Spring 4-28-2017

Musical Genre Identification and Differentiation of Rock, R&B/Hip-Hop, and Christian Songs Through Harmonic Analysis

Nolan A. Foxworth
Southeastern University - Lakeland

MUSICAL GENRE IDENTIFICATION AND DIFFERENTIATION OF ROCK, R&B/HIP-HOP, AND CHRISTIAN SONGS THROUGH HARMONIC ANALYSIS

by

Nolan Andrew Foxworth

Submitted to the Honors Program Committee

in partial fulfillment

of the requirements for University Honors Scholars

Southeastern University

2017

ABSTRACT

This thesis attempts to identify and distinguish musical genre through harmonic analysis. The genres of Rock, R&B/Hip-Hop, and Christian have been selected for this study. The top ten songs from each genre (as listed by Billboard's Year End Charts) are analyzed and contrasted with those of other genres in an attempt to prove that harmonic analysis alone is sufficient to identify the genre of an unknown song. Heavy in analysis, this thesis will find structure in music and use that structure to more deeply appreciate not only the study of genre, but of music itself.

KEY WORDS: Music, Harmony, Genre, Rock, Hip-Hop, R&B, Christian

ACKNOWLEDGMENTS

I would like to thank Dr. Gordon Miller and Dr. Paul Harlan. Both of these professors have served as educators for me since my first semester at Southeastern University, and their aid in completing this thesis was invaluable. I also would like to acknowledge Amy Harris, who took the time to help me with grammar and citation. I would like to thank my parents, Jeannie and Steve Foxworth, for always believing in and supporting my passions and my education. I am where I am because of the investment they made in me. I would like to thank my brother, but all he really did was distract me from actually doing homework. Finally, I would like to thank my incredible wife, Becca Foxworth. She paved the way for me, and was able to advise me as I worked on and completed my thesis a semester after she did. Her love and support are of the utmost importance to me, both in my thesis and beyond.

TABLE OF CONTENTS

I. CHAPTER 1: INTRODUCTION 1

II. CHAPTER 2: LITERATURE REVIEW 5

A. METHODOLOGY OF ANALYSIS 5

B. MUSICAL GENRES 7

C. OPPOSITION 9

D. FURTHER STUDY 12

III. CHAPTER 3: METHODOLOGY 13

A. TERMINOLOGY 13

B. METHODOLOGY 17

IV. CHAPTER 4: ANALYSIS OF GENRES 23

A. ROCK ANALYSIS 23

B. R&B/HIP-HOP ANALYSIS 30

C. CHRISTIAN ANALYSIS 36

V. CHAPTER 5: CONTRASTING GENRES 41

A. ROCK HARMONY 41

B. R&B/HIP-HOP HARMONY 48

C. CHRISTIAN HARMONY 54

VI. CHAPTER 6: CONCLUSION 61

VII. BIBLIOGRAPHY 66

VIII. APPENDIX: GLOSSARY OF TERMS 70

LIST OF TABLES

Figure 1: HARMONIC ANALYSIS SAMPLE..... 18

Figure 2: CHORD INVENTORY SAMPLE..... 20

Figure 3: ROCK TONALITY 23

Figure 4: ROCK MUSIC CHORD INVENTORY 25

Figure 5: R&B/HIP-HOP TONALITY 30

Figure 6 R&B/HIP-HOP CHORD HARMONY 32

Figure 7: CHRISTIAN TONALITY 36

Figure 8: CHRISTIAN CHORD HARMONY 38

CHAPTER 1: INTRODUCTION

“Genre” is an interesting term. A title given to organized groups of art, genres are hard to define. It is often the case that a viewer or listener can experience a piece of art and understand which genre it fits into without knowing why. Furthermore, as art progresses and artist engage their own creativity, genres begin to blend together and create new frameworks for artistic expression.

These genre difficulties can be observed frequently in the world of music. The classification of genres in music is an interesting study on its own, with countless sub-genres being created as composition progresses. One could analyze genre as broadly as the distinction between classical, popular, and jazz. Contrarily, one could be as specific as to differentiate EMD with dubstep, or indie from alternative rock.

Many arguments have been made concerning the creation and definition of musical genres, ranging from instrumentation based, composition based, artist defined, or even genre definition based on the overall sound of a piece. These various methods of defining genre often yield the same end result, but can sometimes cause a song or an artist to be classified by different genres. By and large, though, genre is often determined by record labels and other commercial entities, using the categories to better provide goods and services to customers.

This thesis is not meant to explore the creation or definition of genres, nor is it meant to provide a critique on the existing framework of musical genre. Instead, this thesis is meant to explore a method for differentiating songs of different genres

and identifying which group they belong to through the practice of harmonic analysis.

Harmonic analysis is the process of studying the chord structure of a piece. This study does not take into account melody, instrumentation, tempo, or rhythm (besides that pertinent to the progression of chords). The study of musical harmony has been used to more deeply understand the beauty of a piece of music. Just as there are varying complexities of musical composition, there are various levels of harmonic analysis. Some music, such as avant-garde jazz, requires pitch class set analysis, or something of the like. In this thesis, since Rock, Hip/Hop-R&B, and Christian music are fairly simple in their harmonic language, I will use a traditional tonal harmonic analysis. It is my belief that this harmonic analysis can provide an effective framework for genre identification and differentiation of a given set of musical works.

To test this theory, ten songs have been selected from three different genres. This sample list has been selected from Billboard's Year End Charts, specifically the Hot Rock Songs of 2016, the Hot R&B/Hip-Hop songs of 2016, and the Hot Christian Songs of 2016. These lists put forward the most popular songs from each of their respective genres from the year 2016. It was important to limit the study to one period of time, as genres evolve throughout their lifespan.

These 30 songs were then analyzed harmonically and distilled to their key components. Songs were then separated by genre and patterns were observed and noted. These patterns were condensed into "rules" for harmonic analysis. It is important to note that what is referred to as harmonic rules are not unbreakable

laws for composition, nor does any one rule alone dictate the genre of a piece. Rather, these rules are observed consistencies within a genre that, should my thesis prove true, would together aid in genre identification and differentiation.

Once these rules have been identified, they will be applied to the 30 songs of differing genres to test their validity. The potency of these rules will then be observed depending on whether they differentiate other genres, or if the rules are too broad or incorrect.

Genre identification through harmonic analysis would open the door for a number of more effective musical practices. Most notably, harmonic identification of genres would strengthen the growth of Music Information Retrieval systems. Researchers such as Shenoy and Ye Wang have been attempting to create automated systems to sort and organize songs into genres. This would allow consumers to more easily find music of their preferred genre, as well as aid companies in organizing their inventory. The growth of MIR systems is being pushed in a variety of different methods. While harmonic analysis is one of the leading methods, other researchers are creating systems through rhythmic structure, timbre, instrumentation, etc. A harmonic based genre identification would also provide a unique framework to analyze songs that may be a blend of two or more genres. For example, a song may push the bounds of rock music by using different instrumentation, but a harmonic analysis still identifies the elements of rock harmony.

It is not the purpose of this thesis to prove that genre is defined by harmonic analysis, nor is it suggesting that genre should be redefined to base off of harmonic

analysis. This thesis poses that harmonic analysis is a sufficient method of identifying and differentiating genre in any given song or song set.

CHAPTER 2: LITERATURE REVIEW

Music, no matter how new or original, has always been sorted into various categories, known as “genres.” Sometimes these categorizations are arbitrary, but more often than not there is a logical reasoning behind it. Some classify genres by timbre and others by “feel” of a song, but for this thesis genre will be classified primarily through harmonic characteristics. This literature review will give a foundation for a methodology of analysis, describing a few known harmonic traits of Rock, R&B/Hip-Hop, and Christian music, discuss alternate genres that may or may not benefit from harmonic genre classification, address the opposition to chord based identification, and finally, begin the discussion for further possibilities of research.

Methodology of Analysis

Harmonic analysis is a longstanding tradition in music theory, and is easily applied to more modern music forms such as Rock, R&B/Hip-Hop, and Christian. However, a glossary analysis will not be sufficient for a full contrast between genres. Yvetta Kajanová gives a framework for analyzing more modern genres. She compares rock, pop, and jazz (three very large and encompassing genres) with each other and with classical music, paying specific attention to melody, harmony, and song form. She argues that a historical study of each music style is equally as important, as it shows the progression and reason behind every musical element.

Abeßer, Lukashevich, and Bräuer conducted a study analyzing the bass line’s relation to genre. Bass lines are, in almost every genre, the root of the

harmonic progression. Listeners and musicians alike have been conditioned to orient their ears to the bass line in a piece of music, and analyzing the behavior of the bass can serve as an indicator of genre. In their analysis, the researchers looked at the bass line pitches in relation to each other, the pitches as they pertain to harmonic rules and functions, and the rhythm at which these pitches sound. Bass is an important part of harmony, and could be the difference between a I and a I6 chord, adding a new level of depth to harmonic analysis.

Another group has taken the concept of harmonic genre classification to a further level. Carlos Pérez-Sancho et al. have created a program which converts audio into a written chord analysis. Using this program, the group identifies the chord progression of a given piece and sorts it into the appropriate genre based on a preset list of rules. This application of harmony is done in bigrams and trigrams; two-chord movements and three chord movements, respectively. When analyzing three note and 4 note extended chords, the program yielded an 87% success rate in accurate genre identification. The harmonic analysis of this work is fairly limited, as it only addresses bigrams and trigrams of specific chords. Débora Corrêa has done similar work with her Music Information Retrieval systems. She proposes a symbol/visual based system which analyses harmonic structure and rhythm to identify genre.

Richard Terrat sheds some additional light onto harmonic analysis through his dealings with a 12 bar blues progression. This progression is very rigid and standard, and plays with tonic, subdominant, and dominant. He observes the importance of the concept of “dominant” and “subdominant” over the specific V and

IV chord being used, and analyses music from that perspective. Additional movements, embellishments, and substitutions can be included in a chord progression, yet still function as tonic, dominant, and subdominant chords. Terrat demonstrates the importance of a beyond-glossary harmonic analysis that deals with chord intent and purpose over specific chords.

Hedges et al. take the concept of harmonic identification even deeper. They argue that a jazz composer can be identified by the harmonic progression of the lead sheet of a song alone. This level of analysis goes beyond genre identification into a more complex and specific form of identification, one which will be too specific for this thesis. Songs must be analyzed deeply enough to identify the genre, but not so deep as to divide between composers.

Musical analysis of this level requires a large amount of musical terminology. The terminology section of the methodology chapter explains some of the more frequent terms within, and uses Miles Hoffman's *The NPR Classical Music Companion: Terms and Concepts from a to Z* to define them.

Musical Genres

Rock music is most commonly described by its rhythmic stress and rougher timbre ("Rock (music)"). Beyond this subjective analysis, researchers have attempted, and succeeded, to identify key harmonic components within the rock genre. David Temperley and Trevor de Clerq statistically analyzed melody and harmony in rock music, and found that it exhibits many traits similar to common practice music, as well the frequent utilization of the Pentatonic Union scale (only superseded in use by the major scale). In "The Melodic-Harmonic 'Divorce' in

Rock", Temperley observed rock music's use of non-chord tones that do not resolve in stepwise motion, as they argue is traditional in music theory.

The genre of rock and roll is further explored through de Clerq and Temperley's analysis of cadences to I. In "A Corpus Analysis of Rock Harmony" they found that IV, the subdominant, was the most common chord to follow I, and very frequently preceded it. The subdominant preceding the tonic is nothing new, but the plagal progression of IV - I is fairly unique (the most common resolution being V - I). Nicole Biamonte further analysed resolution by researching the triadic modal and pentatonic patterns in rock and roll, and found three common harmonic features: the double plagal progression (bVII - VI - I), the Aeolian progression (bVI - bVII - I), and the occurrence of pentatonic-triad structures. These progressions are fairly unique to rock and will serve as excellent guidelines to begin to analyze the genre.

Hip-Hop, as a musical genre, is a more ambitious study. As a meta concept, Hip-Hop is more than just a genre, it is a way of life, a culture (Encyclopedia Britannica, "Hip-Hop"). As a genre, Hip-Hop is a section of a larger culture, which greatly affects the overall identity. R&B, the second half of this genre title, has an interesting history. This title was created as a commercial term to remove more racially insensitive genre names such as "Harlem Hit Parade, Sepia, Race." As time progressed, both of these genres evolved and eventually merged together, so it is important to specify that this thesis pertains to R&B/Hip-Hop music of 2016, not its overall identity.

Christian music is a peculiar genre, as it is by nature a genre based off of message. Much like Hip-Hop, Christian is a culture first, and a genre that flows out of that. Though Christian music has a number of sub categories (such as gospel, Christian metal, southern gospel, etc.), this thesis will adhere to the categorization Billboard has agree on in their Hot Christian Songs of 2016, which provides a kind of meta-genre overview of Christian music. The Christian music genre may be often discredited by some as a genre, but experts say otherwise. Mark Joseph writes about the effect Christian music has on the secular music world, and considers it to be a genre on its own. Even as early as 1999, Billboard publicly acknowledged the growth of Christian music and considered it to be a musical genre, along with the likes of rock or pop (Price, 8).

For the purpose of this thesis, sample lists for these three genres will be taken from Billboard's 2016 year end charts, specifically the Hot Rock Songs, Hot R&B/Hip-Hop Songs, and Hot Christian Songs. While these lists contain a large set of ordered songs, this thesis will look at the top ten songs of each genre for analysis.

Opposition

Genre identification by harmonic analysis is certainly not the only method, and is not even the most popular. A large majority of listeners, from casual consumers to professional researchers, categorize music by elements such as timbre, rhythm, and instrumentation.

Gjerdingen and Perrott conducted a survey in which they play very brief song excerpts to listeners and ask them to identify the genre. The accuracy and speed at which listeners gave their classification led the researchers to believe that it was the timbre of the song that revealed genre. 5 or 6 seconds is not long enough to identify a harmonic structure, in fact, it is hardly enough time for two different chords to pass. With their findings, Gjerdingen and Perrott reasoned that timbre is a very useful genre identification tool, and is probably the most frequently used by casual listeners (94).

Guaus and Herrera conducted research to prove the same point, but approached it in a different way. Instead of having a listener identify the genre of a song played normally, they altered either the timbre or the rhythm of a song and asked the listener to identify its genre. Overwhelmingly, listeners incorrectly assigned genre to distorted songs, giving more evidence to the thought of timbre as a genre identifier. Another group of researchers approached timbre analysis through the visual representation of sound waves, identifying key characteristics and associating them with musical genres (Nanni, Loris et al.).

Allan Moore blends this timbre-based methodology of genre identification with harmonic analysis when he creates his two part framework for genre identification. He poses that what typically identifies a song as genre can be thought of in two elements: the form and structure of a song (which he calls genre), and the articulation and sound (which he calls style) (432). Jennifer Lena and Richard Peterson construct similar multi-faceted frameworks for genre

identification. They argue that genre must be viewed as a sum of all of its parts, and must be observed through the lense of its cultural impact.

Another popular genre identification technique is that of instrumentation. A rock band looks very different from a folk band in the instruments used, and the purpose they are used for. Percino, Klimek, and Thurner argue that it is the instrumental consistency within genres that allows for creativity and diversity within the style. They argue that the instrumentation defines genre, and the harmonic and melodic content is the creative addition.

A third potential issue with harmonic differentiation of genres is the possible exceptions. Folk music, for example, is largely an undefinable genre by any music theory terms (Belaiev), and is so diverse that harmonic consistencies are hard to find (Karpeles). This is a very valid concern, and does present the potential to discredit larger meta-genres from a harmonic based classification system. As more precise genres are formed out of the large category of “folk,” though, harmonic consistencies may well present themselves.

The final opposition to harmonic genre identification is not an opposition to the harmonic analysis, but to the concept of genres altogether. Vlegels and Lievens argue that genre differentiation is a largely futile effort, as music within a genre can be so vastly different that it baffles the listener. They, instead, propose a shift to categorization based primarily by composer. While a composer’s work may differ throughout his life, or even look different from song to song, the consistencies in their patterns and the solid, objective rationale for their grouping provide, in the authors’ minds, a better way of categorization.

Weisethaunet raises no objection to the categorization of genres at large, but does reject the notion of a “blues” genre. Blues, as he argues, is a way of thinking and playing, not a formulaic method of grouping similar songs.

Further Study

Great potential for this core concept exists to be expounded upon beyond this thesis. Primarily, the harmonic analysis of genre differences could be expanded to more genres, such as classical, jazz, blues; and even sub-categories of the three I have chosen: progressive rock, metal, etc. Secondarily, harmonic analysis can be presented beyond the common practice of tonal harmonic analysis to methods such as pitch class analysis and beyond.

Another potential exposition on this thesis is the practical application of harmonic classification in Music Information Retrieval systems (abbreviated as MIRs). Anglade et al. have constructed the beginnings of a program which converts the audio of a song into a MIDI signal, and extracts the harmonic structure from that MIDI information. From there, these songs are sorted automatically into genre by their harmonic structure. Shenoy and Ye Wang are conducting similar research, but their system is more encompassing. They have created a system which extracts the tonal key, harmonic structure, and rhythm from a song, which allows for easier performance, recreation, and classification of the piece of music. Typke, Wiering, and Veltkamp published a work explaining the various methods and functions of MIRs. They explained procedures for searching symbolic data as well as audio data, provided a list of existing MIRs, and listed a few retrieval tasks.

CHAPTER 3: METHODOLOGY

Terminology

Throughout this thesis, musical concepts and patterns are referred to using terms commonplace within the music theory discipline. This section will explain the list of terms used, and give context to the rest of the thesis. For the majority of this section, *The NPR Classical Music Companion: Terms and Concepts from A to Z* by Miles Hoffman will be used to define theory terms.

This thesis is evaluating the harmonic structure of music and its potential to identify the genre of a song. These two words, harmonic and genre, may need defining to those not familiar in music theory. Hoffman defines harmony as the "overall practice, or science, of creating chords and chord progressions according to certain rules and principles," (96) and chords as "three or more different notes sounding together" (95). He explains that the "rules and principles" by which chords are organized may change, resulting in different kinds of harmony; all that is necessary for an understanding of harmony is that chords are structured to some set of pre-existing rules.

Hoffman does not have a definition of "genre," and that is not uncommon. Genre, as a musical concept, is very difficult to define. Were this not the case, a thesis presenting a potential method for genre identification would be somewhat irrelevant. In reality it is uncertain whether genre comes from sound, structure, theory, message, or more likely some combination of all of these. For the purpose of this thesis, genres are classified as Billboard observes them, which is largely

established by record labels producing the music they are classifying. This thesis is not meant to define genre, but to identify songs that belong to it.

This thesis contains an abundance of harmonic analysis. This kind of analysis can be done in a few ways, most notably with chord names, with Roman numerals, or what is known as the Nashville Number system. The chord name methodology lists the name of the exact chords used in each song (C, G, em, F, etc.), and gives the musician a precise idea what chord is being requested. This method is excellent for performance, but this study deals with the relation of chords to the key they are in, rather than their precise performance. The Nashville Number system lists chords by their relation to the key they are in. Using Arabic numbers (1, 2, 3, etc.), this system presents chords as they relate to the tonic and expects the musician to know the key they are in. While this method allows for transposition (the changing of keys) and informs the harmonic relation to the tonic, the numbers themselves do little to indicate the tonality of the chord itself. Roman numerals, the more detailed companion to the Nashville Number system, rectifies this issue. Still adhering to the numbering of chords in relation to their tonic, this system uses Roman numerals rather than Arabic ones to represent harmony. In this case, capital numbers are major chords (I, IV, V, etc.) and lowercase numbers are minor (ii, vi, etc.). This method allows the observer to see the harmonic progression as it relates to the tonic, as well as the tonality of each individual chord, while also allowing the presence of non-diatonic chords. This is the numbering system that will be used for the entirety of this thesis.

Tonality, as discussed previously, is the major or minor nature of a scale or a chord. The major/minor distinction is most notably found in the 3rd scale degree (a major third from the tonic for a major key/chord, a minor third for a minor key/chord). There are other differences between these two scales, though these other differences sometimes change. The two different tonalities each carry their own natural set of chords, each a triad of stacked thirds starting on each note of the scale. Each key, whether major or minor, has a set of chords called diatonic. These chords are the naturally occurring triads of thirds, using the different notes in the key as their base. Any chord not beginning with a note in the established key, or utilizing a note outside of the key anywhere in the chord, is considered to be non-diatonic. Non-diatonic chords certainly have their place, and they are not disallowed simply because of their nature as outside of an established key. In fact, non-diatonic chords are often used to add intrigue to a piece, or create a strong progression that lands in multiple tonal centers before again reaching the topic. These non-diatonic chords excluded, the list of possible diatonic chords in each tonality is as follows:

Major: I ii iii IV V vi vii

Minor: i ii III iv v* VI VII

The v in the minor key is marked by an asterisk, since it is often substituted for a V. The major V presents the note one half step below the tonic (also called the leading tone), which establishes the key in a more resolute way. This major V adheres to a harmonic minor scale, a variant of the natural minor scale, and is not uncommon. Special attention should be given to the v or V chord in a minor song.

Major and minor scales can relate to each other in two ways: parallel or relative. Parallel keys are different modalities of the same tonic, for example C major is the parallel major to C minor. Relative keys, on the other hand, contain the exact same notes as each other, but call different notes "tonic." The relative minor of a major key is always the sixth scale degree, so in the case of C major, a minor is the relative minor. As an added note, major songs will be indicated by the color green and minor songs by the color blue in various charts throughout this thesis.

Dealing with tonic, tonicization is the temporary use of a non-tonic chord as the tonal center. A chord can serve as a temporary tonic through the use of secondary dominants, borrowed chords, or even the progression of diatonic chords. Tonicization is not a proper key change, as the true tonic will soon be heard in a manner solidifying it as a stronger resolution.

There are a number of terms for chord functions, the most notable being tonic and dominant. The tonic is the first note in the scale of a song, and the tonic chord is the triad built off of that note. This is one of the most important chords in any key, as it is the centerpiece for the rest of the piece. The dominant is built on the fifth scale degree, and of all the chords, is of "central importance because it is the harmony that leads most strongly to the tonic" (78). A diminished vii chord can often fill the same role as a dominant chord, but the dominant V is far more common. This notion of dominants can be extended to chords which are not the tonic of a piece, but rather serve as a temporary tonic for a moment of time. For example, V is the dominant of I, but if a composer wants to draw the listener to the V chord, he may use the dominant of V, or the V/V chord. In the key of C (in which

G is the dominant), this progression would read as D (V/V), G (V), C (I). These secondary dominants can be written to give way to any chord, and typically involve non-diatonic notes.

There exists a pattern of descending resolutions of fifths called the Circle of Fifths. This progression descends each following chord by a diatonic fifth in a resolution very common to the western ear. The final three chords of this circle, ii-V-I, is a very common resolution pattern, but this trend can be extended beyond the standard dominant resolution. vii-ii-vi follows the rules of a circle of fifths progression, even though it does not resolve on a I.

Once each genre has been analyzed, chord inventories are created showing the overall contents of each song and, by extension, each genre. A chord inventory is simply a list of every chord used in a given song, whether it was used once or in every progression. Once chord inventories are created for each song, pieces within the same genre are compiled to create a genre-wide chord inventory showing in how many songs each chord was used within a given genre.

Methodology

This study centers around harmonic analysis and comparison, so naturally that was a large part of the methodology. In order to test the ability of harmonic analysis to differentiate genres, a sample set had to be selected from multiple different genres, analyzed, and contrasted from one another.

The song selections all come from Billboard's 2016 year end charts. The top ten songs from the *Hot Christian Songs of 2016, Hot Rock Songs of 2016,* and

Hot Hop-Hop/R&B Songs of 2016 were chosen for intense analysis and comparison. The Rock and R&B/Hip-Hop genres represent a wide encompassing selection of popular music, and the addition of the Christian music genre provides an interesting perspective on both music genre and the Christian culture.

To clarify, this is not a thesis on the nature or definition of Christian Music, nor is it a thesis promoting nor condemning it. Songs are identified as belonging to the Christian genre as Billboard has classified it. The only explanation Billboard gives to the selection of their songs for the Hot Christian Songs of 2016 is that the songs are "ranked by radio airplay audience impressions as measured by Nielsen Music, sales data as compiled by Nielsen Music and streaming activity data provided by online music sources" (Billboard). This genre is separate from Gospel and appears to contain mostly Contemporary Christian Music, which is a specific branch of pop-rock style music written by Christian artists with an explicitly Christian text.

After the song bank has been selected, these songs underwent a surface level harmonic analysis. The chord progressions and repetitions of each song were written out as they occur in the song, with a column to the right to jot down quick notes or to highlight strong chord progressions. These results looked very similar to this:

Intro: I V vi IV	I V vi IV
Verse: vi IV I V/vi	Use of secondary dominant
Chorus: I IV vi V	I IV vi V
Bridge: vi V I ii	Walking bass line 6-7-1-2 Use of ii

Figure 1: Harmonic Analysis Sample

As a quick explanation, each song was analyzed in sections such as introduction, verses, choruses, and bridges. Chords were listed using Roman numerals to notate each chord used, with capital numerals representing major chords and lowercase numerals representing minor. Verses, choruses, bridges, or any other section listed may occur multiple times throughout a piece, but it was only necessary to analyze them once as they appear identically (unless otherwise noted).

After analyzing harmonic structures of a song as a whole, a chord inventory was created. A chord inventory is simply a comprehensive list of chords utilized throughout a piece, whether it was used once as a substitution for another chord, or in every progression. This was meant not to identify the common strong harmonic progressions, but to discover which chords are commonly used or left out in any particular genre.

Once each individual song was identified and inventoried, songs from similar genres were placed together and compared. The first step in comparing

songs of the same genre was to line up all chord inventories next to each other, to identify the common chords. This was compiled into a graph in this format:

Chords	Song	Song	Song	Song	Song	Song	Song	Song	Song	Song
I or i										
ii or II										
iii or III										
IV or iv										
V or v							V	V		
vi or VI										
vii or VII										
V/vi										

Figure 2: Chord Inventory Sample

While this graph does not represent any actual findings presented in this thesis, it does illustrate the form and function of this graph. First, the two colors (green and blue) represent modality; green represents chords in a major key and blue represents chords in a minor key. This modality does not affect the chord with which it represents (a blue square in the row of VI chords does not necessarily mean a minor vi chord), but rather the key of the song. White or empty cells represent the absence of the corresponding chord within that song, for example the first song does not contain a ii, iii, vii, or V/vi. Variants from the standard diatonic pattern are written in the cell, such as the dominant V of i used in two of the example songs. Secondary dominants are given their own rows below the standard seven chord system, though only V/vi is found in the given sample set.

This graph allows the reader to quickly and easily see not only the chord inventories of an entire genre, but also the tonalities present within each genre. These charts can be found in the chapter analyzing each genre.

Next, all of the major chord progressions were compiled into a list by genre, and duplicates were noted. The purpose of this list was twofold: first, it identified any chord progressions that appeared in multiple songs, and second, it brought all of the relevant harmonic information of a genre into one location.

With this information assembled, each genre was analyzed and compared to itself, in order to find consistencies. Chord inventories were compiled and common chords across a genre were extracted. The list of chord progressions allowed easy access to frequent chord progressions and resolutions, which were all noted. Within this same strain, chords were analyzed with respect to their function, that is to say, what purpose a specific chord serves. The typical harmonic functions are tonic, subdominant, and dominant, though there are many other functions found in pop music. Finally, unique harmonic elements were identified within each genre. The qualifications of a unique element are fairly vague, this is simply a category for harmonic events or motifs that stood out as odd or different, such as a constantly repeating progressions or non-diatonic chords.

This analysis gave way to “rules” of harmonic analysis. These rules are not regulations for a song to be classified in a certain genre, nor are they exclusive ways to compose within a genre. These rules are observed patterns that appear to be commonplace within a certain genre.

Once rules have been established for each genre, the three will be contrasted with one another, first on a conceptual level, then a practical one. Conceptually, the rules and patterns of each genre will be compared to the other two in the study and contrasted on a general basis. Practically, rules of genre A will be applied to songs from genres B and C to demonstrate their non-validity. Should the rules of each genre be different from each other and resist applying to songs of differing genres, then one can reason that harmonic structures can sufficiently identify and differentiate musical genres from each other.

CHAPTER 4: ANALYSIS OF GENRES

Rock Analysis

The term “Rock music” is a fairly ambiguous term. Encompassing everything from prog-rock to heavy metal to alternative, “rock” music could mean a variety of different sub genres. For the purpose of this research, Rock music will be used as Billboard has used it, and songs that Billboard labels as Rock will be considered to be included in this study. Rock has found its identity through cultural movement, often inciting non-complacency or action on the part of those dissatisfied with something. When someone thinks of the term “rock music,” they often conjure images of electric guitars and leather jackets, and probably hear the sound of loud, distorted power chords through oversized speakers. Unfortunately, none of these elements are harmonic in nature.

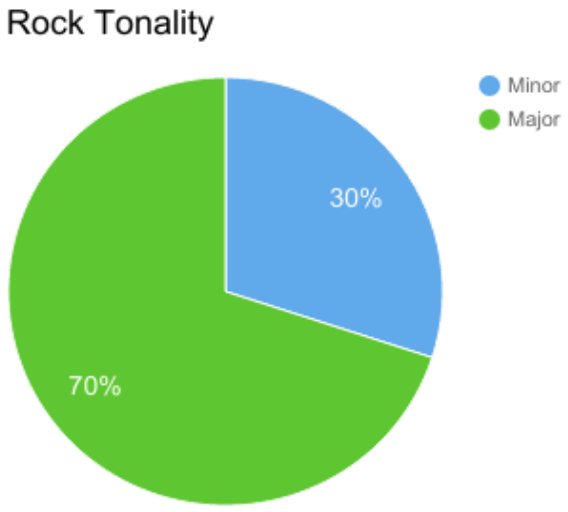

Figure 3: Rock Tonality

The top ten Rock songs of 2016, as listed by Billboard, show a prevalence of major tonality, with only three minor songs making the list. Even then, some pieces may sound as if they are in both major and minor at points, either altering between relative major/minor, or in the case of *Heathens* the parallel major (which is the same key in different modalities, e.g. G major is the parallel major to g minor). Each song, despite its moments of tonal ambiguity, still sounds fairly solidly in one mode or the other. This aural identification is found by listening to which resolution feels the strongest to the personal ear, the major tonic or the minor tonic. Deciding by sound whether or not a song is major or minor is partially a matter of personal opinion, but the findings seem to validate the results. Both major and minor rock songs contain very similar chord inventories, when analyzed within the mode in which they most closely sound.

Hot Rock Songs of 2016, Billboard's Year End Charts

1. *Stressed Out*, twenty one pilots
2. *Ride*, twenty one pilots
3. *Heathens*, twenty one pilots
4. *Let It Go*, James Bay
5. *Unsteady*, X Ambassadors
6. *Ex's & Oh's*, Elle King
7. *Hymn for the Weekend*, Coldplay
8. *Sucker for Pain*, Lil Wayne, Wiz Khalifa & Imagine Dragons With Logic & Ty Dolla $ign Feat. X Ambassadors

9. *The Sound of Silence*, Disturbed

10. *Adventure of a Lifetime*, Coldplay

	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10
I or i			also I							
ii or II										
iii or III										
IV or iv										
V or v										
vi or VI										
vii or VII										
V/vi										

Figure 4: Rock Music Chord Inventory

At first glance, it is apparent that I, IV, V, and vi (and their minor key counterparts) are abundantly prevalent, with I and V occurring in every rock song and IV and vi in all but one each. Major and minor tonalities contain very similar chord inventories, so they will be analyzed together with special note made for differences.

As previously stated, every song in this selection used a I or i and a V or v chord in some form or another. Taking into account this information alone, one

would expect an abundance of authentic cadences strengthening the tonic. On a closer inspection, this is not usually the case. In fact, the V resolves to the vi far more frequently than it does the I. This pattern of deceptive cadences establishes the vi as a focus point of the piece, creating a minor feel within a major song. Occasionally, artists will so intentionally emphasize this vi center that they will use the dominant of vi to reach it (V/vi). This can often give the illusion of a minor tonality when written on paper, but creates a dissonant sound when played that serves rather to reinforce the major modality while emphasizing the vi center.

It should be noted that the V chord takes on unique properties in a minor song. Diatonically speaking, the fifth chord in a minor key would be a minor v chord. While we do see this chord used (once in *Adventure of a Lifetime*), it is far more commonly converted into a major chord to create a more conventional V to i pull. *Sucker For Pain* employs this very motif, beginning it's progression with a i and ending with a V, which pulls the ear back to the i of the repeating progression. *Heathens* also employs a V in a technically minor key, though this song weaves in and out of major and minor tonalities, and needs to be analyzed on its own.

Within the Rock genre, we see a lot of varying progressions, with verses, choruses, and even bridges often containing differing progressions from one another. There are two notable exceptions to that rule, and one that appears to be. *Ex's & Oh's*, at first glance, seems to be comprised of one repeating chord progression, and though it does technically only contain one progression of multiple chords, the verses vamp on the I chord throughout, making the chorus and verse "progressions" different from one another. *Adventure of a Lifetime* does

consist of a single progression repeating, with only one color chord used at the end of the bridge. This song is the abnormality within rock, and it is the only true rock song to utilize a single repeating chord progression. There is another piece that uses a repeating progression, but that song will be analyzed separately.

Additionally, the vi chord is often almost tonicized, with many progressions either beginning with or resolving to a vi. V chords often resolve in a deceptive cadence to a vi, and some songs even find extended passages to remain on the vi chord. This tonicizing of the vi is not enough to qualify the pieces as a minor song, as the more concrete resolution is always found in the I chord, which is present in each song. This vi center is a very frequent occurrence, though, and should be noted.

Sucker for Pain is considered to be a rock song, according to Billboard, and on one level that makes sense. The chorus is melodic, the chord inventory is similar to that of other rock songs, and it is partially written by Imagine Dragons and X Ambassadors, both considered to be typically rock artists. However, the majority is one of four verses, which are all rap verses by different artists. Upon listening, this piece definitely sounds with elements of R&B/Hip-Hop, mixed in with Rock. When looking at the harmonic structure, this synthesis of genres becomes evident. The chord inventory is consistent with a Rock song (i, iv, V, VI), and finds a strong resolution with the V pulling to the i on each new turnaround. The progression itself, though, repeats on an almost endless loop, which is a staple of R&B/Hip-Hop music. This piece, as a selection of the Rock music genre, creates a slight difficulty for analysis due to its blended nature. In and of itself, though, it

shows a strong use of harmonic elements from both genres coming together to create a song that is neither completely rock nor completely R&B/Hip-Hop. This merge almost reinforces the harmonic rules of each genre since the presence of both gives the piece a dual identity, with clear roots in both genres, though Billboard does not acknowledge this duality.

Heathens also needs a more careful analysis, due to its bi-tonal nature. The song as a whole is in a minor key, but uses the major I chord in the chorus and the bridge. The V chord is always a major, which draws our ear towards either the major or minor tonic, though it is usually the iv that resolves in a plagal (or IV to I) cadence to the I or the i chord. This alterations between tonalities is not seen anywhere else within this sample list of rock songs, or any of the three genres for that matter. It is important to note that the change between major and minor tonality is not a full key change, nor is it a conversion between relative major/minor, but a change between parallel major/minor. It also is important to not trivialize this tonal change by calling it a Picardy third, since the shift happens multiple times throughout the song, and is not simply a cadential flourish. A Picardy third is the use of the major I chord at the cadence of a minor piece, and a cadential flourish is any unique element used at the cadence of a phrase for effect. This use of the major I is neither a cadential accent or a Picardy third, but a constant part of the structure of the chorus. All of that having been said, the piece is composed primarily like a minor song (iv and VI chords, use of the dominant V) that simply substitutes the major I for effect.

These observations seem to draw out a few patterns useful for harmonic identification.

1. Rock music primarily uses I, IV, V, and vi chords, and their minor counterparts
2. Rock music makes frequent use of deceptive cadences
3. Rock music tonicizes the vi, creating a minor feel without entering into a minor key
4. When in a minor key, Rock music tends to substitute the dominant V for the diatonic v

These rules are in no way cemented in the fabric of Rock music, nor are they limits to creativity within the Rock genre. These rules are patterns extracted from a sample set and used to identify traits common within the genre.

R&B/Hip-Hop Analysis

R&B/Hip-Hop is by far the most difficult of the three genres to analyze for one simple reason, it is a heavily lyric based musical style. This genre is largely dominated by rap, which by nature focuses more on what is being said than the music behind it. This harmonically lacking nature by no means invalidates it as an art form, it is rather a defining characteristic. As the study shows, harmonic complexity is not a staple in R&B/Hip-Hop. Instead, R&B/Hip-Hop finds its complexity in rhythmic emphasis and lyrical content. The title “R&B” stands for “Rhythm & Blues,” which more clearly defines the rhythmic emphasis found in Hip-Hop.

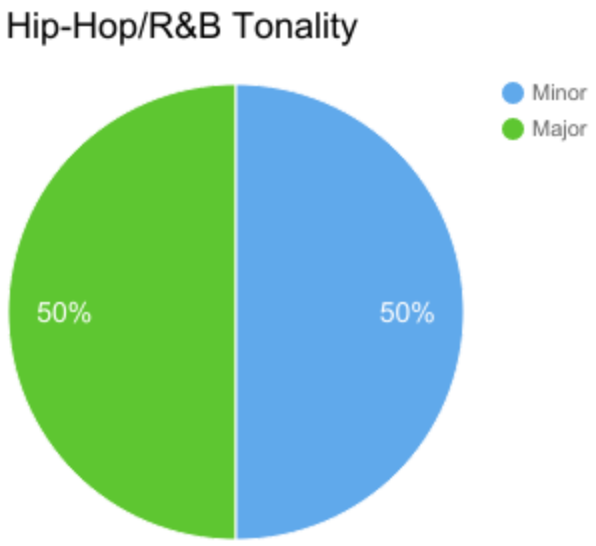

Figure 5: R&B/Hip-Hop Tonality

In the top 10 songs of Billboard's Hot R&B/Hip-Hop Songs of 2016, half are in a major key and half are in a minor one. It is fairly evident that major and minor R&B/Hip-Hop songs use different chord inventories, so they will need to be analyzed separately.

Hot R&B/Hip-Hop Songs of 2016, Billboard's Year End Charts

1. *One Dance*, Drake Featuring WizKid & Kyla
2. *Panda*, Desiigner
3. *Work*, Rihanna Featuring Drake
4. *Needed Me*, Rihanna
5. *Me, Myself & I*, G-Eazy x Bebe Rexha
6. *Hotline Bling*, Drake
7. *Too Good*, Drake Featuring Rihanna
8. *Broccoli*, D.R.A.M. Featuring Lil Yachty
9. *Here*, Alessia Cara
10. *The Hills*, The Weeknd

	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10
I or i										
ii or II										
iii or III										
IV or iv										
V or v										
vi or VI										
vii or VII										
V/vi										

Figure 6: R&B/Hip-Hop Chord Inventory

The 5 major songs show similar chord inventories, though no two songs have the exact same collection of chords. Each song uses the tonic chord, three use the ii, two use the iii, one uses the IV, three use the V, and one uses the vi. For the minor songs, all songs use the tonic, one uses the II, four use the iv, one uses the v, three use the VI, and two use the VII.

Major R&B/Hip-Hop songs tend to use I, ii, and V, while throwing in other chords for texture. No two songs have the exact same inventory, and no two share a specific chord progression. There are a handful of instances where one chord will move to another across pieces (two in which there is a I-V progression), but

this is likely more attributed to the small and repetitive harmonic structures rather than a similar harmonic hook. Most of these songs have a two or three chord progression, with only *Work* consisting of four chords. In all of them, however, the progression is consistent and repetitive, rather than having separate progressions for a chorus and a verse, for example.

Minor R&B/Hip-Hop songs center heavily around i, iv, and VI. Just as in their major counterparts, no two minor songs share a chord progression, and any harmonic patterns seem to be a result of a small chord inventory. All minor songs also repeat a consistent progression, rather than changing the order of the chords or introducing new ones. Unlike major songs, however, more minor songs have four chord progressions than not, at a three to two ratio.

It seems that one of the leading harmonic rules of R&B/Hip-Hop music is repetition, which is no surprise taking into account the other elements of the genre, namely the lyrics and the rhythm. To identify R&B/Hip-Hop harmonically, one would have to look for this repetition. This alone, however, is not enough to base an entire genre identification system on, as there are a number of songs in other genres that follow similar repetitious patterns, and even entire genres such as electronic music compose pieces in a similar way. In order to more accurately identify R&B/Hip-Hop, more patterns must be extracted.

Though it does not provide a complete method of identification, chord inventory assists in genre organization of R&B/Hip-Hop music. If nothing else, the simplicity of the harmonic content should be noted. None of the top ten songs use secondary dominants, borrowed chords, or anything non-diatonic, for that matter.

Any chords outside of the established key should serve as an indicator that this piece may not be an R&B/Hip-Hop piece. The research sample was divided perfectly between major and minor pieces, so neither of those modes can be factored out of the R&B/Hip-Hop genre. Within each mode, however, there are a few patterns found in this sample set. Major songs use I, ii, and V, and do not consistently begin or resolve on the I. Minor songs tend to begin on the i, but will use a variety of chords as a precursor to i.

No two R&B/Hip-Hop pieces share a common chord progression, which makes identification more difficult. There is a general lack of IV-V-I progressions, or even a V-I progression. Two pieces do utilize a V-I progression, but a majority of the sample set do not. Though this dominant resolution is occasionally present, it is not a driving method of cadence. With this subdominant, dominant, tonic resolution method being such a staple of western music, its absence provides a helpful identification tool for R&B/Hip-Hop music.

R&B/Hip-Hop is inherently a rhythmic and lyrical genre, but that does not mean it is impossible to identify harmonically. The key with R&B/Hip-Hop harmony is repetition, repetition, repetition. These pieces loop the same chord progression for the entirety of the song, utilizing elements such as dynamics, emphasis, and instrumentation to move the song along and avoid becoming stagnant. In these chord progressions, there is an overall avoidance of starting or resolving to the major I chord, and there are hardly ever any non-diatonic chords.

Identification of R&B/Hip-Hop harmonic structure, then, proves to be difficult, since it has a stunning shortage of unique qualities. There are, however, still a few patterns that can be drawn from the research.

1. R&B/Hip-Hop harmony consists of one repeating progression
2. R&B/Hip-Hop does not contain non-diatonic chords
3. R&B/Hip-Hop does not primarily follow a dominant to tonic resolution pattern

As with all other genres identified in this thesis, these rules are not established mandates for composition or necessary components to establish a piece as "R&B/Hip-Hop," but rather patterns that have been observed in a limited selection of the most popular songs from 2016.

Christian Analysis

The term “Christian Music” is a complicated one that often carries connotations extraneous to the music itself. Even within the Christian community, there is much debate on what makes a song “Christian.” Is this a term reserved only for worship music? Or is any song written by a Christian a “Christian” song? While this is a fascinating debate to engage in, it is not the point of this thesis. For research purposes, I will again follow Billboard’s list of Hot Christian Songs of 2016, analyzing the top ten entries. Christian music is, much like the term “pop” music, not a constant genre, but rather one that changes with cultural norms and trends. Christian music now and Christian music 20 years from now may be totally different forms of music. To avoid the confusion of an ever changing genre, this thesis will deal only with Christian music from the year 2016.

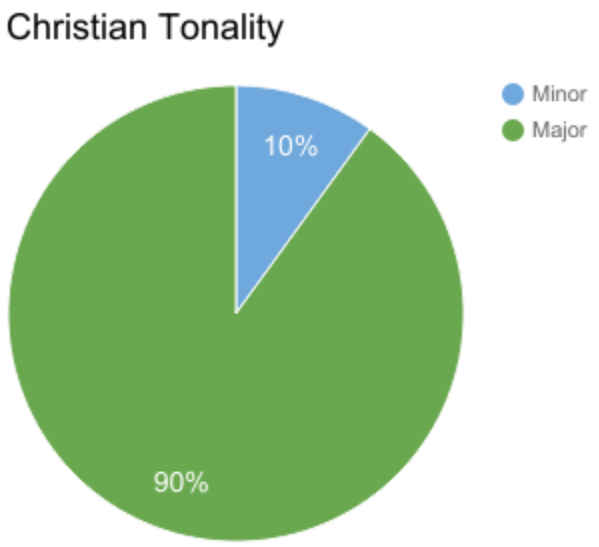

Figure 7: Christian Tonality

All songs but one within the Christian music genre are in major keys, the exception being *Thy Will*. None of these pieces, major or minor, utilize any non-diatonic chords, with even the minor song using the diatonic minor v rather than the traditional borrowed dominant V.

Hot Christian Songs of 2016, Billboard's Year End Charts

1. *Oceans (Where Feet May Fail)*, Hillsong UNITED
2. *Trust In You*, Lauren Daigle
3. *Good Good Father*, Chris Tomlin
4. *Thy Will*, Hillary Scott & The Scott Family
5. *Tell Your Heart To Beat Again*, Danny Gokey
6. *Eye of the Storm*, Ryan Stevenson Featuring GabeReal
7. *Breathe*, Jonny Diaz
8. *The River*, Jordan Feliz
9. *Priceless*, for KING & COUNTRY
10. *Just Be Held*, Casting Crowns

	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10
I or i										
ii or II										
iii or III										
IV or iv										
V or v										
vi or VI										
vii or VII										
V/V										

Figure 8: Christian Chord Inventory

Christian music, much more than either of the other genres, seems to have a very fixed chord inventory. Every Christian song in the top ten uses I, IV, and vi (or the minor counterparts), and all but one use a V (or a v). Beyond those staples, a minor ii seems to be a popular chord, with half of the selected pieces using it. Beyond that, only three songs use a iii and only the minor piece uses VII (which is not surprising, as a vii in a major key is a diminished chord). The only minor song in the research pool shares a very similar inventory with the major pieces, so they will all be analyzed together.

Christian music has a variety of specific chord progressions, though most seem to resolve around a set of four chord progressions. These progressions typically vary between verses, choruses, and bridges. There are a couple of progressions that make appearances in multiple songs, such as vi IV I V, but most

songs find different combinations of the core I, IV, V, and vi chords to construct a progression.

Though the actual progressions vary, there are a number of harmonic patterns that can be identified in Christian music. First, nearly every individual progression in every song begins with a I, IV, or a vi, with only one progression in *Tell Your Heart* beginning with a V, and one in *Just Be Held* starting on a ii. Second, we see a common plagal resolution theme as the I chord is often arrived at through the IV. Despite usually functioning as a subdominant leading to the V chord, the IV often gives way to a I, which then often leads to the V. This reverse circle of fifths progression is not terribly uncommon in pop music, but its frequency is certainty notable.

The Christian music genre inherently changes based on the time period it is presented in, but today's Christian music follows some similar harmonic patterns. Four chord progressions that change depending on the stanza of the piece seem indicative of Christian music. The frequency of I, IV, V, and vi, along with the major dominated selection both assist in genre identification. Plagal cadences also occur frequently, which often then move to the dominant.

The research seems to reveal these harmonic patterns within the Christian music genre:

1. Christian Music is largely composed of multiple four chord progressions
2. Christian music is primarily major
3. Christian music mostly uses I, IV, V, vi

4. Christian music frequently utilizes the plagal cadence, which often then moves to the dominant

Again, it is important to remember that these patterns are not hard and fast rules that must be followed for a piece to be labeled “Christian.” These are simply common occurrences within a large musical genre that may help in identifying members of this group.

CHAPTER 5: CONTRASTING GENRES

The three preceding genres now have rules that seem to identify the songs within their category, but are these rules enough to differentiate genres from one another? In this section, the rules from one genre will be applied to the songs from the other two genres in attempt to prove that the rules do not apply. Should the rules for each genre only hold true within their own selection of songs and not in the songs of other genres, then it would stand to reason that these harmonic rules of identification are suitable for genre differentiation.

Rock Harmony

The rules of Rock harmony are as follows: 1) Rock music primarily uses I, IV, V, and vi chords, and their minor counterparts. 2) Rock music makes frequent use of deceptive cadences. 3) Rock music tonicizes the vi, creating a minor feel without entering into a minor key. 4) When in a minor key, Rock music tends to substitute the dominant V for the diatonic v. These rules will be compared to R&B/Hip-Hop songs and Christian songs to test their adherence outside of the Rock genre.

One Dance, Drake Featuring WizKid & Kyla

One Dance is in a minor key, which is uncommon for rock songs, but not unheard of. This piece uses i, II, and iv. I and IV are common chords in Rock music, and follow the first rule. However, *One Dance* does not use V or vi, V being present in every rock song and vi in all but one. *One Dance* does not ever use a deceptive cadence, and never tonicizes the vi. *One Dance* is in a minor key, but does not

use any form of a V chord, much less a borrowed dominant. Though containing two of the four chords common in Rock music (as stated in rule 1), *One Dance* holds very little similarity to the rules of Rock harmony.

Panda, Desiigner

Panda is a fairly simple song harmonically, containing only a i-V progression. This progression does adhere to a few of the rules of rock harmony, but still falls short in a few areas. The first rule lists I, IV, V, and vi as crucial elements of rock harmony, and only two of those chords are present. *Panda* also uses the borrowed dominant by using a major V in a minor piece, which is common rock practice. However, *Panda* never tonicizes vi, nor does it ever resolve a deceptive cadence. Overall, *Panda* falls short of the Rock harmonic rules.

Work, Rihanna Featuring Drake

Work very nearly looks like a rock progression, and is one of only a few R&B/Hip-Hop songs to contain a four chord progression (common in rock). Like rock, *Work* contains I, IV, and V, though never uses a vi. Because of this, vi is never tonicized or used in a deceptive cadence. In fact, *Work* does not really use any kind of strong cadence. The ii-I-IV-V progression never really resolves to a cadence, but instead reverses the circle of fifths logic and moves from V to ii. At a brief glance, *Work* looks like a rock progression due to its use of I, IV, and V, as well as being a four chord progression, but under closer observation, it does not adhere to the rules of Rock harmony.

Needed Me, Rihanna

Needed Me, as is a growing pattern in R&B/Hip-Hop analysis, uses two of the four key chords in Rock music; I and V. This song also uses iii, which is the second most uncommon diatonic chord in rock music. This three chord progression (iii-I-V) does not follow any rock harmony rules of cadence or tonicizing of the vi, and is missing two of the four crucial Rock harmony chords.

Me, Myself & I, G-Eazy x Bebe Rexha

Me, Myself & I is another R&B/Hip-Hop song that uses a four chord progression. This minor song contains i and iv, both common rock chords, but does not contain a V, a staple of rock music. There is also no deceptive cadence, or even a vi chord at all. Cadences are mostly plagal, which is not uncommon in rock music, but is not an identifying factor either. This piece also frequently uses a VII chord, the least common diatonic chord in rock harmony.

Hotline Bling, Drake

Hotline Bling shares almost no similarities to rock harmony. Besides containing a I chord (which every song analyzed for this thesis did), *Hotline Bling* follows none of the rock harmony rules. There is never a IV, V, or vi chord, a iii chord is commonly used (a very uncommon chord in rock), cadences are weak and non-final, and the song consists of a single repeating progression of two chords.

Too Good, Drake Featuring Rihanna

Too Good comes close to an adherence to rock harmony. This song contains I, V, and vi, only missing a IV chord (which not every rock song contains). There is an instance of a deceptive cadence, in which the vi is substituted for a I chord. This is a single instance, though, and hardly constitutes as a tonicization of vi. Furthermore, the song in essence functions as a constant I-V progression, occasionally adding a ii as a passing chord or substituting the vi for the I. This repetitive two chord progression is not aligned with rock harmonic patterns, and thus still defies rock harmony.

Broccoli, D.R.A.M. Featuring Lil Yachty

Broccoli holds little similarity to rock harmony. Much like *Hotline Bling*, this piece is simply a repetitive two chord progression containing I and ii. While ii is not an uncommon rock harmony, it is not a staple like IV, V, or vi, all of which are missing. vi is never tonicized or used in a deceptive cadence.

Here, Alessia Cara

Here is another example of a song holding similarities to rock harmony while not adhering to its rules. This piece contains a four chord progression that repeats on a loop. This minor progression does contain i, iv, and VI, all common rock progressions. Being a minor song, VI is never tonicized and deceptive cadences are not present, which would be expected in a minor rock song as well. The important difference is the lack of a V chord, major or otherwise. Every rock song

analyzed contained a V chord, and its absence is enough to invalidate *Here* as a rock song.

The Hills, The Weeknd

This piece follows almost exactly the same pattern as *Here*. *The Hills* contains i, iv, and VI, but no V. Just like *Here*, that alone is enough to contradict rock harmony.

Oceans (Where Feet May Fail), Hillsong UNITED

Oceans begins the analysis of Christian music in comparison to Rock harmony. This piece contains the four important rock chords, I, IV, V, and vi. However, vi is never really tonicized. This is a somewhat difficult observation to make, however. Both the instrumental and verse progressions begin on vi, which would at first glance seem to imply its tonicization. However, the progression strongly draws this vi to the I chord, specifically through the first inversion V chord. This is not a tonicization of vi, but a strong pull to I. The V chord here is used as a passing chord, creating a smooth transition to the I. The bridge does contain one deceptive cadence, though it is the only occurrence. *Oceans* adheres fairly closely to rock harmony, when all factors have been analyzed.

Trust In You, Lauren Daigle

Trust In You follows similar patterns to *Oceans*, using all four rock harmony chords in various ways throughout the piece. This song does not contain any deceptive cadences, opting instead for perfect and plagal ones. The vi is not tonicized, or even heavily emphasized in this piece. Though the chord inventories

are similar, there is enough difference in *Trust In You* to contradict rock harmony rules.

Good Good Father, Chris Tomlin

Good Good Father again uses all four chords common in rock music, though vi is only used in the bridge. No deceptive cadences or vi tonal centers are found, and the song as a whole stands opposed enough to rock harmony to distinguish the two.

Thy Will, Hillary Scott & The Scott Family

This piece is the only minor Christian song analyzed, and contains i, iv, v, and VI. being already a minor song, no deceptive cadences or vi tonal centers are found. Unlike rock harmony, though, *Thy Will* uses the diatonic minor v, rather than the borrowed dominant V found frequently in minor rock harmony.

Tell Your Heart To Beat Again, Danny Gokey

Tell Your Heart To Beat Again very nearly follows the rules of rock harmony. This major song contains I, IV, V, and vi, deceptive cadences, and even tonicizes the vi in areas. The only differentiating factor that can be found is the use of iii. The iii is extremely uncommon in rock harmony, only found in two of the ten analyzed songs. That having been said, iii does occur in rock harmony, so its presence alone is not enough to disqualify a song as a rock piece.

Eye of the Storm, Ryan Stevenson Featuring GabeReal

Eye of the Storm adheres to the rock harmonic patterns of deceptive cadences and use of I, IV, V, and vi. In fact, those are the only four chords found in this piece, which is not common in rock music, though not impossible (three of the ten analyzed rock songs only contain I, IV, V, and vi). vi is never tonicized, though it is not always in rock harmony either. Much like *Tell Your Heart To Beat Again*, *Eye of the Storm* follows the rules of rock harmony fairly sufficiently.

Breathe, Jonny Diaz

Breathe uses the typical rock chords I, IV, V, and vi, but also uses the uncommon iii. The use of iii paired with the lack of tonicized vi or deceptive cadences creates enough diversity in *Breathe* that it, overall, does not adhere to the rules of rock harmony.

The River, Jordan Feliz

The River shares a similar pattern with *Eye of the Storm*. Though it does not adhere to every rule of rock harmony, there are enough similarities to at least cause uncertainty. *The River* uses I, IV, V, and vi, as well as heavily tonicizing the vi. It does use a iii which, as stated numerous times, is uncommon but not unused in rock. There are no deceptive cadences, though not every rock song contains one. There are not enough similarities between *The River* and rock harmony to definitively make the connection, but not enough differences to definitively deny it.

Priceless, for KING & COUNTRY

Priceless, though it contains I, IV, and vi, does not contain a V chord, a critical chord in rock harmony. The absence of a V, compounded to the lack of vi tonicization and deceptive cadences, is enough to contradict rock harmonic patterns.

Just Be Held, Casting Crowns

Just Be Held contains I, IV, V, and vi, just as rock harmony requires. However, vi is never tonicized, and plagal cadences are preferred to deceptive cadences (which are never present), distinguishing this piece from the rules of rock harmony.

R&B/Hip-Hop Harmony

The rules of R&B/Hip-Hop harmony are 1) R&B/Hip-Hop harmony consists of one repeating progression, 2) R&B/Hip-Hop does not contain non-diatonic chords, and 3) R&B/Hip-Hop does not follow a dominant to tonic resolution pattern. The following section will contrast rock and Christian songs with these four rules.

Stressed Out, twenty one pilots

Stressed Out is an innovative song, written by an innovative band. Twenty one pilots is a musical duo who merges musical styles to form their own brand of music. The instrumental music is very similar to rock music, and that is what it is classified as. The vocal line, however, often layers rap over the harmonic structure. This use of rap may cause the listener to draw a connection between twenty one pilots and Hip-Hop music, but harmonically speaking, that connection could not be

farther from the truth. *Stressed Out* has multiple different progressions, rather than one solid repeating one. It uses a non-diatonic chord (the secondary dominant V/vi), and through this secondary dominant, emphasizes the dominant to tonic resolution.

Ride, twenty one pilots

Ride, by the same artists as *Stressed Out*, breaks most rules of R&B/Hip-Hop harmony. Like *Stressed Out*, *Ride* has two distinct chord progressions and emphasizes both the dominant-tonic resolution, as well as the plagal subdominant-tonic patterns. The absence of any non-diatonic chords is the only similarity this piece has with R&B/Hip-Hop harmony.

Heathens, twenty one pilots

Yet again, twenty one pilots appears on this list. This song is harmonically complex, and differs from any other song in this thesis due to its manipulation of tonality. For the majority of the song, the chord structure adheres to a minor scale with a borrowed dominant. However, in the chorus of the song, the major I chord is used, creating an interesting sound. Both the major I and the borrowed V are non-diatonic chords, and though the dominant-tonic resolution is not emphasized, the variety of chord progressions differs greatly from R&B/Hip-Hop.

Let It Go, James Bay

Let It Go contains a large variety of chord progressions. Though it avoids non-diatonic chords and does not emphasize the dominant tonic relationship, the

lack of a repeating chord progression invalidates this piece as a R&B/Hip-Hop song.

Unsteady, X Ambassadors

Unsteady very nearly resembles a R&B/Hip-Hop harmonic structure. This piece does not emphasize the dominant-tonic resolution, and avoids non-diatonic chords. *Unsteady* is composed of two chord progressions which are hardly different from the other. However little the difference, though, the chords of the verse and the chorus are different, creating two distinct harmonic passages, invalidating them as R&B/Hip-Hop songs.

Ex's & Oh's, Elle King

Ex's & Oh's is a very harmonically simplistic song, but not in the same way that R&B/Hip-Hop harmony is. The intro, verse, and pre chorus of this piece consist of one single chord, the vi. The chorus then introduces a real chord progression, in which V/vi is present. This secondary dominant emphasizes the dominant-tonic resolution, even if the resolution itself is only presented a few times. Between the distinctly varied harmonic sections, non-diatonic chords, and dominant to tonic resolutions, this song is very clearly not in adherence to the R&B/Hip-Hop harmonic rules.

Hymn for the Weekend, Coldplay

Hymn for the Weekend does not contain any non-diatonic chords, but varies its chord progression throughout the piece. We also see the dominant-tonic

resolution emphasized a few times, which goes against the harmonic rules of R&B/Hip-Hop.

Sucker for Pain, Lil Wayne, Wiz Khalifa & Imagine Dragons With Logic & Ty Dolla $ign Feat. X Ambassadors

Sucker for Pain, unlike the other rock songs analyzed up to this point, contains only one repeating chord progression, just like R&B/Hip-Hop music. This is due to the artists featured in this song. Four of the six musicians or musical groups in this song are notable R&B/Hip-Hop artists, in which case it should be no surprise that there are R&B/Hip-Hop elements to the harmonic structure. Even then, though, we have a dominant V chord in a minor key, which is different from the diatonic minor v, and this V resolves to a i, emphasizing the dominant-tonic resolution. Even in a piece featuring more R&B/Hip-Hop artists than Rock artists, we see a strong disagreement between the harmonic structure of *Sucker for Pain* and R&B/Hip-Hop harmonic rules.

The Sound of Silence, Disturbed

The Sound of Silence takes a different approach to most songs analyzed. Instead of creating a set of 3 or 4 chord progressions and rotating those, this song is one fluid progression that spans more than 4 measures. By this definition, technically *The Sound of Silence* has one repeating chord progression. This progression, though, is not of the same nature as a typical R&B/Hip-Hop progression, so it still breaks that rule. There are no borrowed chords or dominant-

tonic resolutions, but the difference of chord structure is enough to differentiate this song from R&B/Hip-Hop harmony.

Adventure of a Lifetime, Coldplay

Adventure of a Lifetime actually does not contradict any of the rules of R&B/Hip-Hop harmony. There is one repetitive chord progression, there are no non-diatonic chords (even the v chord is a minor, due to the minor key, and not the dominant V typically used in minor rock songs), and the dominant-tonic resolution is nowhere present. In fact, *Adventure of a Lifetime* does not even adhere to the rules of its own genre, and it uses a VII, which is the only time that chord occurs in the Rock sample set. Harmonically speaking, this song does not align with rock rules, but rather R&B/Hip-Hop rules. This anomaly is somewhat rectified by observing the artist in question, Coldplay, is an established rock group, and even appears elsewhere on this list with songs that do in fact adhere to rock harmonic rules. That being said, the thesis put forward is that harmonic analysis alone is enough to identify genre, and in the case of *Adventure of a Lifetime*, it is not.

Oceans (Where Feet May Fail), Hillsong UNITED

Oceans, the first of the ten top Christian songs of 2016, contradicts most R&B/Hip-Hop harmony rules. This song has multiple different chord progressions, and heavily emphasizes the dominant-tonic resolution. *Oceans* does not contain any non-diatonic chords, as is the case for all ten Christian songs.

Trust In You, Lauren Daigle

Trust In You, much like *Oceans*, contains multiple different chord progressions and frequently utilizes the V-I resolution. There are no non-diatonic chords, but the difference in progression styles and presence of dominant to tonic resolutions is enough to discern this song from R&B/Hip-Hop music.

Good Good Father, Chris Tomlin

While *Good Good Father* does not emphasize the dominant-tonic resolution or utilize any non-diatonic chords, it has varied chord progressions for different sections. As with many of the songs outside of R&B/Hip-Hop, this alone is enough to create a distinction.

Thy Will, Hillary Scott & The Scott Family

The only minor song in the top ten Christian songs of 2016, *Thy Will* shares little with R&B/Hip-Hop harmony. This song has a varied set of chord progressions, which goes against one of the critical tenets of R&B/Hip-Hop. *Thy Will* does, however, adhere to the R&B/Hip-Hop rules of exclusively diatonic chords and the absence of a diatonic to tonic relationship.

Tell Your Heart To Beat Again, Danny Gokey

Tell Your Heart To Beat Again contains a variety of different chord progressions, though does not emphasize the V-I resolution or contain non-diatonic chords.

Eye of the Storm, Ryan Stevenson Featuring GabeReal

Eye of the Storm keeps its chord progression simple, yet still alters it between sections. Though there is an absence of non-diatonic chords, the V-I progression is emphasized throughout the piece, and is a key harmonic element.

Breathe, Jonny Diaz

Breathe shares most of its characteristics with *Eye of the Storm*. It contains exclusively diatonic progressions that highlight the dominant to tonic resolution while altering the chord progression playing between different sections.

The River, Jordan Feliz

Just as with *Breathe* and *Eye of the Storm*, *The River* contains a variety of chord progressions that contain a frequent use of the V-I resolution and no non-diatonic chords.

Priceless, for KING & COUNTRY

Priceless comes very near to the repeating chord progression so central to R&B/Hip-Hop harmony. The various sections, however, are altered just enough to make them each unique to their respective part. Had that progression been a constant, *Priceless* would have followed the R&B/Hip-Hop harmonic rules quite nicely, since it contains no non-diatonic chords and never uses the dominant to tonic resolution. Since the progressions do differ, however, this song is clearly not a R&B/Hip-Hop song.

Just Be Held, Casting Crowns

Despite opting for a plagal cadence rather than a dominant to tonic one, the variety of chord progressions in *Just Be Held* invalidates it as a R&B/Hip-Hop song.

Christian Harmony

The rules of Christian harmony are 1) Christian Music is largely composed of sets of four chord progressions, 2) Christian music is primarily in a major key, 3) Christian music mostly uses I, IV, V, vi, and 4) Christian music frequently utilizes the plagal cadence, which often then moves to the dominant. These rules will be compared to the harmonic practices of Rock and R&B/Hip-Hop.

Stressed Out, twenty one pilots

Stressed Out is in a major key and does use I, IV, V, and vi, just as Christian harmony typically does. This piece also contains mostly four chord progressions, with a few three chord progressions in which the third chord is held twice as long. There are no plagal cadences in *Stressed Out*, however. Between the lack of IV-I resolutions and emphasis on chords other than I, IV, V, and vi, this song is distinguished from Christian harmony.

Ride, twenty one pilots

Ride used four chord progressions in a major key and emphasizes the plagal cadence. Though it does use I, IV, V, and vi, the ii chord is commonly emphasized, which is a variation of Christian harmonic principles.

Heathens, twenty one pilots

Heathens is in a minor key (though it uses elements of the parallel major), which puts it at odds with Christian harmony. Though there is one minor song in the ten song sample set of Christian harmony, it is a very uncommon practice. *Heathens* does not contain any four chord progressions, instead using 2 or 3 chord progressions. i, iv, V, and VI are all used, but are not enough to draw the connection with Christian harmony in light of the minor tonality and lack of four chord progressions.

Let It Go, James Bay

Let It Go is a major song that uses four chord progressions. This piece does not use plagal cadences and emphasizes the iii chord, which is not common in Christian harmony.

Unsteady, X Ambassadors

Unsteady follows all of the rules of Christian harmony. This major piece is composed of four chord progressions using exclusively I, IV, V, and vi, and very commonly moves IV to I.

Ex's & Oh's, Elle King

This piece, while in a major key, uses chord progressions and movements not common in Christian harmony. The IV chord is absent, and a secondary dominant (V/vi) is used to resolve to the I, which is an uncommon practice in Christian harmony. Furthermore, the intro, verse, and pre chorus all contain only one chord, rather than a four chord progression.

Hymn for the Weekend, Coldplay

This major piece uses the four common chords in Christian harmony, but structures them in three chord progressions and never resolves a plagal cadence.

Sucker for Pain, Lil Wayne, Wiz Khalifa & Imagine Dragons With Logic & Ty Dolla$ign Feat. X Ambassadors

Sucker for Pain is a minor piece that does not resolve plagal cadences. Despite containing the common Christian chords and organizing them in a four chord progression, the minor tonality and lack of plagal movement create enough distinction between this song and Christian harmony.

The Sound of Silence, Disturbed

The Sound of Silence very closely resembles Christian harmony. Using I, IV, V, and vi in a major key, this piece often resolves IV to I. *The Sound of Silence* is not structured with four chord progressions, but there are examples of Christian songs that do not either.

Adventure of a Lifetime, Coldplay

Adventure of a Lifetime is a minor piece with three chord progressions. This piece does not use vi and only uses v once, and never resolves a plagal cadence.

One Dance, Drake Featuring WizKid & Kyla

Most R&B/Hip-Hop songs will compare in a similar way with Christian harmonic patterns, namely the difference in chord inventory and lack of four chord progressions. *One Dance* contains a single chord progression of three chords, and

does not use a V or a vi chord. The turnaround does emphasize a minor plagal cadence, but the minor key diminishes its effect.

Panda, Desiigner

Panda only contains a i and a V, missing the IV and vi so important to Christian harmony. Furthermore, this minor song only uses two chord progressions, rather than a progression of four chords.

Work, Rihanna Featuring Drake

Work features a four chord progression and uses I, IV, and V, just as in Christian harmony. However, the single repetitive chord progression is uncommon in Christian music, and the lack of plagal cadences and vi chords creates enough difference between the two.

Needed Me, Rihanna

Needed Me contains one three chord progression and never uses IV, vi, or a plagal cadence.

Me, Myself & I, G-Eazy x Bebe Rexha

This piece uses i, iv, and VI, as well as a four chord progression. However, the minor key, lack of V, and absence of plagal cadences differentiates this song from Christian harmony.

Hotline Bling, Drake

Hotline Bling only contains a single two chord progression, and of those two, I is the only one called for in Christian harmony. There are no IV, V, or vi chords and on plagal cadences.

Too Good, Drake Featuring Rihanna

Too Good contains, in essence, a single two chord progression. Sometimes a vi is substituted for the I, and sometimes a ii is added as a quick passing chord, but even then, this song never reaches the four chord pattern of Christian harmony. The absence of IV and plagal cadences also distinguishes this song from Christian harmonic patterns.

Broccoli, D.R.A.M. Featuring Lil Yachty

Broccoli uses a single two chord progression of I and ii. This song does not use IV, V, or vi, plagal cadences, or four chord progressions.

Here, Alessia Cara

Here is a minor song that does not contain a V chord. Though it contains i, iv, and VI, it never uses plagal cadences, and even includes a VII chord, which is very uncommon in Christian music. This piece does have a four chord progression, but this progression contains so many harmonic inconsistencies with Christian patterns that it can not be considered similar.

The Hills, The Weeknd

The Hills contains a four chord progression containing i, iv, and VI. There are no plagal cadences and the minor key differentiates this song from Christian harmony, as well as the lack of a dominant V chord.

CHAPTER 6: CONCLUSION

Conclusion

The question still stands: can the genres of rock, R&B/Hip-Hop, and Christian music be identified and differentiated through harmonic analysis? An in-depth analysis of the top ten songs of each genre (as defined by Billboard's Year End Charts) provided a framework to test this theory, but does it hold true?

Musical genres, or at least the three analyzed here, all seem to have common harmonic tendencies which allow for improved identification. Rock music tonicizes the vi, Christian contains frequent plagal cadences, and R&B/Hip-Hop holds a repetitive chord progression. Between these rules and the identified chord inventories, harmonic analysis can strengthen genre identification.

Genre differentiation, however, is a more difficult matter. Upon initial observation, one glaring issue arises: the similarity between Rock music and Christian music. When the rules of Rock harmony are applied to Christian songs, or Christian harmony to Rock songs, there is often an overlap. In the case of these two genres, it would seem that harmonic analysis is not sufficient to distinguish.

This is not a surprising conclusion, due to the nature of Christian music and its origin. As a genre, Christian music has echoed the trends of the popular music of its day, and has established itself recently in the musical style of the Rock genre. Though there are a few common harmonic motifs that differ between the two, Christian music is, to put it simply, a recycling of rock music with sacred text. I was aware of this fact when I began my study, though I did hope to see more harmonic differences arise as I looked further, but instead the two genres presented very

similar harmonic tendencies. Christian music, as a genre, is about its text, and follows other genres in its musicality.

The two remaining genres, however, were easily distinguished using harmonic analysis. Rock harmony and R&B/Hip-Hop harmony were vastly different from one another, from the chord inventories to the organization and number of chord progressions. Even the common resolutions were of different natures in Rock and R&B/Hip-Hop. Nearly every rock song found great distinction from R&B/Hip-Hop harmonic rules, usually in some combination of chord inventory or lack of a single repeating progression. Likewise, R&B/Hip-Hop songs rarely came near to adhering to Rock harmonic standards.

There are two exceptions to this pattern, one being more potent than the other. The weaker and more easily explained exception is *Sucker for Pain*. Classified as a Rock song, this piece contains a single repeating chord progression, which is a signature motif of R&B/Hip-Hop. Furthermore, this track features twice as many conventionally R&B/Hip-Hop artists than Rock artists. As a complete work, however, this song is still classified as a rock piece, likely due to the album it was released with. This song was released in a collection of songs from various artists alongside the release of the movie *Suicide Squad*. This collection of songs was labeled as a Rock CD, and included *Heathens* by twenty one pilots (which is also analyzed in this thesis). Despite its commercialized genre classification, *Sucker for Pain* still holds some strongly Rock harmonic patterns. This song emphasizes the dominant-tonic resolution which, though not absent from R&B/Hip-Hop, is not abundant. Furthermore, *Sucker for Pain* uses the

dominant V in a minor key, which is traditionally non diatonic. In the five separate minor R&B/Hip-Hop songs, this is never the case. This piece contains rock harmonic traits, and is classified as a Rock song, but still seems overall to adhere more to R&B/Hip-Hop harmony. *Sucker for Pain*, though it may seem a violation of harmonic progression correctly distinguishing genres, actually strengthens the argument. A study of the composition and release of the song itself shows an overwhelming R&B/Hip-Hop influence with a few Rock artists contributing their style, and this composition shows in a harmonic analysis.

The other, more problematic inconsistency is *Adventure of a Lifetime* by Coldplay. If that band sounds familiar, it is because it is an established and successful Rock band who is featured in the Hot Rock Songs of 2016 twice. Their song *Adventure of a Lifetime*, however, does not look like a Rock harmonic structure. In fact, it looks exactly like a R&B/Hip-Hop harmony. This piece uses a single repeating chord progression that not only does not emphasize the dominant-tonic resolution, but only uses a minor v once. *Adventure of a Lifetime* also uses a VII chord, which is the only rock piece to do so. When only harmony is accounted for, this song seems to be a R&B/Hip-Hop song. When listening to it, it clearly bears more resemblance to the other rock songs it is classified with than the R&B/Hip-Hop songs it shares harmonic patterns with. This does, however, prove that harmonic differentiation of genres is not infallible.

Despite this exception, harmonic analysis seems to be a fairly reliable method of differentiating most musical genres, with Christian music being a clear exception. Rock and R&B/Hip-Hop harmony not only follow different harmonic

patterns, but they show clear distinctions when applied to the songs of the other genre. There are exceptions to this principle, but for the most part, harmonic analysis is enough to distinguish Rock songs from R&B/Hip-Hop songs. Since Christian music is primarily a lyrically identified genre that follows rock or pop music style, it does not hold up to the process of harmonic differentiation.

The process of harmonic identification and differentiation of musical genres could greatly benefit from further study. First and foremost, a wider spectrum of analysis would strengthen this premise. This thesis only analyzed three genres, and only factored in the top ten songs of each genre. There is a vast world of specific genres and subgenres, each with a massive collection of songs and artists. Further study within the genres of Rock and R&B/Hip-Hop would more accurately either create or discourage harmonic patterns, while extending the study to genres such as pop, blues, jazz, and more would create a more fulfilled theory on the world of music in general.

This methodology would also see great success furthered in the world of Music Information Retrieval systems. This is not a foreign combination, but has been researched by a number of teams. The ability of a software to identify a chord structure and sort it into the corresponding genre is a vast step in automated musical categorization and would benefit both the consumer and the industry alike. Typke, Wiering, and Veltkamp explore the connection between harmonic analysis and MIRs in their work “A Survey of Music Information Retrieval Systems.” They describe multiple existing methods of transferring harmonic information into data that can be sorted and retrieved, such as string-based, set-based, and probabilistic

matching. These methods are all computerized processes which take a list of objective data elements, such as harmony, melody and rhythm, and sorts the song in question into set groups.

Music is a complex and specific art form, seamlessly blending intellect and emotion into a medium that all can enjoy. Observing commonly occurring patterns and harmonic structures deepens this appreciation, and expands our knowledge of genre and music itself.

BIBLIOGRAPHY

Abeßer, Jakob, Hanna Lukashevich, and Paul Bräuer. “Classification of Music Genres Based on Repetitive Basslines.” *Journal of New Music Research* 41.3 (2012): pp. 239–257. Academic Search Complete. Accessed 17 Feb. 2016.

Anglade, Amelie et al. “Improving Music Genre Classification Using Automatically Induced Harmony Rules.” *Journal of New Music Research* 39.4 (2010): pp. 349–361. Academic Search Complete. Accessed 3 Mar. 2016.

Belaiev, V. “Folk Music and the History of Music.” *Studia Musicologica Academiae Scientiarum Hungaricae* 7.1/4 (1965): pp. 19–23. JSTOR. Accessed 25 Feb. 2016.

Biamonte, Nicole. “Triadic Modal and Pentatonic Patterns in Rock Music.” *Music Theory Spectrum* 32.2 (2010): pp. 95–110. JSTOR. Accessed 25 Feb. 2016.

Corrêa, Débora C., and Francisco Ap. Rodrigues. "A Survey on Symbolic Data-Based Music Genre Classification." *Expert Systems with Applications* 60.3 (2016): pp. 190-210. Science Direct.

de Clercq, Trevor, and David Temperley. “A Corpus Analysis of Rock Harmony.” *Popular Music* 30.1 (2011): pp. 47–70. Cambridge Core. Accessed 25 Feb. 2016.

Gjerdingen, Robert O., and David Perrott. “Scanning the Dial: The Rapid Recognition of Music Genres.” *Journal of New Music Research* 37.2 (2008): pp. 93–100. Academic Search Complete. Accessed 26 Feb. 2016.

Guaus, E, and P. Herrera. “Music Genre Categorization in Humans and Machines.” *Audio Engineering Society,* Music Technology Group 10 June 2006. Accessed 25 Feb. 2016.

Hedges, Thomas, Pierre Roy, and François Pachet. “Predicting the Composer and Style of Jazz Chord Progressions.” *Journal of New Music Research* 43.3 (2014): pp. 276–290. Academic Search Complete. Accessed 29 Mar. 2016.

“Hip-Hop (music and cultural movement)” *Britannica Online Encyclopedia*, Accessed 3 Feb. 2017. https://www.britannica.com/topic/hip-hop

Hoffman, Miles and (U.S.) National Public Radio. *The NPR Classical Music Companion : Terms and Concepts from A to Z*. Houghton Mifflin Harcourt Publishing Company, 1997.

"Hot Christian Songs - Year-End 2016." *Billboard,* Accessed 19 Feb. 2017. http://www.billboard.com/charts/year-end/2016/hot-christian-songs

"Hot R&B/Hip-Hop Songs - Year-End 2016." *Billboard*, Accessed 19 Feb. 2017. http://www.billboard.com/charts/year-end/2016/hot-r-and-and-b-hip-hop-songs

"Hot Rock Songs - Year-End 2016." *Billboard*, Accessed 19 Feb. 2017. http://www.billboard.com/charts/year-end/2016/hot-rock-songs

Joseph, Mark. "Christian' Music Defies Categorization." *Billboard* 109.38 (1997). Print.

Kajanová, Yvetta. “The Rock, Pop and Jazz in Contemporary Musicological Studies.” *International Review of the Aesthetics and Sociology of Music* 44.2 (2013): pp. 343–359. Academic Search Complete. Accessed 25 Feb. 2016.

Karpeles, Maud. “Definition of Folk Music.” *Journal of the International Folk Music Council* 7 (1955): pp. 6–7. JSTOR. Accessed 3 Mar. 2016.

Lena, Jennifer C., and Richard A. Peterson. "Classification ss Culture: Types and Trajectories of Music Genres." *American Sociological Review* 73.5 (2008): pp. 697-718. SocINDEX with Full Text. Accessed 25 Feb. 2016

Moore, Allan F. "Categorical Conventions in Music Discourse: Style and Genre." *Music & Letters* 82.3 (2001). SocINDEX with Full Text. Accessed 25 Feb. 2016

Percino, Gamaliel, Peter Klimek, and Stefan Thurner. “Instrumentational Complexity of Music Genres and Why Simplicity Sells.” *PLoS ONE* 9.12 (2014): pp. 1–16. Academic Search Complete. Accessed 17 Feb. 2016.

Price, Deborah Evans. "Christian Music Enjoys Growth." *Billboard* 111.29 (1999): pp. 8-9, Business Source Complete

“Rhythm and Blues (music)” *Britannica Online Encyclopedia*, Accessed 3 Feb. 2017. https://www.britannica.com/art/rhythm-and-blues

“Rock (music)” *Britannica Online Encyclopedia*, Accessed 30 Mar. 2016. https://www.britannica.com/art/rock-music

Sancho, Carlos Pérez et al. “Genre Classification of Music by Tonal Harmony.” *Intelligent Data Analysis* 14.5 (2010): pp. 533–545. Business Source Complete. Accessed 3 Mar. 2016.

Shenoy, Arun, and Ye Wang. “Key, Chord, and Rhythm Tracking of Popular Music Recordings.” *Computer Music Journal* 29.3 (2005): pp. 75–86. Academic Search Complete. Accessed 10 Mar. 2016.

Temperley, David, and Trevor de Clercq. “Statistical Analysis of Harmony and Melody in Rock Music.” *Journal of New Music Research* 42.3 (2013): pp. 187–204. Academic Search Complete. Accessed 24 Mar. 2016.

Temperley, David. “The Melodic-Harmonic ‘Divorce’ in Rock.” *Popular Music* 26.2 (2007): pp. 323–342. Cambridge Core. Accessed 14 Mar. 2016.

Terrat, Richard G. “A Pregroup Grammar for Chord Sequences.” *Journal of New Music Research* 34.4 (2005): pp. 355–360. Academic Search Complete. Accessed 30 Mar. 2016.

Typke, Wiering, and Veltkamp. “A Survey of Music Information Retrieval Systems.” *Conference Paper* (January 2005). ResearchGate. Accessed 30 March, 2017

Vlegels, Jef, and John Lievens. “Music Genres as Historical Artifacts: The Case of Classical Music.” *Connections* (02261766) 35.1 (2015): pp. 51–61. Social Sciences Full Text. Accessed 17 Feb. 2016.

Weisethaunet, Hans. “Is There Such a Thing as the ‘Blue Note’?” *Popular Music* 20.1 (2001): pp. 99–116. Cambridge Core. Accessed 24 Feb. 2016.

APPENDIX: GLOSSARY OF TERMS

Cadence- the resolution of a phrase or piece of music

Cadential flourish- Any stylistic event that leads to a cadence

Chord- 3 or more different notes compiled into a single unit

Chord Inventory- a list of all utilized chords in a given song or genre

Christian (music)- songs appearing on Billboard's 2016 year end charts as Christian songs

Circle of Fifths- a progression consisting of descending fifths (or ascending fourths)

Diatonic- containing no pitches outside of the established key

Dissonance- the clashing of pitches

Dominant- the fifth note or chord in a key

Genre- a category of artistic composition

Harmonic- pertaining to the structure of chords

Hip-Hop/R&B (music)- songs appearing on Billboard's 2016 year end charts as Hip-Hop/R&B songs

Key- the scale around which a song is composed

Melody- a sequence of single notes often prominently featured

Mode- the major or minor nature of a key or a chord

Modulation- the changing of keys

Parallel major/minor- the relation of two different modalities of scales that contain the same tonic, but different notes, e.g. G major is the parallel major to g minor

Picardy Third- the use of a major tonic chord at the cadence of a minor piece or phrase

Relative major/minor- the relation of two different modalities of scales that contain the same notes, but different tonics, e.g. G major is the relative major to a minor

Resolution- the movement from dissonance to harmony

Rhythm- the study of music as it takes place in time

Rock (music)- songs appearing on Billboard's 2016 year end charts as Rock songs

Secondary Dominant- the non-diatonic dominant chord of a note other than the tonic

Subdominant- the fourth note or chord in a key

Timbre- the characteristics of a sound aside from volume and pitch

Tonic- the first note or chord in a key

Tonicization- utilizing a note other than the established tonic as a temporary tonic