The Dynamic Battle Music of *The Legend of Zelda: The Wind Waker*

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Abstract

The music of videogames must react to the input of the player, adapting to in-game action that will rarely, if ever, unfold the same way twice. For this reason, most modern videogames employ dynamic music that strategically sequences several musical modules in coordination with in-game events. Nintendo has become known in recent years for its masterful use of dynamic music, and the company's 2002 game *The Legend of Zelda: The Wind Waker* represents a particularly inventive early effort. This paper provides an analysis of the dynamic aspects of the soundtrack of *Wind Waker*, focusing on the game's combat sequences. Building off the work of Elizabeth Medina-Gray, this paper provides definitions of key terms in the nascent field of ludomusicology by using examples from *Wind Waker*. This paper describes in detail the music of four combat sequences: "Phantom Gannon," "Fencing Instruction," "Maritime Battle," and "Battle." Full transcriptions for the latter three are provided as appendices. I argue that many aspects of the game's dynamic soundtrack constitute "micky-mousing," a term used to describe film music that cartoonishly mimics the on-screen action. In the context of *Wind Waker*'s cartoon-like visual style, this technique both enhances the aesthetic of the game and provides helpful feedback to the player.

Introduction

The music of the videogame series The Legend of Zelda ranks among the most iconic in the industry. One strength of recent games within the franchise is their masterful use of music that adapts to the input of the player. So-called *dynamic music* changes in real time in response to player input. In this paper, I discuss the dynamic aspects of the music of 2002's *The Legend of Zelda: The Wind Waker*.[1] Though the music of *Wind Waker* differs with every playthrough, it always synchronizes with the in-game action. At times, the music reflects the player's actions so perfectly that it sounds cartoonish. This is exactly what Nintendo was going for. The dynamic music in *Wind Waker* enhances the deliberately cartoonish aesthetic of the game. It also provides valuable and rewarding feedback to the player.[2]

Wind Waker was released December 13, 2002, in Japan and March 24, 2003, in North America. The music is credited to Kenta Nagata, Hajime Wakai, Toru Minegishi, and Koji Kondo, though it is Kondo's name that is most frequently cited in reference to the music of the Zelda series.[3] In *Wind Waker* – as in most other entries to the series – the player assumes the role of the hero Link as he quests to save the world from the villain Ganon. *Wind Waker* stands out from prior entries to the series for its cartoon-like appearance; rather than continuing to move towards increasingly life-like characters, Nintendo used a graphical technique called cel-shading, which renders 3-D graphics to look like 2-D cartoons. This aesthetic, I argue, is reflected as much in the game's music as in its visuals.

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[1] Nintendo Co., Ltd., *The Legend of Zelda: The Wind Waker,* videogame for Nintendo Gamecube, 2002.

[2] Throughout this essay, the term *player* will refer to the real human being who is at the controls. Any reference to a *character* refers to the fictional, in-game entity.

[3] These names appear – in that order – in the credits that roll upon completion of the game. Koji Kondo received sole credit for the role of sound composer on the first game of the series, and much of that original soundtrack survives in the music of *Wind Waker*.

In this paper, I first define some terminology in the context of *Wind Waker* and provide

musical examples. I then focus more narrowly on the music played during the game's various

battle sequences, as the dynamic techniques used therein are particularly intricate. I have

transcribed and attached as appendices the music that accompanies three particular battles. The

first piece of music, titled *"Fencing Instruction,"* occurs during a tutorial sequence early in the

game. The second, titled "Maritime Battle," occurs during encounters with minor (non-boss)

enemies found in the game's ocean overworld. The third, titled simply "Battle," is played during

encounters with minor enemies found on land.[4] Each example provides a microcosm of the use

of dynamic music both in videogames generally and in *Wind Waker* specifically.

Background and Terminology

Karen Collins, whose writings permeate scholarship of videogame music, defines

dynamic audio as "sound that reacts to changes in the gameplay environment and/or in response

to a user."[5] This is a broad category that encompasses nearly the entire audio output of many

games, as most game music is influenced by player action in one way or another. Collins

therefore further delineates two kinds of dynamic audio: *interactive* and *adaptive*. She defines

interactive audio as "sound events directly triggered by the player, affected by the player's input

device."[6] Such events provide some of the most overt examples of auditory communication with

the player. Collins defines *adaptive* audio as "sound that reacts to the game states, responding to

various in-game parameters such as time-ins, time-outs, and so on."[7] A clear example is the

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[4] Titles for the three pieces of music are taken from the game's official soundtrack: Koji Kondo, Toru Minegishi, Hajime Wakai, and Kenta Nagata, *The Legend of Zelda: The Wind Waker Original Sountrack*, ASIN: B000BD768U.

[5] Karen Collins, *Game Sound: An Introduction to the History, Theory, and Practice of Videogame Music and Sound Design* (Cambridge, MA: The MIT Press, 2008), 184.

[6] Karen Collins, "An Introduction to Procedural Music in Video Games," *Contemporary Music Review* 28, no. 1 (February 2009): 6, DOI: 10.1080/074944608026639835.

[7] Collins, *Game Sound*, 139.

looping music that accompanies a specific area of a game. Such *environmental* music is dynamic because it is under the control of the player who can leave the area at will, thus ending the music or causing a transition to a new cue. However, environmental music is not caused directly by player input, and so is adaptive rather than interactive.[8]

Another helpful delineation of game audio is described by Elizabeth Medina-Gray in her dissertation "Modular Structure and Function in Early 21st-Century Video Game Music."[9] In it, she describes three additional categories of game audio: the *score*, *sound effects,* and *character-produced music.* Character-produced music, aptly named, is music created diegetically by a character in the game. In *Wind Waker,* many characters play music, including Link himself, who "conducts" music on his magical baton (an example of interactive audio – see Example 2 below).

Sound effects are associated with particular actions and serve to provide the player with immediate feedback for her actions. They need not sound realistic. As Medina-Gray points out, sound effects can themselves be quite musical "either because they feature certain characteristics typical of music… or because these sounds fit in the context of the score or other musical content."[10] Often, short melodies or single musical pitches function as sound effects. Such *earcons,* as Medina-Gray dubs them, are regularly heard in *Wind Waker.* Musical tones, intervals, and short melodic phrases comprise many of the cues that accompany player action. Figure 1 shows ten distinct earcons I found within the game's pause menu, each accompanying a specific action taken by the player.[11]

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[8] Perhaps the only videogame audio which is in no way dynamic is that which occurs during scripted, non-interactive scenes used to further a game's story. These cues have the most in common with those in film, and Wind Waker has a few such scenes. Two examples from the official soundtrack are "The Legendary Hero," and "A Mysterious Giant Bird Attacks."

[9] Elizabeth Medina-Gray, "Modular Structure and Function in Early 21st-Century Video Game Music" (PhD diss., Yale University, 2014), ProQuest (UMI 3580771).

[10] Medina-Gray, "Modular Structure," 6.

[11] Medina-Gray additionally provides transcriptions of the earcons that accompany dialog screens in *Wind Waker* in Medina-Gray, "Modular Structure," 197.
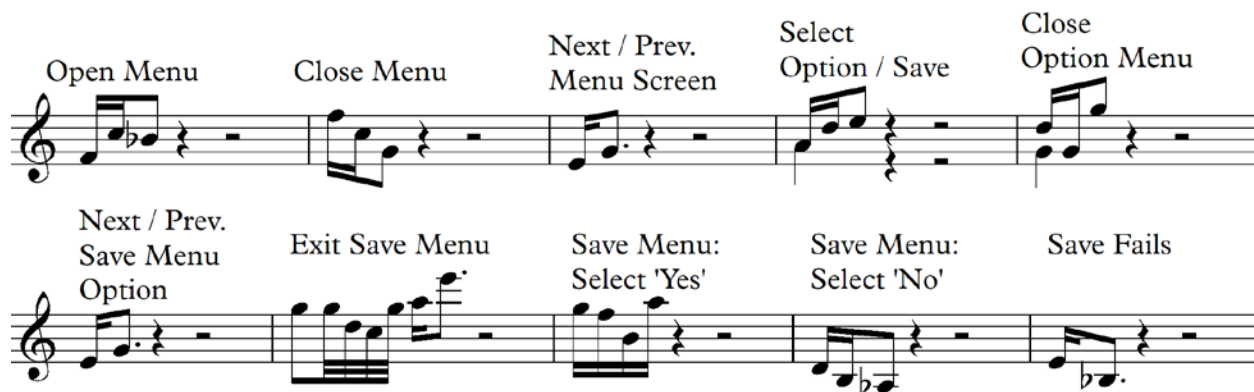
Figure 1. Musical earcons in the start/pause menu

Wind Waker frequently uses music to enhance non-musical sound effects. In many of the game's battle sequences, successful attacks against enemies are rewarded with short musical cues in addition to the standard non-musical sound effects that represent slashing swords and fantasy combat. Unlike earcons, these musical cues are not merely layered on top of the accompanying score; they seamlessly integrate with it, enhance it, and provide feedback to the player (for example, see the discussion of the "Battle" music below and in Appendix C).

Finally, environmental music is part of a game's *score*, which Medina-Gray defines as "the (mostly) continuous music that accompanies gameplay, often for minutes at a time," and is "perhaps the component that most people think of as 'game music.'" She continues, "Unlike in films, however, the score in games is affected by the game's events and the player's actions."[12] Such dynamicity is possible because game music is not written as a single, through-composed piece. Instead, game music consists of a series of musical *modules*, which Medina-Gray describes as "fixed pieces or segments of music anywhere from a fraction of a second to several minutes in length."[13] Modules can play sequentially or simultaneously; they can transition abruptly or with a gradual cross-fade; and their combination can sound consonant or dissonant. It

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[12] Medina-Gray, "Modular Structure," 5.
[13] Medina-Gray, "Modular Structure," 3-4.

is the careful coordination of multiple modules that allows game audio to adapt to the player's input. Indeed, the process of creating dynamic music in videogames can be described as the process of manipulating the *seams* between distinct musical modules.

It is the *modularity* of videogame music that truly sets it apart from that of other entertainment media. Karen Collins describes the challenge of composing for videogames with a helpful analogy in her essay "An Introduction to the Participatory and Non-Linear Aspects of Video Games Audio." She writes:

> A composer of music for linear media can predict how the music will sound from beginning to end for the listener, and compositions are constructed with this aspect taken for granted. The music of non-linear media like video games, however, works more like a major urban metro: At any time, we may want to be able to hop off at one station and hop onto another train going in a new direction. We may not get on at the end of this new train, but perhaps on one of the middle cars. The train may choose to speed up at night, or slow down through built-up urban areas. Every audio cue (train car) must be designed to stand alone, since there is no way to predict its hundreds of possible directions: There is no "correct" sequence of events for the train to follow. A unique relationship arises, then, between these cars and tracks, working with and connecting to one another.[14]

Medina-Gray's dissertation establishes a framework by which we can analyze the seams between musical modules. Crucially, she coins two new terms. If two or more modules interact, overlap, or transition in a way that sounds uninterrupted or such that "the second module sounds believably like a continuation of the first,"[15] then we describe the resulting seam as *smooth*. A seam that does not exhibit these characteristics is, to this extent, *disjunct*. The degree of *smoothness* or *disjunction* between any two modules can be assessed along seven elements of music: volume, tempo, rhythm, key, harmony, texture, and style, each of which Medina-Gray

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[14] Karen Collins, "An Introduction to the Participatory and Non-Linear Aspects of Video Games Audio," in *Essays on Sound and Vision*, ed. Stan Hawkins and John Richardson (Helsinki, Finland: Helsinki University Press, 2014), 1.

[15] Elizabeth Medina-Gray, "Meaningful Modular Combinations," in *Music in Video Games: Studying Play,* ed. K.J. Donnelly, Willima Gibbons, and Neil Lerner (New York: Routledge, 2014), 105

discusses in detail in her dissertation. In this way, two modules may be harmonically smooth yet rhythmically disjunct if they are in the same key, but a different meter or tempo.

Wind Waker as a Case Study

A smooth transition between modules can be heard in *Wind Waker* when the character sets sail into the open ocean that connects each area of the game (the game's *overworld*). As Medina-Gray describes, if it is daytime and no enemies are present when the character sets sail, the game will first play a non-looping cue which she titles "Ocean Intro." When "Ocean Intro" ends, it transitions into the looping "Ocean" cue so smoothly that the player will likely never notice the seam at all. Both "Ocean" and "Ocean Intro" are examples of what Medina-Gray calls *vertically synchronized systems of looping modules*: each is composed of two simultaneously-sounding looping music cues, in this case, the accompaniment (which she titles Ocean Intro 1 and Ocean 1, respectively) and the melody (Ocean Intro 2 and Ocean 2). While the character is sailing at speed, both modules sound (Ocean Intro 1+2, or Ocean 1+2). However, if the character stops his boat or jumps out of it, the melody module fades out while the accompaniment module (Ocean Intro 1 or Ocean 1) continues. The effect is that the music becomes more exciting when the character is moving, and more subdued when the character is still.[16]

In *Wind Waker*, as in most videogames of its generation, smoothness tends to be an aesthetic goal, yet disjunction abounds, largely as a result of the game's central mechanics. For example, the menu cues (Figure 1) can be triggered at almost any time during normal gameplay. If they play over environmental music, the resulting seam could be harmonically smooth or

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[16] Medina-Gray, "Modular Structure" 163. This characterization may or may not reflect how the music is actually programmed within the game. For example, it may be more appropriate to describe each track of the music as belonging to the same module. Perhaps the game simply mixes the tracks dynamically, muting some tracks and unmuting others when programmed to. In either case, the concept of modules is useful as a way of describing the effect of the programming.

disjunct, depending entirely upon the environmental music's sounding harmony. Indeed, Medina-Gray is careful to note that disjunction is "appropriate in certain situations precisely because the modules remain distinct, and because their jarring combinations can serve dramatic and/or usability functions"[17]

One such function is to create an auditory boundary between different in-game locations. The incurring seams between environmental music cues can be quite disjunct, and this may be deliberate. Medina-Gray describes the seam that occurs when the character sails to an island that has its own environmental music, writing:

> This musical disjunction is the only indication that the player has moved from one area of the game to another, wince *Wind Waker* provides no other cues (visual, aural, or tactile) to mark the boundary between island and open ocean. The music is here entirely in charge of *creating* this boundary (a boundary which occurs, indeed, in the water surrounding the island). In short, it is the music that most clearly defines this part of the game's virtual landscape for the player.[18]

Videogames also frequently use disjunct module transitions to signal proximity to an enemy. In *Wind Waker*, when the player's character comes within a certain distance of an enemy, the environmental music transitions via a quick cross-fade into a new musical cue. That new cue will be "Maritime Battle" if the encounter occurs while at sea and "Battle" if the encounter occurs on land. The resulting seam is nearly always disjunct, as the two battle cues strongly contrast with most of the environmental music found within the score.

Changing environmental music and enemy proximity music (or battle music) is typical for adventure games (like those in the *Legend of Zelda* series). Indeed, musical menu cues (earcons) are more common than not in Nintendo games, which are known for providing some of

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[17] Medina-Gray, "Meaningful Modular Combinations," 105.
[18] Medina-Gray, "Modular Structure," 152. In section 3.2.1 of "Modular Structure," Medina-Gray discusses at length the seams between environmental music cues in *Wind Waker* as the character moves between the overworld and various island cities.

the clearest examples of musical communication with the player.[19] However, it is my contention that *Wind Waker* is a more overtly musical game than most.

While this essay is most concerned with the way dynamic music communicates with the player, it is worth noting that even the non-dynamic elements of *Wind Waker's* score contain a wealth of information accessible to an observant player. In his essay "Thematic Unity Across a Video Game Series,"[20] Jason Brame identifies several structural and motivic relationships between the various musical themes found throughout the Legend of Zelda series. He argues that these relationships can signal specific meanings to the player (though he hesitates to identify precisely what those meanings are). A similar analysis is provided by Justin Daniel Sextro in his master's thesis entitled "Press Start: Narrative Integration in 16-Bit Video Game Music."[21]

The distinctly musical nature of the Zelda franchise was cemented in 1998 with the release of *The Legend of Zelda: Ocarina of Time*.[22] In *Ocarina of Time*, the player can use her input device to make the character play an ocarina. Many performances of the same short melodies are required during the game, so it is advantageous for the player to memorize them. In this way, the game encourages – even requires – the player to exhibit at least some musicality. As Sarah Teetsel notes in her master's thesis "Musical Memory of the Player, Characters, and World of *The Legend of Zelda* Video Game Series," *Ocarina of Time* was "the first game of the

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[19] For an entertaining discussion of some of the most dramatic uses of dynamic music in videogames, see Mark Brown, "Adaptive Soundtracks | Game Maker's Toolkit," YouTube video, posted on *Game Maker's Toolkit,* November 6, 2014. As Brown notes, "Nintendo is obsessed with this stuff, especially in the Mario and Zelda games."

[20] Jason Brame, "Thematic Unity Across a Video Game Series," *ACT – Zeitschrift für Musik & Performance,* no. 2 (July 2011), http://www.act.uni-bayreuth.de/en/archiv/2011-02/02_Brame_Thematic_Unity/index.html.

[21] Justin Daniel Sextro, "Press Start: Narrative Integration in 16-Bit Video Game Music" (master's thesis, Truman State University, 2012), ProQuest (UMI 1598475).

[22] Nintendo Co., Ltd, *The Legend of Zelda: Ocarina of Time*, videogame for Nintendo 64, 1998.

[Zelda] series to include widespread musical education and performance for the main character."[23]

Wind Waker retained this mechanism but in an altered form. As Teetsel describes:

> Rather than have Link use a musical instrument, he is presented with a baton that functions as if it were one. When Link conducts, he chooses the time signature from 3/4, 4/4, or 6/4 time, each of which comes with its own tempo and set of notes. The music occurs from an invisible, heavenly wordless choir, who follows Link so precisely [it is] as if he were playing the notes directly.[24]

As in *Ocarina of Time*, performing specific melodies will accomplish specific in-game tasks, like changing day to night, changing the direction of the wind, or allowing the player to control a different character. However, the player is also free to create their own melodies for no reason other than to have fun. Figure 2 shows the three sets of five notes that are available to the player depending on which direction the joystick is held.

Figure 2. Baton notes[25]

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[23] Sarah Teetsel, "Musical Memory of the Player, Characters, and World of The Legend of Zelda Video Game Series" (master's thesis, Bowling Green State University, 2015), ProQuest (1601132), 2.

[24] Teetsel, "Musical Memory," 7.

[25] This example is corrected from that which appears in Teetsel's paper. In her work, she incorrectly transcribes each F♮ as an F♯, thus erroneously concluding that the notes in the first two systems outline a D major tonality. I have also adjusted the tempo markings to reflect my own measurements.

While most enemies within *Wind Waker* will grunt, roar, or yell, certain enemies instead "speak" in musical pitches. The minor enemy known as a miniblin can make four noises, shown in Figure 3. Each is a musical pitch or interval sung to the syllable "na" or "nai."

Figure 3. Miniblin noises

Another minor enemy, a rolling ball that sticks to and slows down the character, makes the sound of a pitched percussion instrument (a marimba or tabla, maybe) as it rolls around.

Wind Waker also provides many examples of what Zach Whalen, in his 2004 master's thesis "Play Along: Video Game Music as Metaphor and Metonymy," defines as *metonymy*: music that "corresponds to the syntagmatic structure of a game's progress (e.g., 'reward' music played after successfully completing a level)."[26] Perhaps the most iconic example is the "secret" cue, shown in Figure 4, which plays every time the player solves a puzzle. This melody (to my knowledge) has appeared in every entry to the franchise and signals to the player that she has solved a puzzle.

Figure 4. Secret cue

Metonymy abounds in *Wind Waker*. Every boss battle ends with a triumphant song, and every opened treasure chest triggers a short brass fanfare that the player will hear many times by

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[26] Zach Whalen, "Play Along: Video Game Music as Metaphor and Metonymy," master's thesis (University of Florida, 2004), 3, http://etd.fcla.edu/UF/UFE0004911/whalen_z.pdf.

the end of the game. In many cases, musical earcons provide more valuable feedback to the player than the visuals do. For example, the character at one point acquires a boomerang which can lock onto up to five separate targets before it is thrown, generating the notes shown in Figure 5. Each time the boomerang locks onto a target, an interval of a perfect fifth sounds. For each successive target selected, the pitches raise by one whole-step. The effect is that locking onto five targets causes the game to play the first five notes of a whole tone scale,[27] and the player can quickly tell by sound alone how many targets she has selected.

Figure 5. Boomerang selection notes

Perhaps the most striking use of *metonymy* within *Wind Waker* occurs during the various battle sequences within the game, in which a successful sword attack against an enemy is often rewarded with a short musical cue that contributes to the drama of the accompanying score. In at least two cases, the character's attack can also trigger an immediate transition to the beginning of a looping music module. One such case is found within the "Fencing Instruction" sequence, discussed further below. The other can be heard on the two occasions within the game in which the character fights a mini-boss enemy called Phantom Ganon.

Phantom Ganon and "Mickey-Mousing"

Phantom Ganon (so-called because he is a ghost-like version of the game's principal antagonist Ganon) throws balls of magic at the character as his main attack. To counter, the

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[27] In fact, two (both) whole-tone scales are suggested simultaneously, as the P5 interval does not occur diatonically within a single whole-tone scale. This is quite clever on the part of the sound designers, as it ensures a consistent degree of smoothness and/or disjunction with the accompanying musical cues.

character swings at them with his sword. A successful hit sends the ball of magic flying back to Phantom Ganon who, in turn, volleys it a little more quckly back toward the player. If the player wins the ensuing short tennis rally, Phantom Ganon will be hit by the ball, stunning him and allowing the character to attack him directly.

The music that accompanies the entire sequence is in the key of C minor. Each time the character successfully hits the energy ball with his sword, an accompanying musical *stinger* – also known as a stab (quick shock chord)[28] – plays. The first hit sounds as the note C. Each successive hit raises the pitch by one semi-tone – C♯, D, D♯, E, then F. Additional successive hits continue to sound as an F until, when Phantom Ganon is finally hit by the energy ball, a triumphant stinger plays on G (the dominant of C), and then the "Phantom Ganon" music loop starts over. If the character instead loses the tennis rally, the music loop continues uninterrupted, and the next stinger begins again on a C. Using this system, the game generates music that perfectly reflects the action: as the ball of magic moves faster and faster and the rally increases in difficulty for the player, the notes rise chromatically in pitch toward the dominant of the key. When the player scores a hit, the music triumphantly resolves back to the tonic.

So precisely does the music accompany this sequence that it could be appropriately described as *mickey-mousing*, a term Mervyn Cooke, writing about film music, defines as "illustrative musical effects synchronized with specific events in a film's physical action."[29] In film music, the term is often used pejoratively. As Cooke describes, "After its initial popularity in serious sound films of the Hollywood Golden Era, mickey-mousing became discredited for its essential redundancy and frequent crudity."[30] However, videogames and cartoons seem to

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[28] Karen Collins, "An Introduction to the Participatory," 5.
[29] Mervyn Cooke, *A History of Film Music,* 3rd ed. (Cambridge: Cambridge University Press, 2010), 29.
[30] Mervyn Cooke, *A History of Film Music*, 29.

benefit tremendously from the effect. In fact, Whalen argues that cartoon music provides a stronger parallel to videogame music than film music does. He writes that both game and "cartoon audiences must suspend a significant amount of disbelief about the emulated reality of both the cartoon and the game world to perceive the character's actions within that world as coherent."[31] He goes on to suggest that "the point may be to provide a humorous counterpoint to the visual of the violence and to characterize the violence as not hurtful so that we laugh at it."[32] Indeed, he reports that "studies of cognition have corroborated this observation with results which suggest that objects are perceived as alive and exhibiting anthropomorphic behavior when their motions are accompanied by a synchronized soundtrack."[33] While many videogames make use of mickey-mousing to varying degrees, the technique is particularly well-suited to *Wind Waker*, as it enhances the cartoonish visual style that defines the aesthetic of the game.

Example One: "Fencing Instruction"[34]

Another striking example of *Wind Waker's* use of dynamic music to communicate with the player during battles can be heard in the game's very first combat sequence. Early in the game, just after the character gets his first sword, the player is presented with a short tutorial sequence in which an elderly fencing master teaches the basics of sword combat by having the player perform a series of specific attacks. Just as in the "Phantom Ganon" sequence, in this "Fencing Instruction" sequence, successful hits are rewarded with a short musical cue – in this case, one of a series of ascending triads in the key of G major. The music sounds deceptively

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[31] Zach Whalen, "Play along," 26.
[32] Zach Whalen, "Play along," 27.
[33] Zach Whalen, "Play along," 27.
[34] My full transcription is attached as Appendix A.

simple, and indeed it is much easier to understand the mechanisms described herein by observing them directly.

The sequence begins with a short introductory module which establishes the key of G major. Throughout the sequence, the bass and drum play a repeating two-measure pattern (Loop #1) shown in Figure 6. After the introductory module and before the first successful strike, this loop repeats indefinitely.

Figure 6. Fencing Instruction Loop # 1

Upon the character's first successful hit against his trainer, the first of a series of stinger chords plays, and the module immediately transitions to a new four-measure sequence, here entitled Stinger Module. The Stinger Module is itself dynamic; the first two measures of the string track (the stinger itself) change depending on how many strikes have successfully hit their target. Stinger #1 is a G major triad. Figure 7 shows the Stinger Module employing Stinger #1.

Figure 7. Fencing Instruction Stinger Module (bass & drum staves omitted)

Without any additional input from the player, these four measures transition seamlessly into a second four-measure loop (Loop #2). Loop #2 is just like Loop #1 but for the addition of a line played by the xylophone,[35] shown in Figure 8. The added xylophone track signals to the player that the fight has begun in earnest.

Figure 8. Fencing Instruction Loop # 2 (bass and drum staves omitted)

Each additional successful hit scored by the player causes the game to immediately transition back to the Stinger Module, except the stinger in the first two measures is replaced by the next one in the sequence. The sequence of stingers, shown in Figure 9, outlines an ascending chord progression that creates a strong cadence as the player scores additional hits. Note how the F# major chord – the most unresolved chord and the one that had the strongest pull to the tonic G major – occurs on Stinger #7, just before the final strike (Stinger #8, a G major chord).

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[35] Or perhaps another pitched percussion instrument like the marimba. Ultimately, the sounds did not originate from real instruments, so it's up to the judgment of the listener to decide what specific instrument is represented by the synthesized tone.

Figure 9. Fencing Instruction Stingers

The player cannot tell by just looking that she is nearing completion of her task. The game does not specify that the trainer must be hit eight times. However, a musically observant player can tell simply by listening that she is nearing the end of the tutorial section, as she can hear the cadence approaching. In this way, the game is communicating to the player even more with music than with visuals.

The entire "Fencing Instruction" sequence sounds cohesive. Every seam between modules sounds so smooth as to be unnoticeable. This is because the modules share so much in common. The bass line and drum pattern, for example, remain constant throughout the sequence. The only seam at which disjunction can be heard occurs at the abrupt transition to the Singer/Hit Module. The transition occurs the moment the trainer is hit by the character's sword, and the player is free to attack at any time she chooses. This means that, should the player's attack land

between beats, the meter of the music may be interrupted. The resulting seem can be rhythmically and metrically disjunct. However, the consistent and repetitive drum pattern (mostly 8th notes), the static harmony (G major), and the simple bass line (only 2 distinct notes, G and D) disguise the disjunction so effectively that the player will likely never notice it.

Example Two: Maritime Battle[36]

 The various musical elements that accompany battle sequences within *Wind Waker* are among the most compositionally diverse and inventive. Nearly every major enemy (boss) has a unique accompanying theme that plays during its battle sequence. Most, in fact, have two or more themes, each accompanying a specific section of the battle. For example, Gohma, the boss that appears at the end of the first major dungeon (Dragon Roost Cavern), is associated with five musical modules. When first encountered, the short introductory module "Gohma Appears" plays. The game then smoothly transitions to the looping module "Gohma Battle First Half." After the player has inflicted sufficient damage, a short animation plays and the second phase of the battle begins, accompanied by the looping module "Gohma Battle Second Half." The two looping modules are thematically related, but the second is noticeably faster and tenser. Towards the end of the game, the player must fight Gohma once again, but this time it is understood that Gohma is a mere apparition. Two new, but again thematically related modules accompany this battle: "Gohma First Half (2nd Time)" and "Gohma Second Half (2nd Time)." Each follows the form of its corresponding earlier module but replaces some instruments with vibrato-laden electronic synthesizers that convey an additional sense of unease.[37]

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[36] My full transcription is attached as Appendix B.

[37] As an even more dramatic example: a total of six distinct modules accompany the six stages of the battle with Puppet Ganon (not to be confused with Phantom Ganon), who is encountered near the end of the game.

It is perhaps surprising that the game has so many unique compositions for boss enemies as, in a normal playthrough, each composition will be heard only once. On the other hand, the two modules that accompany common enemies will be heard repeatedly throughout the game. One of these, "Maritime Battle," plays during encounters with minor enemies while at sea and is discussed thoroughly by Medina-Gray in section 3.2.3 of her dissertation. As she writes:

> When Link comes into close proximity with a minor enemy, the ocean's normal environmental music fades out at the same time as new looping music – Early Combat – fades in. Where this first music is upbeat and melodic – a soundtrack for adventure – the new music is ominous and dark… This change is triggered because an enemy surfaces close to Link while he is sailing, but the trigger can also occur if, for example, Link approaches a visible monster, or a monster approaches Link while he sits still.[38]

As with the "Ocean" modules, described above, two sets of vertically synchronized musical modules comprise the "Maritime Battle" sequence. When an enemy is close enough to the character, a four measure loop (Early Combat) plays. This loop will play indefinitely until the enemy is no longer in proximity (at which point the environmental music, if any, will resume) or until the character hits or is hit by the enemy. Once this first strike lands, the Early Combat module will play to the end of the current measure[39] then smoothly transition to the Late Combat module. Medina-Gray writes, "This music is closely related to the Early Combat loop in several respects, and indeed begins with nearly exactly the same musical material, but the Late Combat music is several times longer than this earlier music, it incorporates more instruments, and it progresses through much more and varied harmonic and melodic material."[40]

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[38] Medina-Gray, "Modular Structure," 166.
[39] Medina-Gray writes that the "Early Combat" module will transition only after measure 2 or 4, whichever comes first. I have not found this to be the case. My research has lead me to believe that the module can transition after any of the four measures of the loop.
[40] Medina-Gray, "Modular Structure," 169.

Both the Early Combat and Late Combat modules are comprised of two vertically

synchronized loops of music. The accompaniment loops (Early Combat 1 and Late Combat 1,

respectively) play throughout the sequence. Early Combat 2 and Late Combat 2 are added only

when the character is in his boat. Each contains a percussion track. Late Combat 2 also adds a

piccolo track.[41] These additional modules add drama and tension to the battle, which is

appropriate because the stakes are higher for the character when he is in the boat: Link can

neither be hit by enemies nor move quickly when swimming. He is also knocked out of his boat

when hit by an enemy, so the player will frequently hear the dynamic music change intensity to

mirror the ensuing naval action.

Medina-Gray describes the seam between the Early Combat and Late Combat modules as

entirely smooth, citing the rule by which Early Combat can only transition to Late Combat at the

end of a measure. She writes,

> With these very limited possibilities, the meter (and hypermeter) always
> continues perfectly across the seam, most of the instrumentation remains
> constant, and all or most of the pitch classes that begin 'Late Combat' are present
> in the prevailing macroharmony before the seam. Volume, abruptness, and
> continuations of rhythmic patterns all contribute smoothness as well. Such a
> smooth seam yields an effect similar to the seam between the Ocean loop and its
> introductory module: the Early Combat and Late Combat modules combine into
> a single piece of music.[42]

And indeed the two modules are presented sequentially, under the same title ("Maritime Battle")

on the official soundtrack.

Medina-Gray ends her discussion of the "Maritime Battle" sequence with a perfect

summary of the effect of this dynamic battle music on the player. She writes:

> With this entirely smooth (indeed, essentially seamless) seam, this moment of
> musical change in itself is not likely to convey critical information about the
> virtual environment or its events; this shift does not serve a usability function in

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[41] Or some kind of MIDI flute.
[42] Medina-Gray, "Modular Structure," 170.

the way that the shift from normal Ocean to Early Combat music does. This modular shift does, however, allow the combat music to advance subtly with the player's progress through a dangerous situation, from the relatively low-key (but still dangerous) first moments of combat to a more advanced combat stage in which Link or the enemy (or both) have taken and/or dealt damage. In other words, the combat music is at once perfectly continuous and flexible enough to accompany the dynamic events of combat gameplay.[43]

Example Three: Battle[44]

If Link meets an enemy while on land, a different sequence of modules plays. This sequence, titled simply "Battle," operates very similarly to "Maritime Battle" but with a few interesting differences. Land-based battles occur more frequently than sea-based battles, and so "Battle" will he heard more regularly and for longer durations than "Maritime Battle" during a normal playthrough.[45] Importantly, Link can also use his sword on land, and, just as in the "Phantom Ganon" and "Fencing Instruction" sequences, the music here is designed to strongly mirror the swordplay.

The music itself sounds tense and unresolved throughout – fitting for battle music. Although it is in the key of F Dorian, it never strongly suggests any cadences. Instead, the underlying thematic material consists of a series of rising quartal harmonies (voicings using mainly P4, P5, M2, and m2 intervals) that use many chromatic passing notes. The last measure of each phrase alters the harmony, briefly interrupting the sound of F Dorian. Even the meter is somewhat ambiguous. As I have notated it,[46] Early Combat and the first half of Late Combat are in 3/2. This reflects the music's structure, in which phrases are three, six, or twelve half-notes

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[43] Medina-Gray, "Modular Structure," 170.

[44] My full transcription is attached as Appendix C.

[45] Of course, every playthrough will be different, so an individual could easily choose to spend more time playing on the game's ocean overworld than on land. My estimation was based on my own playthroughs, and those I saw posted to YouTube.

[46] My metric notation differs from that found in *The Legend of Zelda: The Wind Waker Piano Solo Arrangement*, (DOREMI Music Publishing, released on April 30, 2003). In that volume of easy piano music, the music is written in 4/4, then 3/4.

long. Late Combat, however, concludes with six measures of 12/8, subdivided into four sets of three eighth-notes each. Although the eighth-note pulse remains consistent through the metric modulation, the new subdivision makes the music sound faster. This adds appropriate tension to a battle that has lasted long enough to reach this point in the music.

The "Battle" sequence again has two halves. When Link first comes into proximity with an enemy, the environmental music will quickly fade into the Early Combat loop. Early Combat will repeat indefinitely until Link either hits or is hit by an enemy. At that point, the module will progress until the next bar line, then transition into the Late Combat loop. Like before, the seam between Early and Late Combat will be nearly inaudible to all but the most observant players, as the first two measures of Late Combat are nearly identical to those of Early Combat, and the rules that govern the transition ensure metric smoothness.

Each half is a system of vertically synchronized looping modules. In this case, there are four distinct modules. Following Medina-Gray's lead, I have assigned each a number. Early Combat 1 sounds at all times and consists of low arco strings and mid-range brass that outline the above-mentioned rising quartal harmony. Early Combat 1 also contains a piccolo track, which sounds only at a few dramatic moments in the score. Early Combat 2 sounds only when the character is very close to an enemy, approximately within striking range. It adds low brass, which mostly double the low strings, and a snare drum, which plays a militaristic rhythm of 16th and 32nd notes.

Early Combat 3 and 4 never play simultaneously. The former plays only when Link's sword is sheathed and the latter only when it is unsheathed. Before beginning combat, as Link approaches an enemy, his sword will likely be sheathed, and the enemy may not yet have noticed him. Link can then sneak up on unsuspecting enemies for a surprise attack. The music reflects

this subterfuge, as Early Combat 3 consists entirely of pizzicato strings – an effect which has frequently been used in cartoons to represent sneaking and tip-toeing. Once Link unsheathes his sword, however, Early Combat 3 is muted and replaced by a track of high-pitched, arco strings which embellish the rising quartal harmony and suggest to the player that the opportunity for stealth has passed.[47] During the 12/8 section, Early Combat 3 and 4 play a nearly identical part. The notes are the same, but the former pizzicato and the latter arco.

Easily the most remarkable features of the "Battle" sequence are the stingers that accompany successful sword strikes against an enemy. Each time Link hits an enemy with his sword during either Late Combat or Early Combat, the game plays some kind of stinger. Parries and jumping attacks trigger one of a limited number of short whole-tone scale passages and rising triad arpeggios. However, normal attacks[48] trigger a seemingly endless variety of stingers, which generally consist of two notes harmonized in perfect fourths and fifths. Ten such stingers – an incomplete list – are shown in Figure 10.

Figure 10. "Battle" stingers (the first is the most common; the rest are in no particular order.)

The stingers, though numerous and varied, do not seem to activate randomly. Nor can every stinger sound over every measure of the music. Instead, the game carefully curates the set

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[47] It is possible for Link to have his sword withdrawn without being seen by an enemy. In this case, the music will not correlate quite as perfectly with the action. However, I think the intent of the composers is clear, and the effect worked for me more often than not.
[48] Horizontal slashes, vertical slashes, and thrusting attacks.

of notes from which each stinger is constructed, and this set of notes changes dynamically to reflect the score, ensuring that every stinger, when triggered, is harmonically compatible with the sounding music. For example, over the first two measures of Late Combat, the pitches that can be heard in each stinger are all found within the scale of F Dorian (F, A♭, B♭, C, D). In the fourth measure, however, the pitches more closely outline F natural minor (F, G, A♭, B♭, C, D♭). In measures seven and ten, the pitches are even more distinct (F♯, G♯, A, B, E). Also, certain stingers seem more common than others, particularly the ones that trigger upon the first hit of the enemy (in the example above, the first stinger plays much more frequently than the others). Each successive hit in a combination seems to trigger a more varied collection of stingers, each built from its associated pitch set. This creates a sort of natural crescendo that mimics the player's growing success.[49]

These stingers act as a kind of metonymy, rewarding the player for each successful strike. Far from being a mere sound effect or earcon, however, they provide a valuable part of the score. Indeed, the official soundtrack includes many of these stingers in its representation of the music. They are also represented in the score found in a book of easy piano arrangements of the *Wind Waker* soundtrack.[50] Once again, these stingers provide a clear instance of mickey-mousing. While the technique may be too redundant and cliché for modern film scores, in this context it

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[49] My methodology, while thorough enough to conclude that the pitch sets are shifting, was not precise enough to state with certainty every possible note that could sound within a given measure. I used an emulator (Dolphin version 4.0-9109) to save the game at the start of a "Battle" sequence. I then waited until the music was playing a measure I was studying, attempted to strike an enemy within that measure, and then transcribed the pitches that I heard. After many hours at this, I am somewhat, though not entirely, confident that my description here is accurate. One thing that further research could help elucidate is how regularly the pitch sets change. It's possible that only a few measures of the music correspond to a changed pitch set. Or, it could be that every beat of the music corresponds to its own pitch set. Without somehow analyzing the game's programming (perhaps by speaking with one of its music programmers) it will be difficult to ever reach full confidence in this matter.

[50] *The Legend of Zelda: The Wind Waker Piano Solo Arrangement*, (DOREMI Music Publishing, released on April 30, 2003).

enhances the music and the gameplay. The player may feel (as I did) that, through her actions in the game, she is conducting her own personal orchestra.

The concept of variable pitch sets that change to reflect the accompanying music was be used again by Nintendo in a later entry to the Zelda franchise. Medina-Gray describes in detail how the set of notes played by Link's harp in *The Legend of Zelda: Skyward Sword* change "for each underlying harmony in the given location's environmental music." She continues, "When Link plays the harp, the game continuously repopulates the instrument's virtual strings with single-note modules according to the current position in the environmental music's harmonic progression."[51]

Conclusion

In a 2007 presentation at a Game Developer's Conference, composer Koji Kondo stated that "he believes that embracing the interactivity of games in their sound composition is extremely important and effects [sic] the emotions of the players."[52] One of his slides listed four advantages of interactive music: "(1) The ability to create music that changes with each play through. (2) The ability to create a multi-colored production by transforming themes within the same composition. (3) The ability to add new surprises and increase game play enjoyment. (4) The ability to add musical elements as game play features." Kondo certainly accomplished each of these points in *Wind Waker*, the cartoonish aesthetic of which practically demanded the use of dynamic audio. The game's overt musicality and use of mickey-mousing parallels trends in other children's media. As in cartoons, the music in *Wind Waker* is fundamental to the experience. It does not merely decorate the visuals; it supplements them.

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[51] Medina-Gray, "Meaningful Modular Combinations," 112.
[52] Aaron Kaluszka, "Koji Kondo's GDC 2007 Presentation," *Nintendo World Report*, March 13, 2007, http://www.nintendoworldreport.com/feature/13118/koji-kondos-gdc-2007-presentation.

Yet *Wind Waker* is but one example of many games that use dynamic audio effectively. In fact, dynamicity is the rule rather than the exception for most modern videogames. Adaptivity and interactivity in videogame music, far from being gimmicks or clichés, serve important usability functions. So communicative can the soundtrack of a videogame be, that a musically literate player is likely to receive far more information from a game than a musically illiterate player would. This is especially true of video games released this century[53] and of those created by Nintendo. The examples provided in this essay represent a widespread phenomenon in videogames.

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[53] Medina Gray's dissertation only discusses video games released since the year 2000.

Bibliography

Brame, Jason. "Thematic Unity Across a Video Game Series." *ACT – Zeitschrift für Musik & Performance*, no. 2 (July 2011). http://www.act.uni-bayreuth.de/en/archiv/2011-02/02_Brame_Thematic_Unity/index.html.

Brown, Mark. "Adaptive Soundtracks | Game Maker's Toolkit." YouTube video, posted on Game Maker's Toolkit, November 6, 2014.

Collins, Karen. "An Introduction to Procedural Music in Video Games." *Contemporary Music Review* 28, no. 1 (February 2009): 5-15. doi:10.1080/074944608026639835.

Collins, Karen. "An Introduction to the Participatory and Non-Linear Aspects of Video Games Audio." In *Essays on Sound and Vision*, edited by Stan Hawkins and John Richardson, 263-298. Helsinki: Helsinki University Press, 2007.

Collins, Karen. *Game Sound: An Introduction to the History, Theory, and Practice of Videogame Music and Sound Design.* Cambridge, MA: The MIT Press, 2008.

Cooke, Mervyn. *A History of Film Music*, 3rd ed. Cambridge: Cambridge University Press, 2010.

Kaluszka, Aaron. "Koji Kondo's GDC 2007 Presentation." *Nintendo World Report*, March 13, 2007. http://www.nintendoworldreport.com/feature/13118/koji-kondos-gdc-2007-presentation.

Medina-Gray, Elizabeth. "Meaningful Modular Combinations." In *Music in Video Games: Studying Play*. 104-121, edited by K.J. Donnelly, Willima Gibbons, and Neil Lerner. New York: Routledge, 2014.

Medina-Gray, Elizabeth. "Modular Structure and Function in Early 21st-Century Video Game Music." PhD diss., Yale University, 2014. ProQuest (UMI 3580771).

Nintendo Co., Ltd. *The Legend of Zelda: Ocarina of Time*. Videogame for Nintendo 64, 1998.

Nintendo Co., Ltd. *The Legend of Zelda: The Wind Waker*. Videogame for Nintendo Gamecube, 2002.

Sextro, Justin Daniel. "Press Start: Narrative Integration in 16-Bit Video Game Music." Master's thesis, Truman State University, 2012. ProQuest (UMI 1598475).

Teetsel, Sarah. "Musical Memory of the Player, Characters, and World of The Legend of Zelda Video Game Series." Master's thesis, Bowling Green State University, 2015. ProQuest (1601132).

Whalen, Zach. "Play Along: Video Game Music as Metaphor and Metonymy." Master's thesis, University of Florida, 2004. http://etd.fcla.edu/UF/UFE0004911/whalen_z.pdf.

Appendix A
Fencing Instruction

Each successful strike immediately triggers the Stinger Module, shown below.
The first two measures of the string track change depending on how many hits have landed.
It is followed smoothly by loop #2.

Stingers, in order. Each successive attack triggers its respective stinger in the context of the Stinger / Hit Module.

Appendix B
Wind Waker - Maritime Battle

Early Combat

Each double bar line represents a point at which the Early Combat
module can transition into the Late Combat module.

Late Combat

Appendix C
Wind Waker - Battle

Early Combat

Loops until Link hits or is hit by an enemy,
then jumps to Late Combat at the next bar line.

♪ = 160

4. Arco. Strings (Sword unsheathed)

3. Pizz. Strings (Sword sheathed)
pizz.

2. Low Brass (If enemy is very close)

Mid-Range Brass (Throughout)

1. Low Strings (Throughout)

^
Double bar indicates possible seam point
between Early and Late Combat modules

Late Combat

Hit stinger pitch set - measures 1 & 2

Hit stinger pitch set - measure 3

Hit stinger pitch set - measure 4 (B♮ only on beat 3)

Hit stinger pitch set - measures 5 & 6
and 8 & 9

Hit stinger pitch set - measure 7
and 10