The satisfying reverberation of the cymbal when selecting a game mode is the prelude to the character select screen, the final stop before the fighting begins, imbuing it with greater ludic, musical, and affective weight. Following Jørgensen's golden rule, it is necessary for the music and sounds of a character select screen to avoid boring the player, since they will inevitably end up on this screen over and over again. There are three sonic aspects to this game-state. Firstly, there is the sound of the cursor's movement. Secondly, there is the announcer, who states the chosen game mode and characters before placing the two in opposition to one another. Lastly, there is the music itself, which bears the responsibility of generating the atmosphere around the battle, pumping the players up, and being enjoyable enough to offset the fundamentally repetitive returns to the character select screen. When done well, these can be some of the most memorable and popular songs in the entire game. Consider the character select screen music from *Capcom's Marvel vs. Capcom II* (2000), which is a groovy, energetic R&B loop punctuated by a hook from a female singer- "I wanna take you for a ride!"

The announcer is an idiosyncratic part of a fighting game's sound world. They put the characters in opposition to one another, usher in the beginning of the fight, insert commentary on specific game-states, and they state the winner and how they won; by K.O., ring out, or running out the clock. The announcer is also inherently involved in the affective side of fighting games. For example, in franchises like *Street Fighter* and *Killer Instinct*, the announcer is programmed to provide certain exclamations and reactions based on the length of a player's combo; the bigger the number of consecutive hits, the more intense the feedback becomes. In the *KI* games, there is a mechanic called a "Combo Breaker" that allows the player to escape from a combo if they hit a button that matches the power of their opponent's attack. In the 2013 installment, the player has

access to a gauge that slowly fills up over time, and when they have a full bar, they can spend it to negate a Combo Breaker. This is called a "Counter Breaker!" One of the most iconic aspects of KI's sound design is how the announcer handles these particular game-states. "C-C-C-C-COMBO BREAKER!!" is shouted as the player places the perfect button on the perfect beat, supplementing an already affectively charged moment with further intensity: the player has outplayed their opponent, and there is now an opportunity for a momentum swing. It is only fitting that "COUNTER BREAKER!!!" is exclaimed by the announcer with even more fervor, since this game-state involves outplaying an outplayer. The presence of the announcer effortlessly weaves sonic and affective feedback into the experience of playing a fighting game. Having a disembodied voice approve of your perfectly executed combo is a congratulatory gesture; a positive affirmation to the player. On the other hand, this type of information could be considered distracting in another genre. For example, it would be redundant in a Zelda game like *Wind Waker* (2002), which already provides sonic feedback for successful sword swipes with crisp chops and melodic flourishes. Although the announcer's commentary on the game-state fills the same niche as *Wind Waker's* flourishes, there is a level of specificity about these reactions that makes each situation so much more intimate, intense, and gratifying.

4.0 Analyzing the Music of Fighting Games

Fighting games are unique due to the amount of preparation that precedes combat. Traveling from place to place happens on a menu screen: the player's only responsibility during gameplay is to duke it out. The stakes are high and victory is contingent upon each player's skill, so playing a fighting game ends up being a challenging, personal, and thrilling experience. Metaphorical sound design and the interjections of announcers are just some of the ways that the game sonically reacts to the actions of the player, keeping them engaged with positive affirmations and satisfying sensory feedback. Music is also a part of this reactive sphere. The question is, how is the music of fighting games used in tandem with gameplay? The unpredictability of the genre makes it challenging to choreograph via musical composition. In spite of this fact, there is one certainty: there are points in a fighting game match where tension becomes fundamentally elevated. Musical changes placed at these thresholds can be powerful, addressing the current state of the game while also generating affective responses from the player. For an example of one of these thresholds, consider Lerner's commentary on the "Hurry Up!" theme in Nintendo's *Super Mario Bros* (1985): "When time begins to run out, the music signals that by sounding a series of chromatically rising diminished triads called 'Hurry Up!' and then going to a quicker tempo..."²⁸ This cue pulls the player's attention toward the game's time limit, and the permanent shift from the leisurely overworld music to the manic, sped-up version inherently makes for a tense situation. The time limit is not a variable that can be ignored, but an inevitable consequence of playing the

²⁸ Lerner has further analysis on the "Hurry Up!" cue in *Super Mario Bros*. on p18 of *Music in Video Games*.

game- if Mario does not reach the goal in time, he will lose a life, punishing the player for falling short. This inevitability makes the “Hurry Up!” cue affectively consistent and reliable. Dilly-dallying means risking a brush with death, and the essence of that precarity is felt intensely through the sped-up music.

In the gameplay of *Street Fighter II* (1991), a phenomenon built upon a similar principle appears in every single round. While *Super Mario Bros.* uses the game’s time limit as a threshold for musical change, *Street Fighter II* instead considers each fighter’s remaining health. When one of the players’ health meters drops below one third, the music will modulate up by a half step and the tempo will increase. I would argue that this musical shift generates tension in exactly the same way as *Mario*’s “Hurry Up” cue: it indicates to the player that if they let their gameplay get sloppy, there is a realistic risk of losing. That being said, *Super Mario Bros.* differs from fighting games due to its firm status as a one-player game. To the gamer not on the receiving end—the one who has taken their opponent down to less than a third of their health—this modulation in harmony and speed emphasizes their momentum, as well as the advantageous nature of their current situation. In that sense, there is an affectively potent duality to this musical shift: it simultaneously heralds impending victory and impending doom. Either way, there is an undeniable proximity between this cue and the conclusion of the round, and since health bars are depleted relatively quickly in *Street Fighter II*—three Zangief spinning piledrivers are enough to knock someone out—that adds a layer of frequency and consistency to this modulation. The player becomes acclimated to its presence, and the urgency that it communicates is intuitively understood: it’s now or never! While both the *Mario* “Hurry Up” cue and the modulation of *Street Fighter II* are nondiegetic—none of the in-game characters recognize or react to these musical shifts on their own—the former is an example of adaptive sound whereas the latter occupies the realm of the interactive. The timer in

Super Mario Bros. will constantly tick down regardless of what the player does, but *Street Fighter II*'s shift in harmony and tempo can only take place when one of the players deals or sustains enough damage.

The evolution of fighting games as a genre has resulted in more complex realizations of this concept. While the health-based modulation of *Street Fighter II* was innovative and convincing for its time, it is exceedingly simple and predictable. The surface-level changes in the music limit the creative potential of this gesture: form, melody, the diegetic or nondiegetic binary, and the composer's choice to score narrative and/or setting remain fundamentally unchanged. Fighting game players know that improvement is not possible without investing substantial amounts of effort: the most tried-and-true path to victory is to spend a long time playing the game. Although the musical repetition is disguised by a shift in tempo and tonal center, the way that it recurs every round, without variation, and at the same exact threshold dampens its effectiveness over long play sessions. While repetition does not necessarily translate to a negative experience, it does run the risk of compromising the player's immersion according to Jørgensen's golden rule. Part of what makes the "Hurry Up" cue from *Super Mario Bros.* so iconic and effective is that the player will oftentimes clear a level before the cue even activates, meaning that the gamer is less likely to go the auditory equivalent of nose blind. Sometimes, absence really does make the heart grow fonder.

Street Fighter II (1991) walked so fighting games could run. The shift in tonal center and tempo at one third health showed that even in a genre with inherently unpredictable gameplay, it is possible for video game composers to score a tense situation. The music of *Tekken 7* (2015) vastly improves upon this compositional approach. In lieu of having a slight musical shift every single round, *Tekken 7* waits until match point to switch things up: when one player is a round

away from winning the game, the stage's music will change to a second version derivative of the first, but remixed for greater intensity and impact. While this strategy is clearly a variation on *Street Fighter II*'s modulations, it has two distinct advantages over its progenitor. Firstly, the decision to make this shift take place at match point instead of every round shows restraint; the less frequently the change occurs, the more thrilling it will be for the gamer. Secondly, the tonal and tempo modulations are just two methods for disguising obvious repetition. Having fully-fledged remixes guarantees variation and freshness, so the music is less likely to detract from the immersive gameplay. One analytical dilemma is whether to treat the transition to the remix as adaptive or interactive. *Street Fighter II*'s modulation occurs as a direct consequence of the player hitting or getting hit, rendering it indisputably interactive, but the nature of *Tekken 7*'s remixes is more complex. Who is responsible for the transition that triggers at match point? Is it a threshold that is reached via the passage of time, like the "Hurry Up" cue? The players will inevitably arrive at match point no matter how the games play out, but the timing of that arrival can also be influenced by how they fight. In the standard *Tekken* ruleset, the first player to take three rounds wins the game. With this restriction in place, the earliest possible timing that this transition can trigger is after one player has taken two rounds. Assuming that each player takes a round one after the other, the transition must happen on round four. The discrepancy of when the shift takes place depends upon the progression of the match, and for this reason, I believe that this is interactive music as opposed to adaptive music.

According to Kamp, "musical style is determined mostly by a game's fictional setting."²⁹ *Tekken 7* takes place in a variation of our modern world caught within the clutches of a ruthless,

29 For more of Kamp's perspective on musical style as related to a video game's setting, consult p139 of *Music in the Role-Playing Game- Heroes & Harmonies*.

technologically advanced megacorporation known as the Mishima Zaibatsu. Genetic experimentation, cybernetic enhancement, and robot soldiers are all commonplace in the world-building of the series. Considering *Tekken 7*'s lore in tandem with Kamp's commentary, it makes sense for the game's music to be predominantly electronic. The games include a wide variety of subgenres of EDM such as psychedelic trance (*Electric Fountain (Karma)* from 2007's *Tekken 6*), hard trance (*Plucking Tulips* from 2011's *Tekken Tag Tournament 2*), and jungle drum and bass (*Moonsiders 1st* from *Tekken 7*). The diversity of compositional styles beautifully supplements the affective experience of playing a fighting game. Whatever the situation calls for, music like this has the ability to be uplifting, exciting, ambient, reflective, humorous, and furiously relentless. The electronic touches are evident in the sound design of combat, as well: filtering effects and phasers are applied to powerful punches and kicks, making them sound like artillery blasts or even lasers being fired over great distances.

Initially, the stage music of *Tekken 7* is referred to as "1st." Once match point has been reached, the remix, referred to as "2nd," will kick in. For example, *Moonsiders*, the track that plays on the Infinite Azure stage, is split up into *Moonsiders 1st* and *Moonsiders 2nd*, composed by Taku Inoue. This method is used across all stages in the game, with each "2nd" being derivative of its respective "1st," but with higher intensity. The way that tension musically escalates between the "1st" and "2nd" varies from stage to stage- there is no monolithic analytical strategy that can account for every possible angle and interpretation. Each stage's music is its own separate entity. Out of respect for this, rather than listening to reveal an underlying formula in *Tekken 7*'s compositions, I analyze *Moonsiders 1st* and *2nd* simply to understand how the two are related.

Moonsiders 1st is a jungle drum and bass track in four featuring piano, guitar, synth, hi-hat, kicks, and a snare clap. It features an intro, an A section, a B section, and a bridge that loops

back onto the A section all over again. A and B are respectively followed by A1 and B1, which are slight variations. During the ten second intro, the piano introduces the main melody and harmony in a minor while the hi-hat is struck on every beat. The guitar and synth gradually enter, heralding in the A section, which follows a i-iii-VI-VII chord progression. The beat picks up here with a clap on two and four along with an amen break; an emblematic feature of the drum and bass genre. The kick consistently comes on beat one and the second eighth note of beat three, syncing up with the enjambed piano melody which has a similar rhythmic function. Twenty-two seconds after A is A1. Here, the beat cuts out for one measure, and a synth that doubles the piano melody one octave up enters to create some variation. The same doubling treatment is given to the bass, pulsing eighth notes which finally gets to flesh out the piece's harmony after taking a backseat to the melody in section A. The arrival at B twenty-two seconds after A1 is a nod to the introduction. All tracks cut out apart from the hi-hat, the doubled melody, and the doubled harmony. The chord progression for B is new, but still in the key of a minor- VI-VII-i-v. B exists to build up momentum for B1, where each track kicks back in for a climax. A filter sweep over the synth precedes this cue, which changes the music's timbre and makes the arrival at B1—twenty-two seconds after B—all the more cathartic and beautiful. The amen break is absent here, which makes the beat less busy sounding while also allowing it to breathe. After twenty-two seconds of B1, a gorgeous, sentimental piano bridge will play for five seconds along with a descending laser-like synth sound panned far off to the right. After this signal, the track will loop back onto the A section before going through A1, B, B1, and the bridge again, repeating this sequence until match point.

Moonsiders 2nd's introduction is busy. It features driving synth chords in constant eighth notes, kicks on every beat, and halfway through, a real snare drum hit on every eighth note to match the pace of the harmony. The snare picks up speed with sixteenth and then thirty-second

notes before a descending vocal “yeah” sample—the notes E-D-C-A spaced out with even quarter notes—signals the start of the A section at second twelve. This passage’s sound world is heavy and fierce, featuring kicks that overlap with deep, bassy dubstep throbs falling on beats two and four. Also present are a distant, high-pitched whistling synth and an energetic drill beat. After roughly twenty-two seconds of section A, we arrive at A1, where the booming bass is doubled an octave up and the amen break makes another appearance. The result is a dense texture that vibrates constantly with perpetual motion. Around twenty-two seconds of A1 go by before we arrive at the B section, which actually does not have a B1 variation. The piano melody from the B section of *Moonsiders 1st* reappears here, but instead of being supported by the VI-VII-i-v chord progression, the harmony stays static with a drone-like pulse on every eighth note. The kick hammers relentlessly on every beat, and a filter sweep allows the anxious sameness of this texture to grow in volume and intensity. Out of this expansion, the sixteenth note thirty-second note snare motif from the intro returns, and another statement of the descending vocal “yeah” sample allows for a smooth transition back into the A section. Like with *Moonsiders 1st*, the A-A1-B loop will repeat as long as necessary, but this time until the match is won.

Moonsiders 1st and *2nd* are both the same tempo and remain in the same key. Each of them musically progresses at similar rates; twenty-two seconds is a ubiquitous duration for each section, with the exception of introductions and bridges. The shared melodic content of the B sections is one of the most apparent ways to connect *Moonsiders 1st* and *2nd*, but the harmonic contrast between these passages completely alters the melody’s affective blueprint. While the arrival of B1 in *1st* is a climactic moment of heroic confidence, *2nd*’s B section refuses to harmonically progress beyond a single chord, creating an atmosphere of uncertainty- a nerve-wracking paradox of stillness and momentum. Both *1st* and *2nd* are examples of nondiegetic music and, as previously

stated, I strongly feel that *Tekken 7*'s transitions between these pieces are interactive instead of adaptive. After all, the timing of this shift will vary depending on when the players reach match point. What is truly challenging with instrumental pieces is the task of determining whether they are scoring narrative or setting. The Infinite Azure is a mirror of water that extends as far as the eye can see in every direction, so physically situating it within the world of *Tekken 7* is impossible. It is more of an aesthetic than a destination. In addition, the total lack of lyrics other than the “yeah” sample means that a narrative reading must contemplate the abstract and the affective. The jungle drum and bass sound world of *Moonsiders 1st* is serene and optimistic, reflecting the stillness of the water. For contrast, the vicious, pounding dubstep of *Moonsiders 2nd* disturbs this state of mind; the mirror of water is shaken and blurred by the mighty combatants as they go all out. In that regard, these tracks portray narrative and setting in equal measure. The urgency and desperation of playing at match point is communicated through a shift in genre; a transition from jungle to dubstep. In addition, the carefree melody in *1st*'s B section is completely turned on its head in that of *2nd*, imbuing the gameplay with an air of austerity and consequence that urges the players to fight harder.

4.1 *Killer Instinct*'s Musical Innovation & Ultra Combos

Applying standard ludomusicological methods of analysis to the 2013 reboot of *Killer Instinct* is exciting. Examining the binaries of the adaptive and interactive, the narrative and environment, and the diegetic and nondiegetic reveal just how innovative this game is on all fronts. *Killer Instinct*'s approach to generating dynamic music is unlike anything previously seen in fighting games, and the theme music of many characters conveys narrative with a rare sense of

depth and completeness. Additionally, although there is seldom any diegetic music in fighting games, *Killer Instinct's* Ultra Combos create an utterly unique scenario where diegetic sound and nondiegetic music can exist in perfect synchronicity.

Killer Instinct's musical framework is distinct because each piece is arranged in real time according to the gameplay. My previous examples of dynamic music in fighting games raised tension by using specific checkpoints as musical pivots; reaching match point in the case of *Tekken 7* (2015), and when one fighter ends up at one third health in *Street Fighter II* (1991). *KI's* approach to dynamic music is intricate because the quantity of pivot points and cues is much greater than that of the average fighting game. These pivot points used for transitions are much like joints in a limb- a higher number inherently begets increased flexibility and precision. The music of *KI* ebbs and flows, bending every which way to score the gameplay with an effectiveness that was noticed by the FGC before the game even officially released. One of the perks of being an FGC content creator on YouTube is that if your platform is large enough, game developers will sometimes allow you to play a game prior to its release date. This gesture is mutually beneficial: the YouTuber garners further credibility by collaborating with an established studio, and the studio's game can receive the endorsement of a trusted community figurehead. This was the case when Double Helix Games, the development team behind *KI*, allowed the YouTuber Maximilian Dood to show the game off to his audience during July of 2013. *KI's* dynamic music made such a massive first impression on Max that he simply had to show his viewers how it worked.

Max's demonstration takes place on a stage called the Tiger's Lair, which is the home field of *KI's* protagonist, a Tibetan warrior-monk named Jago. Max starts off his analysis with a controlled scenario: he makes sure to play against an opponent—more like a dummy—that does not move at all, so that the musical changes are guaranteed to match the pace of his gameplay. This

lack of interference allows him to show exactly what happens when no buttons are pressed. After a brief intro with soaring female vocals and pounding drums, there are approximately two measures of low, rhythmic electric guitar with percussive shouts on beat two. Following this, the game's music becomes more texturally sparse, settling into the stage's idle theme with mellow strummed chordophones and a less aggressive—though still driving—percussive beat. Notice how musical phrases are allowed to breathe for a bit, making the transitions organic and pleasing to the ear. Eventually, Max has Jago take one step forward, triggering a musical change: the electric guitar returns in full force, this time accompanying the gritty sound of a male throat-singing ensemble. After hitting the opponent a few times, he pauses again in order to show how something as simple as movement can serve as an interactive pivot point. Playing against a completely inactive opponent eventually limits Max's ability to demonstrate *KI*'s musical shifts, so he follows up by facing an AI that fights back. Two rules to the dynamic music in *KI* become evident from this fight. Firstly, the music switches to a more intense loop when entering a game-state that is significant enough to be addressed by the announcer. When Max lands a tremendous seventeen hit combo, the announcer provides feedback by exclaiming “insane combo!” and right on cue, another layer of guitar is added for a heavier texture. Secondly, interactive game-states such as combo breakers and counter breakers tend to function as pivots as well. Max's opponent gets a successful counter breaker, heralding in a passage played by the guzheng, a Chinese zither. This instrument fills in the upper register of the music, complementing the growling rhythm guitar. When Max wins the game, an upward flourish from the guzheng creates a final cadence, rounding out the ludic experience.³⁰

30 “KILLER INSTINCT: Dynamic Music Breakdown.” Uploaded by Maximilian Dood, July 19, 2013. <https://www.youtube.com/watch?v=LQmkSWPhINE>.

Of all the fighting games featured in my analysis, the one with the greatest amount of musical pivot points is absolutely *KI*. That said, these shifts do not detract from immersion because of how seamlessly they flow together. New loops are held back until they make sense within the formal structure of the music, allowing phrases to finish before the texture increases or decreases in density. As such, in spite of the fact that there are constant triggers such as movement, combos, and interactive game-states that cause momentum swings like combo breakers, each musical shift is timed and executed in a way that makes logical sense. Medina-Gray describes this approach to interactive composition as modularity. “In a modular system, a collection of modules—discrete chunks of music—goes through a process of assembly...according to rules programmed into the game...and are able to reflect and affect a player’s individualized gameplay experiences.”³¹ The fluidity of progression and regression between modules is something completely absent from *Street Fighter II* (1991) and *Tekken 7* (2015), and is one of the key ingredients that make *KI*’s combat feel so musical. There are official versions of character themes uploaded to composer Mick Gordon’s YouTube channel, each of which progresses over time in a linear fashion. Independently of these, however, anyone listening to the music that accompanies gameplay would have no knowledge that the modules are out of order: as Jesper Kaae states in his writing on multi-linearity, Stockhausen, and video game music, “no matter how the music is organized, it will always appear to be linear to the listener in a structural sense...”³² Shifts between modules feed into the affective side of the gameplay, minimizing the potential whiplash of each transition by pairing them with announcer cues and exciting in-game interactions. This also disguises the inherent non-linear nature of *KI*’s dynamic music, leaving the player’s immersion intact even though these

31 Medina-Gray breaks down the process of composing with modules in greater detail on p105 of *Music in Video Games*.

32 Kaae describes the function of linearity and non-linearity in dynamic music on p78 of *From Pac-Man to Pop Music*.

circumstances create a situation where, as Kaae also writes, “the computer is now the interpreter.”³³

As fighting games have been modernized, the role of the stage as a portrait of the character has been extended to include music more than ever before. In the past, it was much more common for composers to score setting as opposed to narrative; consider Dhalsim’s theme in *Street Fighter II*. Why? Firstly, I would argue that instrumental timbres and modes are sufficient to evoke a character’s nationality, even when limited by older arcade sound chips. Secondly, the majority of music featured in fighting games is instrumental, with the exception of samples and hooks like *Marvel vs. Capcom 2*’s (2000) “I wanna take you for a ride.” Songs written with verses and choruses are usually saved for opening cinematics when it comes to fighting games, but in the last decade of video games, composers have started incorporating more lyrics into theme music for their characters. This has proved to be a tremendously successful method for transmitting narrative, most noticeably in Platinum Games’s *Metal Gear Rising: Revengeance* (2013). The music and lyrics were done by Jamie Christopherson and Logan Mader. In this futuristic action hack-and-slasher game, fully written songs will play during boss fights against cybernetically-enhanced foes, giving the player insight into their life stories, attitudes towards combat, aspirations, and respective states of mind. Though exposition can sometimes feel like a chore compared to gameplay, the music of *Metal Gear Rising* takes exposition and forges it into a gripping, emotional spectacle, and people just love it.

It just so happens that *KI* came out later the same year as *Metal Gear Rising*, and it was also using lyrics for their character themes. Rather than accusing Mick Gordon of ripping off

³³ More of Kaae’s writing on how algorithms can be used to generate musical non-linearity and randomness can be found on p84 of *From Pac-Man to Pop Music*.

Christopherson, I believe that this is just an example of two artists using the same storytelling device due to its sheer effectiveness. How many fantasy stories can you think of that feature a prophecy, for example? It's an archetype—a vehicle—a means to an end; all that matters is using it well. Needless to say, *KI*'s theme songs with lyrics are expository in a way that is gripping and exciting, and all wrapped up with a perfect little bow called incredible production quality.

One of Mick Gordon's most viewed *KI* theme songs on YouTube is the one for T.J. Combo, a disgraced athlete on the path to redemption. This one is called *I'm Back (to Rise)*, and it features the rap vocals and lyrics of Omega Sparx. T.J. Combo, an African American man, was once a heavyweight boxing champion of the world, but in order to improve his punching power, he decided to place cybernetic implants in his arms. When this was brought to light, T.J. was ruined. *I'm Back (to Rise)* tells the story of T.J. Combo's rejection of the implants, his regrets over his past mistakes, and his aspirations to prove that his skills are for real. The old school hip-hop texture of the track is full of hard, bassy kicks that ooze with style and confidence. This, together with Omega Sparx's nimble and impassioned performance of the lyrics, makes for a song that is as fun to listen to as it is inspiring.

I used to be the flashiest star
Chilling with cash and cars
But somewhere lost my passion's heart
Now at the Combo gym, getting back my art
With the fury inside you can't match my spark

While one could argue that Omega Sparx is just T.J. Combo's mouthpiece here, the explicit use of "I" and "my art" tells a different story; the character is the one rapping and relaying his life story

to the listener. Combo is going back to the basics to completely reinvent himself as a man and a fighter.

It feels good without the implants in me
Here to show the world that my skill's more than skin deep
I charge in a wind speed, moving in a frenzy
Show I'm the champ, leave them something to envy
I stay defiant in the sweet science
Ready to rumble in the jungle on these weak lions
I'm a legend, a street giant
Think you can last three rounds against me, fool keep trying

What can these lyrics reveal about the character? Firstly, Combo wants to overcome his fall from grace. Secondly, he sees his opponents as underdogs that have to face him on his terms- he is the champ, and all others are challengers. Finally, although the lyrics radiate confidence and even arrogance, there seems to be a tacit understanding that he cannot ascend to his previous levels of acclaim without earning them all over again. Lyrics in fighting game theme music are a convenient way to teach players about lore, to score narrative in a setting-dominated genre, and to give the listener a reason to root for the character the music represents. In the case of T.J. Combo, his fervent desire to reclaim what his hubris cost him reflects self-awareness, but also an unwavering confidence in his abilities. Omega Sparx's lyrics portray a character who believes that he can overcome his past, and by proxy, the listener can believe in Combo as well. Doesn't everyone desire redemption in some way, shape, or form?

KI's music innovates on all fronts. Its optimization of dynamic pivot points creates music that is perfectly tailored for any match, fast or slow in pacing. Beyond specializing in interactive

music with seamlessly connected modules, *KI* also weaves narrative into its character themes, adding a dimension to its sonic world-building that sets it apart from other popular fighting game franchises. One of *KI*'s most unique characteristics in terms of gameplay and music, however, is the presence of Ultra Combos. A player who fully depletes their opponent's health bar will have an opportunity to continue attacking with no risk of retaliation, meaning that they can combo the loser for as long as their skill and resources allow. Because of this, Ultra Combos are a site for the gamer to demonstrate their individual virtuosity; a higher number of consecutive hits correlates to expertise. The opponent, having lost all of their health, no longer gets to use mechanics like combo breakers to escape. My experience as a musician has helped me realize that an Ultra Combo is much like a concerto's cadenza. Think about two people competing in a fighting game as a type of ensemble, for example. In a cadenza, all ensemble members drop out apart from the soloist, who is now free to demonstrate their musical proficiency without interference from other players.

The western classical concept of the cadenza is geared toward showcasing excellence and the tremendous amount of effort that goes into mastering a piece of music. An Ultra Combo works on a similar principle. How high can the player pump up the combo meter when their opponent is unable to fight back? The diegetic sound of the video game reflects this one-sided domination, but what makes Ultra Combos so fascinating is that each attack generates a note of nondiegetic music. *KI*'s Ultra Combos balance effortlessly upon the razor-thin edge between the diegetic and the nondiegetic, making them an example of what Collins refers to as "kinesonic congruence." Gesture and sound coalesce, outright dissolving the barrier between gameplay and music.³⁴ In this state,

³⁴ Summers provides his perspective on Collins's notion of kinesonic congruence as it relates to *Ocarina of Time* on p72 of *The Legend of Zelda Ocarina of Time- A Game Music Companion*.

the controller and avatar both become the player's instrument, meaning that analyzing Ultra Combos is ideal for elucidating how playing a fighting game can be a musical act.

I have selected several samples of Ultra Combos done with the character Glacius, an extraterrestrial cryomancer known for his projectiles and long range; a classic zoner. The first comes from a YouTube video by Data Squad Station, featuring an identical, thirty-one hit Glacius Ultra Combo performed on each of the different stages in *KI*. There is a predictable rhythmic cadence to these sequences (see Figure 4).

Glacius Ultra Combo Rhythm

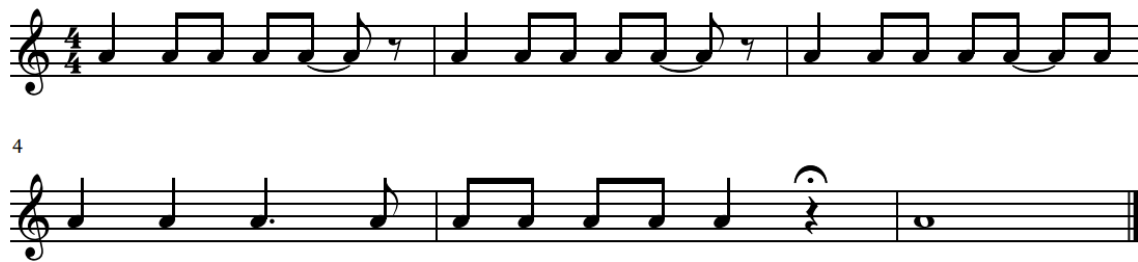


Figure 4- A Glacius Ultra Combo's Rhythm, Notated via Noteflight

While the rhythm of the Ultra Combo remains consistent, the pitch content varies from stage to stage. This is largely dependent upon each stage's signature sound and affect. The first Ultra Combo performed by Data Squad Station takes place in the aforementioned Tiger's Lair. The music that syncs up with the rhythm of Glacius's tackles, punches, stomps, and ice blades is driven by shouted vocals on the downbeats and an electric guitar hit that rises in pitch after each measure. The reason for the fermata is that before the final blow, Glacius will rear back, let out a

guttural battle cry, and then shoot one final pillar of ice out of the earth into his foe. The five eighth notes in a row starting at the end of measure four are an upward flourish scored by the guzheng. Each location treats the harmony and melodic contour differently, but Glacius Ultra Combos on stages for heroes are noticeably more consonant than those of more sinister fighters. At 3:00, Glacius does his standard Ultra Combo on the stage of Hisako, a terrifying and vengeful spirit inspired by the dark-haired Japanese ghost from *Ring* (1998). This Ultra combo finishes off with a low, thrumming tritone instead of a triumphant flourish.³⁵

My next sample is a ninety-eight hit Glacius Ultra Combo performed by none other than Maximilian Dood. He makes sure to include the word “musical” in the YouTube video title. The rhythm of this one is identical to the previous ones up to a certain point. Max interrupts the musical sequence after the first beat of measure four, allowing him to combo into a string of tackles and kicks that keeps the streak going for longer. The Ultra Combo melody is interrupted here by a tension-building rising orchestral glissando, and it is only at hit seventy-one that the combo-based music returns. This is what is referred to as a “Double Ultra,” which happens when a combo goes on for long enough to merit a second cycle of kinesonic congruence. Max’s rhythm during the second cycle is practically identical to that of Data Squad Station, with two exceptions. First of all, Max leaves the slightest bit more space in between some moves. Secondly, he finishes off with a multi-hit triple ice attack instead of Data Squad Station’s single pillar, getting in a few extra hits.³⁶ While the subject of Double Ultras is still fresh, there is technically no upper limit to the number of musical cycles possible in an Ultra Combo. The current world record for longest Ultra Combo

³⁵ “Killer Instinct Glacius Ultra All Stages.” Uploaded by Data Squad Station, June 5, 2015. <https://www.youtube.com/watch?v=guUUUWZwd5Q>.

³⁶ “Killer Instinct: Glacius 98 Hit Double Musical Ultra Combo.” Uploaded by Maximilian Dood, July 20, 2013. <https://www.youtube.com/watch?v=0F2hprUzBFw>.

belongs to YouTuber Mac von Kraft, who managed to perform a two-thousand-six-hundred-and-three hit combo with Hisako that lasted for over twenty-four minutes!³⁷

The final Glacius Ultra Combo sample comes from a YouTuber who goes by Nexus Wolf, and this one contains a grand total of one-hundred-and-seventeen hits. Once again, it makes use of the rhythm of attacks used by Data Squad Nation and Maximilian Dood, but with minor optimizations for a bigger combo. For example, instead of interrupting the first cycle of music on beat one of measure four, Nexus Wolf instead does so after the second beat, adding in another hit. He also opens the glissando section by spending two bars of meter on two shattering ice attacks. These hit a total of ten times, so the second cycle of music begins at hit eighty-one instead of Max's seventy-one. One final optimization is made by Nexus Wolf during the fermata. Glacius does a tackle into two more shattering ice attacks, tacking on eleven extra hits before rearing back for his final blow; the rising pillar.³⁸

What does this data show us about the underlying musical properties of Ultra Combos? For starters, the amount of cycles rewarded to the player is dependent on skill; the better your combos, the more music you can make. Secondly and more importantly, there is a definitive way to perform Glacius Ultra Combos for maximum duration and efficiency, marked by the fact that every sample featured a consistent rhythm generated by the same moves. This is why the comparison between Ultra Combos and cadenzas is so apt: both are executed through tactile sequences and maneuvers that need to be extensively prepared ahead of time. The combination of buttons and motions necessary for a Glacius Ultra Combo requires the player to plan, compartmentalize, and rehearse. In addition, it is not as though the player is practicing to perform something *resembling* music,

37 "Killer Instinct WORLD RECORD Hisako 2603 Hit Ultra Combo!!" Uploaded by Mac von Kraft, May 2, 2015. https://www.youtube.com/watch?v=jj_AyUKLeno.

38 "Killer Instinct: Glacius 117 Hit Ultra Combo." Uploaded by Nexus Wolf, September 26, 2015. <https://www.youtube.com/watch?v=aNWpW7jXAKI&list=LL&index=2>.

such as with the Daigo parry- Ultra Combos are musical by their very nature. The kinesthetic gesture of pressing buttons on a controller directly results in the simultaneous production of diegetic sound and nondiegetic music! Furthermore, it is because of Glacius's frame data and tool kit that certain attacks are allowed to combo into one another- the music made by this character's Ultra Combos sounds the way that it does due to these factors, imbuing it with further cadence and flavor. In the same way that a flute is different from a trombone, no other character in the *KI* roster can replicate a Glacius Ultra Combo. Thus, the gamer is playing two instruments; controller and avatar.

5.0 Conclusion

What is it that makes fighting games so uncommon in ludomusicology? Although their music can be studied and evaluated based on the same parameters as any other genre of video game, there simply is not much work on them. Why? Is it because of the disjointed transitions between game-states, what with the predictable flow from menus into the character select screens into combat? Perhaps. Maybe people think that the audiovisual experience of fighting games is all about cultural tropes, and that there is little else to unpack. Ludomusicologists speak of the genre in cursory acknowledgements and whispers. I earnestly hope that this will change. Musically and sonically, fighting games are the quintessence of battle, of generating intensity that rises in tandem with fierce conflict, and of selling the impact of each and every one of the player's moves. When they are complemented by sufficiently interactive scores and masterful foley work, they create a customized audiovisual experience unlike anything else in ludomusicology. What consequences will there be to the actions you choose? Will the game resound with crisp impacts and the announcer's exclamations as you make back-to-back perfect plays, or will you be humbled by the muted sounds of your blocked and whiffed strikes? There is only one way to know and to grow, and that is to play.

Studying fighting games reveals the intersecting points between playing music and playing video games. They are tactile. They are emblematic of persistence and discipline. They are virtuosic. They are beautiful, personal, and ever so deep. At the peak of mastery, the player is in perfect unison with what they hold in their hands, manipulating it so freely and so absolutely that it becomes an extension of the self. Is it a controller they are holding, or an instrument? What if it was both? Indeed, beyond the interface of player and controller, one must also consider the

interactivity between the player and their character; an instrument within an instrument, beckoning and challenging the wielder to master both. Timing, effort, knowledge, spirit, and the indomitable human thirst for excellence all converge on one point and manifest in fighting games, as well as in those who play them. Is that not sublime? Is that not art? It is no surprise that the people who play fighting games love them so dearly, for it is impossible to become great at them without unconditional, hungry devotion.

The cultures of fighting games and musicianship are more than simply adjacent; they are compatible- thrillingly, uncannily intertwined. It is inevitable that anyone making an earnest effort to improve at music or fighting games will learn the same skills; patience, resilience, and mechanical prowess. The practice. The struggle. The constant search for new information and new perspectives. Humility, community, rivalry, friendship, and mentorship. Basking in the majesty of a master's perfection, and striving for greater heights. Did the people in the venue during the Daigo parry feel the same way as Paganini's starstruck audience did, centuries ago? I cannot know for certain. What I *do* know is that fighting games deserve every ounce of appreciation they receive from the FGC, and that I am grateful for the opportunity to show what makes them consequential. Hopefully, by sharing my love with other music scholars, I can open the door for more discussion on the music and manifold musical qualities of fighting games. To the future ludomusicologists who feel the same, it's time to get ready for the next battle!

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