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Harmonic Structures of 21st Century Heavy Metal

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Abstract

Since the birth of heavy metal as a genre, many different styles of music that fall under the broad category of “metal music” have emerged, each having their own scenes and subcultures. This thesis investigates the relationship between subgenre and harmony, aiming to answer the question: how do the different subgenres of metal music in the 21st century handle harmony differently?

One hundred metal tracks from five different subgenres of metal were analysed, with data on which chords were used and which modulation techniques were employed recorded for each. Analysis of the data showed that, whilst each subgenre certainly recapitulates the techniques used by the early heavy metal bands of the 1970s and 1980s, each has its own signature style that is used to portray the desired sonic aesthetic of the subgenre. Most crucially, a specific modulation technique was found to be almost entirely unique to power metal, and is heavily used within the subgenre. Black metal bands were found to make heavy use of non-diatonic, pan-triadic sequences that are well suited to a neo-Riemannian perspective on harmony.

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1. Introduction

Compared to other genres of music, relatively little has been written about the harmonic choices made by metal artists, and even less so about metal music in the 20th century. The most prevalent texts on the matter are currently Esa Lilja's *Theory And Harmony Of Classic Heavy Metal* (2009), and Robert Walser's *Running With The Devil* (1993). Both of these texts discuss at length heavy metal's use of Aeolian, Dorian, and Phrygian modes, power chords, and the characteristic i, VII, VI Aeolian chord progression outlined by Alf Bjornberg's (1984) *On Aeolian Harmony In Contemporary Popular Music*.

These two main texts, however, do not discuss whatsoever the use of harmony in metal in the 20th century. Walser's was written in 1993, and Lilja's only covers "classic" heavy metal, up to and including the year 1985. For myself, a heavy metal fan and harmony enthusiast, this begs the question: what harmonic techniques are metal artists using now, and has this evolved at all since heavy metal's beginnings?

Furthermore, since these texts (or the topics thereof), many new subgenres of heavy metal have arisen. Styles such as Black Metal, Death Metal, Power Metal have emerged where before, according to Glen Benton of Deicide, "there was just metal" (McIver 2005). This led me to wonder as to whether the harmonic traditions of metal in the 1980s have been advanced in different ways by different artists, and whether they use harmony differently to portray the various required aesthetics of the new subgenres.

In an attempt to quantify the compositional decisions made, data was collected from 100 different modern metal tracks, all from different artists spread over five subgenres of metal music. This data falls into two categories: the chords used and the modulations employed. This data was compiled into a spreadsheet so each track and each subgenre can be compared and contrasted effectively to see which harmonic techniques are prevalent within their category.

This thesis contains a brief background of each of the subgenres I have chosen in chapter 4, including a description of each of their desired aesthetics including lyrical themes, cultural origins, and how they

are defined in the 21st century. This is to provide context to the reader if they are coming from the external perspective of a non-metal fan and also to ensure that readers who are metal fans understand the decisions I have made as to what subgenres I have included in the study. The chapters that include the bulk of the harmonic analysis will first present the harmonic techniques that are intrinsic to each subgenre, providing real-world examples of how they are used, followed by a section that compares the subgenres and discusses the differences between them.

The chapter that includes the harmonic analyses is split into two, first discussing the chords used by each subgenre in chapter 5.1, examining different techniques used by each. The key findings concern the use of secondary dominants and diminished sevenths within power metal and neo-Riemannian pan-triadic sequences in black metal, deliberate simplicity within metalcore, new wave of British heavy metal (NWOBHM) influences on melodic death metal, and inherent complexity of progressive metal, followed by a passage comparing them.

Chapter 5.2 will cover specifically how each subgenre approaches modulations, which key-changes are being used, and how they are prepared, followed again by a few paragraphs comparing between them. This chapter discusses at length the “Aeolian chromatic mediant” modulation frequently used in power metal, melodic death metal’s affinity for modulating up and down by one whole tone several times within one track, and discusses how progressive metal bands which have a main secondary subgenre which “progressive” acts as a prefix of commonly employ modulations found within these subgenres. Following this, the chapter 6 discusses the implications of the findings, how harmony can affect the perception of “heaviness” within music, for example, how the research expands on existing heavy metal literature, and how the findings may contribute to future genre taxonomies, using harmonic analysis as a method of genre classification.

2. Literature Review

2.1 Music theoretical analysis of popular music

Though the harmony of metal music itself has not been subject to a large amount of quantitative research that spans dozens of tracks and artists, the larger field of popular music has lots to offer. Clerq and Temperley's (2011) "A corpus analysis of rock harmony" offers an extensive database of chord progressions collected from one hundred different rock songs spanning five decades. They used this to draw conclusions about the genre's harmonic choices and see how rock music's harmonic palette developed over half a century. Furthermore, the possible bias of the writer's choice in music is reduced by the tracks being taken from *Rolling Stone* magazine's "500 Greatest Songs Of All Time", rather than a select few tracks chosen by the writers, as we see in the work done by Lilja and Kazdan. However, this methodology can lead to other biases, for example it may be true that bands treat harmony differently when writing singles, perhaps wishing to use simpler progressions to keep the track commercially viable. The pair addressed the issue of harmonic analysis being somewhat subjective by both providing analyses of all the tracks used in the study and found they agreed on over 90% of the material.

Also concerning rock music is Everett's "Making Sense of Rock's Tonal Systems*"* (2004). This text offers a list of nine classifications of these tonal systems. It discusses how each differently handles harmonic function, scalar modes, and voice leading by analysing how each of these different systems is used in different eras and styles of rock music. Everett offers a holistic, global overview of all the different harmonic techniques that rock music employs in different ways.

Moore (1992, 1995, 2001) argues that modality is the most intrinsic factor in rock harmony. He explains that rock chord progressions are often built around one mode, with Ionian, Dorian, Aeolian, and Mixolydian being the most represented. Similar to Kazdan's findings on Scandinavian Death Metal, he discusses how movement by fourths is most common and how rock harmony is typically non-functional, meaning the chords do not cause the listener to expect a specific subsequent chord.

Covach, J and Boone, G. (Eds.) (1997) published a collection of essays entitled *Understanding Rock: Essays in musical analysis,* which covers a range of topics about rock music's scholarly analysis. The essays use rhythmic, harmonic, and melodic analyses to provide deeper insight into the works of artists like Cream, The Beach Boys, and Jimi Hendrix.

In his book *Analysing Popular Music* (2010), David Machin provides a guide for scholars on the textual, semiotic, and multimodal analysis of popular music. The book acts as a good starting point for those without a background in music or music theory, who wish to write about music as part of multimodal discourse, for example, sociology or media students. It is also an excellent place to start for music students and scholars interested in discussing music from another angle.

2.2 Genre Theory

To discuss how genre (or subgenre) affects artists' musical decisions, we must first take steps to understand what genre is and how the various axioms of a genre can inform both decisions of a composer and a listener's expectations. These paragraphs include a brief introduction to genre theory and explore the existing taxonomies of metal subgenres.

2.3 Genre In Popular Music

In *A Theory Of Musical Genres: Two Applications*, Franco Fabbri defines a musical genre as "a set of musical events (real or possible) whose course is governed by a definite set of socially acceptable rules" (1982, pg. 1). The phrase "musical event", being defined as "any type of activity performed around any type of event involving sound" (pg. 1). Fabbri further explains that these sets of rules diverge into subsets known as subgenres and that these musical events may belong to two or more subgenres simultaneously. In this thesis, the musical events we are concerned with are the chords and key-changes used.

Fabbri relates musical genres' functions and rules to Roman Jakobson's functions of communication: referential, emotional, imperative, phatic, metalinguistic, poetic. Jakobson states that all of these are usually somewhat present in every message, with one dominating the others. Fabbri explains that the same is true for a piece of music and that the rules of the piece's genre determine which of these

functions becomes the most important. One of Fabbri's given examples relates well to the topic at hand: how the poetic factor is more prominent in art music (music, for music's sake), as it "distinguishes progressive rock from hard rock". An understanding of the intended communicative function of a piece of music is imperative to understanding the artist's compositional decisions. A piece of phatic (background) music, for example, is not best scrutinised under the same lens as one that's intended purpose is the emotional function and vice versa. The same is true of the subgenres of metal, and whilst this research must, for fair research, treat all subgenres as equally as I can, it is worth bearing in mind that the differences between them are just as much a by-product of their intended function, as they are to the compositional skill or knowledge of the bands in question.

Concurring with Fabbri's claim of genres including a "definitive set of socially acceptable rules", Brackett's definition of genre (2002, p. 67) states that "genres are not defined by characteristics of musical style alone but also by performance rituals, visual appearance, the types of social and ideological connotations associated with them, and their relationships to material conditions of production." Both of these views ascertain that genre is not purely concerned with musical elements.

There has been some disagreement in the past as to whether this concept of genre's main identifying factor being compositional rules should apply to metal music or not. Writers such as Moore (2001) used a model for analysing rock music that focused on melody, harmony, and rhythm, rather than lyrics, aesthetics, and other paratextual factors. Existing metal scholars such as Smialek (2015) and Gracyk (2016) both argue that musical style alone cannot define heavy metal. Smialek argues that paratext must be accounted for, especially for a genre such as black metal, which is so heavily determined by lyrics. Hillier (2020b) proposes that "elements of musical style should be the primary, defining characteristics of a metal subgenre within metal studies."

2.4 Genre In Metal

While metal music was still a young genre, many bands splintered off from the crowd to create new musical styles. Whilst they were independent of each other, they were still considered by themselves and by others to be 'metal'. This led to the vast array of subgenres that we have today. Few other

music genres have so many different styles that fall under the same umbrella, and fewer still place such importance in categorising them.

Similarly to popular music as a whole, metal scholars have long talked about both the flexibility of genre (Walser 1993), and the importance of visual, social, and behavioural elements in the conceptualisation of genre (Weinstein 1991). Traditional models of genre have often been discussed as incompatible with heavy metal due to its complex history and its seemingly never-ending web of interconnected subgenres and styles (Kahn-Harris 2007, Smialek 2015). Several texts offer discussions of genre within heavy metal, both making efforts to categorise the various sounds found within heavy metal (Dunn 2005, Hill 2008, Sharpe Young 2007) and to understand better heavy metal's relationship with genre as a whole (Smialek 2015, Hillier 2020b, Kennedy 2018).

Smialek (2015, pg. 34) offers exploration and critique of some existing metal subgenres' taxonomies. He describes Sam Dunn's "Definitive Metal History Family Tree" (2005, rev. 2011) as "a good starting point because of the intuitive simplicity of its layout" (2015, pg. 37). Dunn's work is presented as a flow chart, with each subgenre linked to related ones by coloured lines, showing the reader the parentage of each subgenre, and making the influences that older styles have had on newer ones easy to identify visually. Dunn's chart has come under some flack, however. Smialek criticised his misplacement of two bands (Children Of Bodom being under thrash metal, and Cradle Of Filth being under Norwegian black metal, although both were amended in his revised version in 2007), along with a misspelt band name (Over Kill rather than Overkill).

Both Eric Lestrade's *"History of Metal: And some other related musics…"* (2001) and Mike Hill's *"Metal Subgenre Popularity Index"* (2008) hierarchically present their taxonomies. Hill's work organises subgenres by extremity, ranking fourteen subgenres amongst each other. Hill's ranking also displays how some subgenres lack subcultural capital amongst metalheads: with nu-metal and metalcore ranking below NWOBHM. Smialek states that "it would be difficult to argue that NWOBHM is more musically aggressive than they are".

Lestrade's work posits a similar view to Hill's. Although it was created before the widespread mainstream growth of metalcore, therefore not including it, *History Of Metal* (2001) includes a bracket

titled “alternative metal”, containing the “abject genres” of its day: nu-metal, industrial metal, fusion, and grunge. These subgenres are placed as far away as possible from death metal and black metal as possible, even more so than hard rock. As the title suggests, *History of Metal* is the first of these taxonomies to include a chronological scale, giving rough dates of each subgenre’s inceptions and the most prominent bands within each.

In *Functions of Genre in Metal and Hardcore Music* (2018), Kennedy differentiates between genre, style and scene, analysing how each can differ in their meaning and usage, despite being heavily inter-connected and often used interchangeably. When discussing genre, Kennedy is quick to acknowledge the significance of non-sonic factors when genre has been analysed previously in both metal academia (Weinstein 1991) and literature on popular music as a whole (Brackett 2002, Fabbri 1982). He identifies genre as the most general term, “encompassing visual, verbal, behavioural, discursive, and ideological elements” (2018 pg. 184) whilst remaining music-focused in both academic and non-academic discourses. Kennedy describes style as more specific and literal, allowing discussions to be had about the musical elements of a track without denoting cross-contamination of subgenres. Kennedy gives the example of “referring to a song that uses death metal style vocals, for instance, specifies a particular aspect of the piece in question, but refrains from ascribing to the song the genre title death metal” (pg. 185). Finally, Kennedy addresses the term “scene”, which he concludes is similar to both style and genre, but with attribution to physical place and period. An example of this would be American band The Black Dahlia Murder being a melodic death metal band, but not being included in discussions of the Gothenburg sound pioneered by In Flames, Dark Tranquility, and At The Gates.

One important concept to grasp when discussing the differences within metal genres and fans’ behaviours is that of subcultural capital. Smialek (2015) explains this as a kind of “street cred” specific to those within the metal subgenre. Keith Kahn-Harris in *Extreme Metal: Music and culture on the edge* (2007, pg 122-131) takes this concept and develops it into two forms: “mundane” subcultural capital and “transgressive” subcultural capital. Mundane subcultural capital is explained as being “accrued through self-sacrifice, commitment and hard work”, and having knowledge of the complex histories of the scene and by having heard the music of its vast number of bands.

In contrast, transgressive subcultural capital is “claimed through a radical individualism, through displaying uniqueness and a lack of attachment to the scene” (2007, pg 127). Kahn-Harris credits this transgressive subcultural capital with the development of the genre as a whole, especially in the extreme metal scene and the growth of black metal. stating that “Black metallers have been most enthusiastic in claiming transgressive subcultural capital” (pg 128), and “Norwegian black metal bands strove to transgress boundaries within the extreme metal scene itself”. This implies that whilst mundane subcultural capital is intrinsic to the retention of beliefs and behaviours of the scene, transgressive subcultural capital is needed for the scene to grow and flourish into the diverse family of scenes that metal music encompasses.

2.5 History Of Metal Music Research

The field of metal music studies has been a gradually flourishing discipline for some twenty-plus years now, the first full-length text being Deena Weinstein’s (1991) *Heavy Metal: A Cultural Sociology,* which focuses on the culture of metal music and offers explanations on why heavy metal has outlived many of its cousins that were also birthed of rock music, arguing that heavy metal as a music and a culture is here to stay, and is a genre worth respecting. Since Weinstein set a precedent for metal music to be a worthwhile academic pursuit, other texts followed, including Walser’s seminal text *Running With The Devil* (1993). Walser further demonstrated metal’s worth as a field for academic study by introducing the idea that the virtuosic guitar playing that many metal players are famous for was more heavily influenced by Baroque composers than their rock guitarist predecessors. This helped to validate heavy metal as a genre that focuses not on just masculinised brutality but technical skill and musical intricacy.

These two texts are not without criticism, however. Due to their age, both texts have become outdated, as they predate social media and online forums, which have become important settings for members of metal subculture to convene and discuss the music and its surrounding phenomena. The two authors have been referred to as “first generation metal academics” (Kennedy 2017, pg. 28) due to their initial importance but waning relevance. Walser attracted criticism for neglecting the “institutional matrix that produces heavy metal music” (Manheim 1995, pg. 233), overlooking the

marriage between big-business marketing and the grass-roots, underground scene that was essential in the growth of the genre. A similar criticism has been made of Weinstein's work, with one online reviewer on metal-rules.com noting that Weinstein all but ignores the "true underground and the thousands and thousands of bands that inhabit that realm" (J.P. 2001). The omission of the underground, club-scene bands in both of these texts however is likely due to both authors feeling the need to "defend metal music culture as an area worthy of scholarly consideration" (Kennedy 2017), and not wishing to alienate readers by discussing smaller artists.

The first academic conference to feature heavy metal as its primary subject took place in Salzburg in 2008. Dozens of people attended the meeting, most of which presented papers, and it gained international media attention, notably from the UK newspaper *The Guardian.* Organised by Niall Scott, this conference further legitimised the field of metal studies. It inspired many aspiring academics to enter the field and expand their collective knowledge. These first metal conferences helped scholars worldwide become aware of each other's work and provided a sense of community for academics in the world of metal studies. Before this, even prominent metal scholars Deena Weinstein and Keith Kahn-Harris (2011) saw it as unthinkable that a conference or journal on heavy metal would be feasible.

Another of the first moments where metal studies began to be seen as a worthwhile pursuit, particularly by the mainstream academic world, was when the *Journal For Cultural Research* published an issue entirely dedicated to the emerging field. In this issue, Spracklen et al. (2011) provided two explanations for the new academic endeavour's sudden emergence. The first of which being that as young metal fans grew into budding scholars, they were attracted to the world of heavy metal as not only a listener but an academic, wanting to delve into the intellectual facets of a big part of their identity. This is supported by data from cultural surveys of the time, which found that in the early 2000s, heavy metal was growing as a favourite of university graduates (Savage 2006). The other explanation is that a shift in how metal music was viewed and portrayed in the media occurred around this time. No longer ridiculed and disregarded (Weinstein 2004), but treated as an equal to jazz and classical music. As an article from *The Observer* states, "some of the brightest young people

in Britain like nothing more than a monster riff to unwind to after a hard day of being a chess prodigy" (Empire 2007).

Metal academia came into its own in 2013, with the International Society for Metal Music Studies' creation. This organisation was created to bring academics interested in the area together from all over the globe, share their research, and expand the horizons of metal music studies. The organisation has published the *Metal Music Studies* journal since October 2014, releasing issues thrice a year since 2015. It has included articles from various disciplinary approaches, including history, philosophy, and religion (Olson 2017). A recent trend in the field is cultural studies, with the journal even having a full issue of articles related to heavy metal's cultural impact in 2016. This covered topics such as; gender issues and sexism (Hill 2016; Fellesz 2016), heavy metal's relationship to Eastern European politics at the end of the cold war (Von Faust, 2016), and the cultural impacts of metal in countries that have more recently adopted it, mainly those outside Europe and North America (Banchs 2016; Maclachlan 2016).

2.6 Music theoretical analysis of metal music

Somewhat underrepresented, however, is the discussion of the music theory of heavy metal, and even more so lacking is the study of harmony within it. The most prominent text written on the subject is *Theory and Analysis of Classic Heavy Metal Harmony* by Esa Lilja (2009). Lilja discusses the compositional decisions made by artists from heavy metal's inception up until the year 1985. This leaves a gap in the market for analysis of modern heavy metal, as since 1985, the metal genre has diverged into many individual styles of music distinct from one another. Lilja argues that these "classic" bands like Dio and Deep Purple, despite being modern, popular music, have a closer harmonic language to Baroque and Renaissance composers than other popular music styles of their day. He highlights the prominence of Aeolian and Dorian modal progressions and riffs and how guitar distortion affects the acoustic properties of the genre, along with the audience's perception of it.

One facet of music theory that will be discussed in later chapters of this thesis is neo-Riemannian theory. This is a school of thought championed by music theorist Richard Cohn in his book *Audacious Euphony, Chromatic Harmony and the Triad's Second Nature* (2011), which proved useful in

discussing black metal's harmonic progressions. Cohn describes in great detail how the master composers of the romantic era often choose chord progressions not based on key or modality but instead by how smoothly they can be moved through each other by voice-leading. This text redefines how composers and theorists alike can navigate pan-triadic progressions and provides easily understandable diagrams to explain the techniques.

2.7 A Brief Primer on Neo-Riemannian Theory

Neo-Riemannian theory is, in essence, another method of analysing chord progressions championed by music theorists Richard Cohn, David Lewin, Brian Hyer, and Henry Klumpenhower. Rather than describing triad's relations to one another from the perspective of what key signatures they fall in, neo-Riemannian theory views chord relations based on how many "units of work" are needed to transform one into another. "Unit of work" meaning to shift one of the notes in a chord up or down by one semitone.[1]

Guy Capuzzo discusses how a Neo-Riemannian perspective can be useful in *Neo-Riemannian Theory and the Analysis of Pop-Rock Music"* (2004). He explains how non-diatonic progressions in the music of bands like Depeche Mode and Radiohead "make a Roman numeral analysis anything but straightforward" (pg. 179). Capuzzo does also delve into the world of heavy metal, providing a Neo-Riemannian analysis of a guitar sequence in Ozzy Osbourne's "Flying High Again", explaining how this analysis better encapsulates the "sequential drive" of the progression (pg. 183). Capuzzo remarks that Neo-Riemannian theory is able to "demonstrate coherence in music that resists Schenkerian, functional harmonic, or other "classical" tonal approaches" (pg. 196).

Esa Lilja highlights neo-Riemannian analysis as a valuable framework for discussing heavy metal harmony in *Harmonic function and modality in classic heavy metal* (2019). Although rather than using it to discuss moments where composers use non-diatonic, pan-triadic progressions, he uses elements

[1] For example, it takes one unit of work to transform C major into C minor, moving the E natural down a semitone to an E flat. The same amount of work is required to transform C major to E minor, moving the tonic down a semitone, to B natural. This means that, from a neo-Riemannian perspective, C major is as closely related to C minor as it is to E minor, which cannot be said from a traditional, roman numerals based approach, where C major and E minor share a key signature and C major and C minor do not.

of neo-Riemannian theory to gain a new perspective on the analysis of the “tried and true” minor-mode chord progressions that metal music theorists have written about many times over (Lilja 2009). Furthermore, in a similar fashion to his 2009 text, he only discusses its application to “classic” heavy metal, and only references music from the 1970s and 1980s, further suggesting that there is room for more to be written about metal in the modern era.

In *Textural applications of power chords in Scandinavian death metal* (2017), Allana Kazdan discusses the application of harmony in Melodic Death Metal, Folk Metal, and Viking Metal, and how rhythm, lead, and bass guitars are used differently between them to create different textures. She finds that death metal generally uses typical tonic, subdominant, dominant, tonic progressions, emphasising pedal tones to stabilise the harmony and allow for more interesting melodic lines. This text is one of the very few that offers a comparison between multiple different styles of metal. Yet, it still covers three subgenres that fall under the umbrella term of “Scandinavian Death Metal”. However, the work covers only one track from each subgenre, leaving questions about whether the conclusions drawn can be accurate for Scandinavian Death Metal as a whole.

Stolz (2017) takes a more layperson-friendly approach to analysing the works of Black Sabbath. *Experiencing Black Sabbath: A listener’s companion* explores Black Sabbath’s twenty studio albums song by song, providing insight into the music that birthed the genre of heavy metal. Foregoing the intricate score analyses and technical language of texts like Lilja’s, Stolz has received praise for writing in plain english, describing Black Sabbath’s sounds in such a way that someone without a formal musical education can understand. When musical terms are unavoidable, Stolz makes great effort to explain them simply but effectively, for example his definition of the tritone (2017, pg. 1). Stolz’s work also touches on production techniques, explaining how panning is used to sonically illustrate the story of the track “Iron Man” (pg. 15).

Several texts have analysed the rhythmic structures of heavy metal outside the realm of harmony, a large number of which discuss the band Meshuggah and other progressive “math-rock” bands. The online blog *Metal In Theory* which Stephen Hudson established in 2014 includes such articles as “Disconnecting Rhythm and Pitch in Meshuggah’s “Nostrum””, “Fragments and Asymmetrical

Repetitions, Meshuggah-Like Rhythms in Tesseract's "Retrospect"", and "Fragments of Riffs and Small Alterations in Meshuggah's "Obzen"". These articles discuss the prog-metal world's intense rhythmic complexities and how techniques like polyrhythm, isorhythms, and asymmetrical repetitions create the chaotic yet undeniably groovy style that Meshuggah have pioneered. American scholar Calder Hannan has written two guest posts in the blog analysing the "layers of metre in Inter Arma's "The Atavist's Meridian" " (2019) and "Metric Complexity in Car Bomb's "Light's Out" " (2017).

This topic is further discussed outside *Metal In Theory* by scholar Eric Smialek (2008) with his Master's thesis *Rethinking Metal Aesthetics: Complexity, Authenticity and Audience in Meshuggah's* I *and* Catch Thirtythr33, which delves into Meshuggah's use of programmed drums, and how this was an act of rebellion against the "rules" of heavy metal recording at the time, and further contributed to their mechanical, machine-like aesthetic. Pieslak (2007), in the journal *Music Theory Spectrum* offers insight into the subgenre's socio-cultural perspective and the relationship between structural analysis and the music's fans.

Specific to black metal, there is *Helvete: A Journal of Black Metal Theory,* which was first released in 2013. Similar to *Metal Music Studies*, this journal covers a wide range of topics including religion (Cotterel 2013), black metal vocal technique (Pröll 2016), and, more relevant to my thesis, harmony, which Bert Stabler (2016) covers in "False Atonality, True Non-Tonality". Stabler states that black metal conforms to a "musical cage of flattened supertonics and parallel fifth chords" (2016, pg. 111). This is a similar view to that which Owen Coggins presents in "Distortion, restriction and instability: Violence against the self in depressive suicidal black metal" (2019), in which he describes black metal's chord progressions as "repeated, usually straightforward patterns of one chord strummed for bar, changing chord when changing bar, cycling through predictable and extensively repeated progressions without much variation" (pg. 406).

2.8 Music technology and production

One prominent area of heavy metal literature that has grown in the last few years is the relationship between composition and music technology. Mynett (2012, 2013, 2017) has written extensively about heavy metal production techniques and how producers and musicians must work together to find a

balance of heaviness and intelligibility. For example, layering guitar tracks creates a “wall of sound” that increases heaviness but lessens the definition of the attack (Mynett 2013, p. 106-107).

There is similar research on production techniques focused on how distortion affects the timbre of the electric guitar, affecting the music’s perceived heaviness and creating overtones that can alter the tonality of chords. It is generally accepted that the “power chord”, a perfect fifth interval is the most frequently used chord in most metal genres (Walser 1993: 43; Berger 1999: 184–85; Kahn-Harris 2007: 31–32). Despite the power chord having no intrinsic tonality, as it lacks a third, several authors have written about how overtones created by distortion can cause listeners to perceive it as major. In “The influence of progression type and distortion on the perception of terminal power chords" (2011), Juchniewicz and Silverman tested the effect that distortion has on the perceived tonality of the final power chord in a progression in a listening study performed on undergraduate music majors. They found that distortion has a significant impact on whether or not a power chord was heard as a major chord by the participants. Lilja (2015, p.396) explains that this is due to the major third overtone, the fourth in the harmonic series, being amplified by distortion. Herbst (2016, 2018) has published two studies into the effect of distortion on the perceived tonality of the power chord and the perceived “pleasantness” of various chord types. In his spectrographic analysis (Herbst 2016, p.185-92), Herbst found that distortion amplifies the combination tones of the perfect fifth, intensifying the major third that Lilja discusses, thus that a distorted power chord has an almost identical harmonic structure to a major chord.

Due to the prominence of power chords within heavy metal, this perspective would put a proverbial “nail in the coffin” for my research. However, Berger and Fales (2005, p.184) argue that the listener rather hears these overtones as noise surrounding the tone, rather than explicit extra notes. I would also make the argument that there are usually external factors that contribute to the tonality of the chord in the context of the song as a whole. Lead guitar melodies, vocal lines, and keys parts all regularly contain notes that inform the tonality of a chord, in which case Berger and Fales’ perspective fits more in line with my research.

Herbst's other recent paper on the topic "*Heaviness and the electric guitar: Considering the interaction between distortion and harmonic structures"* (2018) discusses distortions' effect on the perceived pleasantness of a chord, recording how it affected different types of chords differently, and how the effects were different amongst different demographics. Men, for example, were found to be less affected by distortion than women.

2.9 Heaviness

A constant discussion within the realm of heavy metal academia is on the concept of heaviness. Many scholars assert that heaviness is the single most crucial aspect that defines heavy metal as a genre (Walser 1993, Berger 1999, Mynett 2017), but what constitutes heaviness? How do we define it? Several elements of heavy metal music have been said to enhance a track's heaviness, including rhythmic complexity, modality, arrangement, tonality, and production.

For Berger (1999), heaviness is primarily a descriptor of guitar timbre, namely distortion. Along with Cornelia Fales, he conducted a study using spectrograms, analysing how guitar timbres have changed since heavy metal's inception in the 1960s. They surmised that as the genre developed, it became heavier over time, with guitar distortion being the most important factor in this increased heaviness (Berger and Fales 2005, pg. 182-83). Walser (1993) agrees with this and states that harmonic content can have an impact, citing that heavier subgenres of metal make more extensive use of darker modes, namely Phrygian and Locrian (1993, pg. 46).

Calder Hannan (2018) talks about the relationship between heaviness and rhythmic complexity. He discusses two influential progressive metal bands that use intricate polyrhythm and virtuosic metre changes: Meshuggah and The Dillinger Escape Plan, and concludes:

> While rhythmic difficulty is neither necessary nor sufficient for heaviness, it can effectively contribute to it in a variety of ways: by allowing an opportunity for a band to showcase their precise playing and inspire awe; and by being perceptually unwieldy, awkward and uncomfortable". (2018, pg. 455)

On black metal, Ross Hagen (2011, pg. 184) writes that for black metal “full chord voicings, which produce a denser and less clearly resonant timbre when played through distortion” affect the subgenre’s heaviness because of the impact on the sonority of the guitars, and discusses that obscured tonality caused by the reduced clarity in the guitars has a further bearing on black metal’s heaviness.

The number of different perspectives on heaviness concerning different subgenres of heavy metal music suggests that concepts of heaviness are different within each subgenre, and consequently, the perceptions of heaviness vary wildly amongst the fan subcultures of the genre. Mynett (2013, pg. 40) notes that heaviness for each subgenre is “a discursive category that implies a collection of sonic characteristics and compositional, or performative, elements”.

3. Methodology

To answer the two main questions of my research “what approaches are modern metal artists using with regards to harmony?”, and “how do different subgenres of metal music differ in their approaches?”, the first step taken was to create a shortlist of metal subgenres that, in my experience as a listener, composer, and scholar, have distinguishable harmonic palates from their cousins. Due to the lack of any existing text that compares the harmony of different subgenres, I had to use my judgement to decide which subgenres would be worthwhile covering. The subgenres I settled on were black metal, power metal, progressive metal, melodic death metal and metalcore. These five subgenres were suitably different from one another, and though they do not encompass all of the different styles of metal in the modern world, they do represent a large portion of what is happening in metal’s current climate.

In current literature, black metal is said to have “heady, intense harmonic progressions” (Steinken 2019, pg. 23) and “predictable and extensively repeated progressions” (Coggins 2019, pg. 406). These two quotes along with black metal’s lyrical themes (Smialek 2015) and overall dark aesthetic prompted me to include black metal over death metal as the “extreme” subgenre in the study. Although Smialek identifies death metal as the other “principal” subgenre of extreme metal (2015, pg. 22), he also notes that death metal bands like Cannibal Corpse and Demilich prefer to build songs around riffs based on transpositionally similar pitch collections, (pg. 165) rather than create songs with traditional pan-triadic chord progressions. With my work focusing largely on chord progressions and modulations, death metal’s largely atonal (pg. 167) harmonic structure made it seem less suitable than black metal.

In an effort to not totally neglect the existence of death metal, the inclusion of melodic death metal seemed an acceptable compromise. Hillier (2018, 2020a) and Bowar (2019) have written about the harmonic and melodic content of melodic death metal, so its inclusion in this study should be able to expand upon their existing work.

Power metal's close relationship to Western classical music (Walser 1993, Sharpe-Young 2007), light-hearted lyrics (Metal Crypt 2004) and virtuosic vocal melodies (Herbst 2019) were all elements of the genre that beckoned me to examine how power metal bands compliment these aspects in their harmonic material.

Metalcore's commercial popularity and deliberate simplicity (Wiederhorn and Turman 2013) indicated that it would be a strong contrast to the other more harmonically intricate subgenres. Furthermore, the influence that hardcore punk holds on metalcore (Kennedy 2018) would likely play a part in its harmonic material, with it foregoing emotive chord structures in favor of breakdowns and riffs (Easley 2015).

Finally, progressive metal was chosen to round out the quintet of subgenres. Despite being tricky to define and a very broad term, it seems sensible to include as progressive metal as it is known for being a boundary-pushing genre that is more inventive and more technical than others (Travers 2021), and this study can help determine whether that applies to harmony as well as instrumentation and structure.

In terms of sampling, in an attempt to keep my personal bias out of which tracks were analysed, I used a similar technique to Clerq and Temperley's (2011) study, taking tracks from albums found in top lists from the websites loudwire.com. rateyourmusic.net and metalstorm.net, using either the first single released from each album, or the first track of each record. This approach helped to ensure that each band was sorted into its subgenre correctly, or at least with some general consensus of the fanbase. This ensured that, particularly with the tracks found on *Metalstorm*'s top lists, that the tracks chosen were an accurate representation of which artists are considered to be the best in their field, as *Metalstorm'*s lists are based on fan ratings. The tracks found in loudwire's lists are not, but there was a strong overlap between the two sources, and loudwire's journalists are a strong enough authority on the music to be able to trust their choices. The reason multiple lists were used for each subgenre is that, as due to the study only including songs from the twenty-first century, a single toplist often did not include twenty albums from after the year 2000.

Primary data was gathered by listening to the chosen tracks, and recording harmonic data based on what I heard. The data included two main components: what chords were used in homophonic/pan-triadic sections, recorded as roman numerals rather than letter-names for notes/chords, so each chord is recorded relative to the key. When modulations occurred, key-changes were recorded as a number indicating how many semitones the new tonal centre was from the previous, +3, for example, would be an upwards shift of three semitones.

Due to the nature of some tracks being much more complex than others, some tracks took several listens before I was happy that my analysis was sufficiently accurate, whilst others took far less, particularly those that were built on simple diatonic progressions with lots of repetition. During the listening process I used a few methods to help me confirm I had recorded the information correctly. Playing along to the track on piano was an easy way to double check the simpler songs. Transcribing passages of tracks in scorewriter software Guitar Pro gave me not only a visual aid when I needed one, but also was useful for deducing some more intricate chords, as I could use the audio from the notation software to match the pitches heard in the track.

For the more difficult to decipher songs, I found that taking the track into a DAW (digital audio workstation)[2] and isolating the audio that was panned hard left and right was a good way to listen to just the guitar lines, as this is where they are typically situated within the mix, this combined with more listens to the track as a whole allowed me to pick out some notes that otherwise would have been more difficult to decipher. A tool that at first seemed useful that I eventually chose not to use was a spectrogram, this would have helped to eliminate personal biases making my analysis more objective. However, I found that analysing metal tracks within a spectrogram to not be very easy, as the large amounts of compression and busy arrangements made it hard to identify what was what.

The variable of chord played was based on the harmonic rhythm of the track, meaning that if for example a song consisted of a sequence of a bar of C minor, a bar of Ab major and 2 bars of Bb major, repeating 16 times, it would count as 16 each of i and VI, and 32 of VII. Converted to percentages would be 25% each of i and VI, and 50% VII. This helped to ensure that chords which

[2] Software which can be used to record, edit and otherwise manipulate sound.

were held for longer than others within a given sequence were not underrepresented as they would have been if I'd recorded the same sequence as being 33% each chord. Using percentages rather than numerical values helped to prevent longer tracks from overshadowing shorter ones, as these would likely include more instances of each chord.

In the interest of simplicity, and because the tonality of metal music is so overwhelmingly minor (and especially) Aeolian based (Lilja 2009, Kazdan 2017, Berger 1999 etc.), I treated all the tracks as being in a minor key throughout their entirety. Thus, each roman numeral given refers to a degree of the Aeolian mode, unless modified by accidentals (b and #). Whilst one could analyse a section of a track that started on the relative major, a chorus, for example, as a modulation, I found this unproductive as to move from a minor key to its relative major, e.g. B minor to D major, is not a change of key signature, and can just as easily be recorded as a section that begins on the chord bIII. The fact that relative keys share the exact same notes (Benward and Saker 2003), especially as so much of the material is aeolian (natural minor), would potentially cause this to confuse the data, for example VI chords from the minor would become IV in the major, without a change of key signature. Also, changing III to major I in the same key signature would diminish the significance of when a major I happens as a non-diatonic chord. For example in Heavenly's "Keepers of the Earth" (2004) (figure 1.1, bar 7), the major tonic (A major in the context of A minor) is used in preparation for a modulation. Recording this as the same event in the data as the chorus in this track that starts on the relative major (III, G major in the context of E minor, figure 1.2) would dilute the meaning of both, as they aren't being used for the same effect.

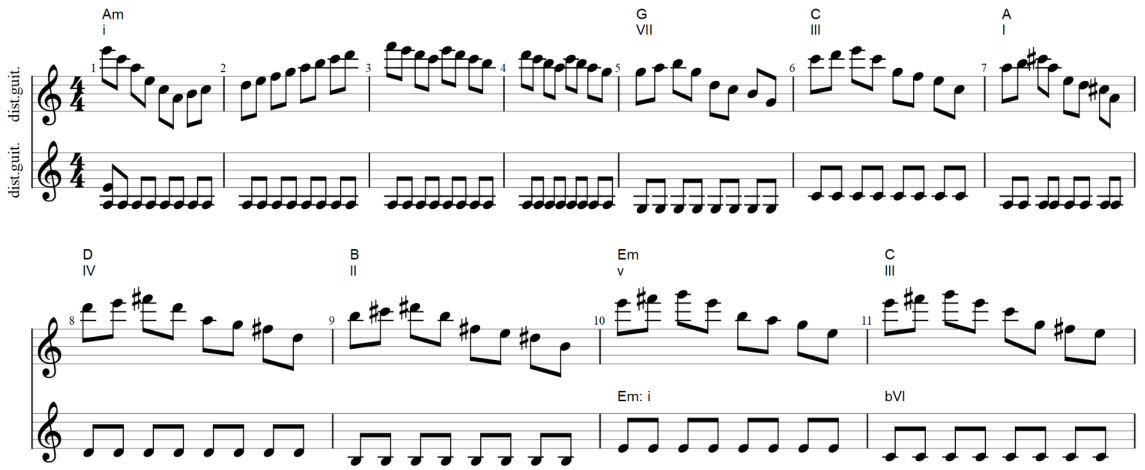

Figure 1.1: Heavenly's "Keepers Of The Earth" guitar melody including major tonic chord. (0'49")

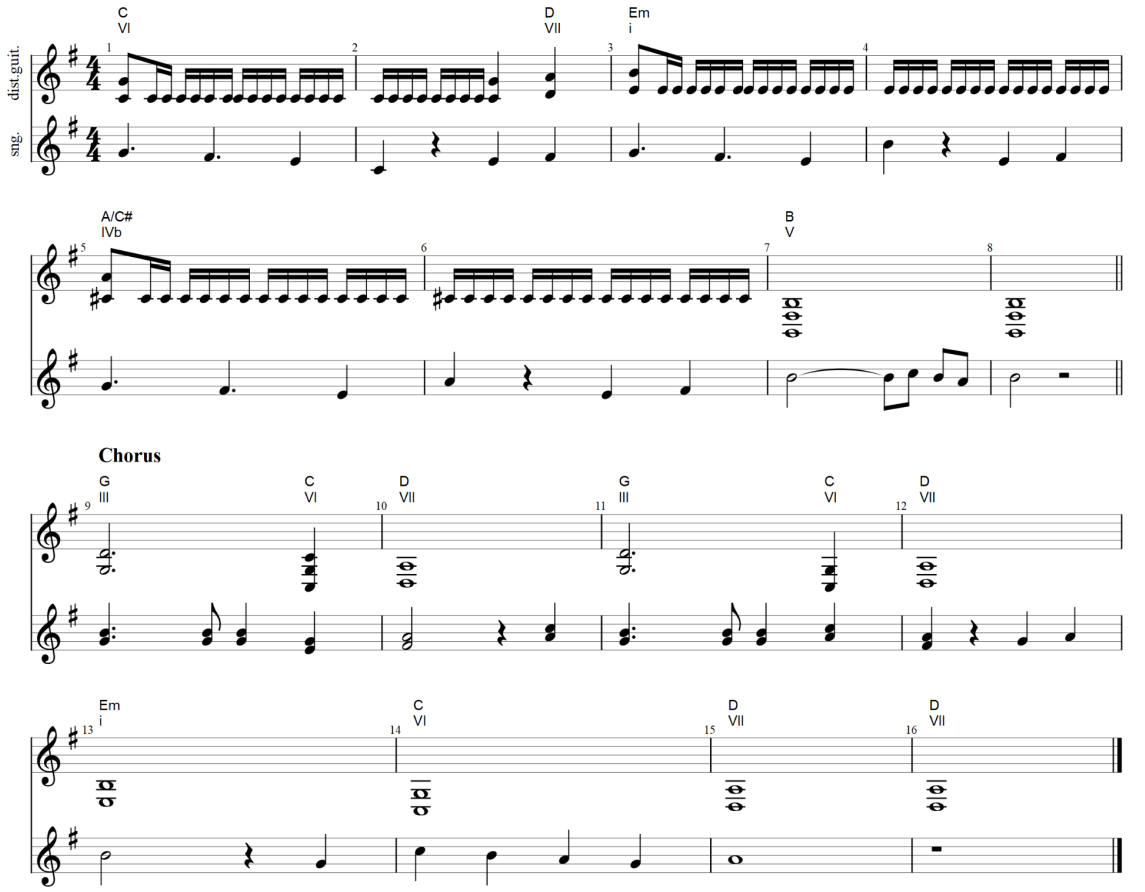

Figure 1.2: "Keepers of the Earth" last 8 bars of verse and first 8 bars of chorus, where chorus begins on relative major. (1'39")

4. Historical context of the subgenres covered

This chapter provides a brief explanation of the histories and styles of the subgenres covered in the work. This is largely to provide context for readers who are unfamiliar with metal subgenres and subculture, but also some information here will be linked back to later when interpreting the data.

4.1 Power Metal

The first subgenre of metal I chose to be part of this thesis is power metal. According to Sharpe-Young's *Metal: The Definitive Guide* (2007: p.262), the genre is considered by many to be a "perfected form of heavy metal". Its most significant influences as a genre are the NWOBHM titans such as Iron Maiden, Judas Priest, and Queensryche, in both vocal style and intricacy of the guitar work. Christe (2004: p.95) agrees, stating that power metal takes classic heavy metal and doubles the speed and crunch. These influences make power metal the most closely related to the "Classic Heavy Metal" bands that Lilja discusses, giving a good starting point for seeing how the genre has developed.

The Metal Crypt (2004) defines power metal as "fast songs with an emphasis on melody, often accentuated with keyboards". It discusses its use of the guitar as a melodic instrument rather than a rhythmic one. This agrees with Shape-Young's (2007) assertion that power metal's fine crafted guitar lines are a "prerequisite" of the genre.

Lyrically, power metal is lighter in heart than other metal genres. Common fantasy tropes such as dragons, magic, and good fighting evil are highly prevalent, along with references to victory in battle, power, and glory. These lyrics, with the singers' affinities for "high pitched vocals" and "vocal acrobatics", often spanning four or five octaves (Herbst 2019: p.4), work together to give power metal its infamously bright and lively semblance. This cheerfulness has even earned the subgenre the nickname "Flowercore" (Metal Crypt) as metal fans who prefer the more serious themes deem power metal's lyrics too "happy".

Multiple sources (Weinstein 2011, Metal Crypt 2004) cite Helloween's *Keeper Of The Seven Keys* (1987) as the beginning of power metal. Sharpe-Young states that power metal's rise in the 1990s was "given momentum by Germany's unrelenting appreciation for '80s metal." (2007, p.262). While Germany had a large domestic scene for power metal for many years, it rose to power on the global stage when the USA and UK's metal scenes had wilted during the rise of grunge, leaving room for European bands to make headway and progress the genre.

One facet of power metal that may prove interesting when analysing its harmonic content is its relation to classical music. One of the forefathers of what would now be called neo-classical metal, Yngwie Malmsteen, expressed gratitude towards composers like J.S. Bach, Paganini, and Vivaldi (Walser 1993). Walser points out that the orchestral repertoire of the eighteenth and nineteenth centuries had held influence over heavy metal guitarists since its inception in the 1960s, but it was guitarists like Malmsteen that took this trend to the maximum. A music journalist at the time said that looking to classical music for inspiration and form was "the single most important development in rock guitar in the 1980's" (Stix 1986, p.59).

With Malmsteen being cited as one of power metal's most significant influencers for the guitarists (Sharpe-Young), especially with the abundance of "virtuosic, fiddly solos" (Herbst 2019), it is no surprise that the affinity for European classical music has continued into modern power metal bands. Several power metal bands, including Rhapsody Of Fire and Nightwish are often described as "symphonic power metal" (Metal Archives). With bands such as Dragonland going as far as to quote famous pieces directly, re-arranging passages of Beethoven's Moonlight Sonata in their 2006 track "Beethoven's Nightmare".

4.2 Black metal

Black metal as a subgenre is one of the most challenging to define, because of how much the definition has changed since its inception and how much disagreement there is between fans on what is "true" black metal. A defining element of Black Metal is its deliberate transgressions and abjection from the "norms" of its cousins, lyrically, visually, and sonically. Glen Benton of Deicide points out in an interview with Joel McIver (2005, pg. 66) that genre definitions have shifted as time has passed. In the

80s, it was just “metal”. He confirms that “Anything that dealt with Satanism is Black Metal” and further suggests that the boundaries between subgenres have moved considerably since black metal’s inception by saying, “what was Black Metal then is considered Death Metal now.” Smialek (2015) notes that this claim reflects the process of ever-changing musical labels are a result of not only developments in musical style, but also are the result of changing verbal discourse.[3]

The definition of black metal has since expanded into black metal being an umbrella term for another set of sub-subgenres. Fabien Hein (2003) proposes that the term black metal now includes: Black Metal, True Black Metal, Electro “Industrial” Black Metal, Brutal Black Metal, Symphonic Black Metal, Melodic Black Metal, Folkloric Black Metal, Viking Black Metal, Pagan Black Metal, and Progressive Black Metal. A perfect example of metal fans and scholars alike often opting for overly precise, almost fussy categorisation of music.

In the 20th Century, Smialek (2015, pg. 22) notes that black metal typically functions under the dichotomy of “raw black metal” and “symphonic black metal”, with the former being “second wave” bands such as Darkthrone and Gorgoroth, and the more modern bands who followed in their footsteps such as Watain and Dødsengel. Symphonic black metal is referred to by Smialek as the third wave of black metal, including bands like Cradle of Filth and Dimmu Borgir. These two subtypes of black metal have become so different from each other that there are almost entirely separate fanbases, divided by differing ideals of what constitutes black metal. As it is not for me to say which of these is the “truer” subgenre, I shall be including both in my research under the same umbrella of black metal, but trying to ensure there is an equal distribution of both throughout so I can investigate the compositional differences between the two. Sharpe-Young (2007, p. 198, 222) points out that these two bands were both the most heavily vilified by fans for not remaining “true to the cause”, whilst simultaneously being the two best-selling black metal acts of all time.

[3] Including heavy lyrical themes of Satanism, suicide and the occult, black metal has previously been defined as “satanic metal” (Steinken 2019). However this definition has decreased in its utility, with other lyrical themes becoming apparent and satanic lyrics being present in other music. It is unhelpful, for example, to consider Motley Crue’s “Shout At The Devil” (1983) as a black metal song.

Sharpe-Young also divides black metal into two different categories in *Metal: The Definitive Guide* (2007) but does so differently than Smialek. As black metal is so synonymous with Norway, he divides the genre into “Norweigian black metal” and “worldwide black metal”, rather than categorising them based on musical differences.

Steinken (2019) describes Emperor’s 1994 track “Towards The Pantheon” as having “heady, intense harmonic progressions primarily driven by distorted electric guitar and minor mode atmospheric textures between the bass guitar and keyboard synthesizer” (pg. 23). He considers this dyad of compositional techniques to be foundational for early symphonic black metal. This is a similar description of black metal’s musical discourse as that provided by Coggins (2019), which he uses for black metal as a whole, not differentiating between its two most prominent sub-categories. This suggests to me that, other than the main differences between them being in the production values and the inclusion of heavy keyboards/orchestral sounds, the compositional material included by modern bands in both subgenres is largely similar and is still heavily influenced by early second wave bands, even if the cleaner production and addition of keys makes the harmonic material more intelligible in symphonic black metal.

4.3 Metalcore

The term “Metalcore” is used to describe a fusion of elements of heavy metal music with hardcore punk. The date of the inception of metalcore is a debated topic, as there are many semantic debates about whether metalcore constitutes a genre, style, or scene (Kennedy 2018). Dunn’s *Metal: A Headbanger’s Journey* (2005) cites metalcore running from 1985 to the present day, whereas Wiederhorn and Turman’s chapter on metalcore in *Louder Than Hell: The definitive oral history of metal* covers 1992-2006 (2013, p.557). Smialek (2015, p.79) seems to offer the most holistically balanced view on this and points out that intermixtures between metal and punk had been happening since the 1980s, and writers have referred to these bands as “metalcore” in historical texts. However, a self-aware scene that was known by itself and others as metalcore didn’t emerge until 2003-2004, dethroning nu-metal as heavy metal’s most commercially successful subgenre.

Musically speaking, metalcore's formula has long been the combination of the melodic, hook based choruses of heavy metal, with the crushingly heavy breakdowns and screamed/growled vocals of hardcore punk, creating a "good cop, bad cop" dichotomy of contrasting song sections (Banger 2015, 4:36-4:48). Two of metalcore's most influential acts, Killswitch Engage and Hatebreed, have stated in interviews with Wiederhorn and Turman (2013) that a deliberate move towards simplicity was part of the songwriting process for both band's early albums, *Satisfaction is the Death of Desire* (1997) and *Alive or Just Breathing* (2002). Jasta asserted that for Hatebreed, the band should "make this meat and potatoes. Let's try and be like the AC/DC of metallic hardcore and write songs that any kid can pick up and learn' (Wiederhorn & Turman 2013, p. 624). Killswitch Engage Michael D'Antonio had a similar view on composition, and after hearing Hatebreed's work "started from scratch and stripped everything down, and added these guitar harmonies inspired by Swedish melodic death metal" (p.586).

Smialek considers metalcore to be an abject genre: a phenomenon he describes as a moment where metal music found mainstream popularity outside of the metal subculture. This helps to explain some of the animosity from other metal fans towards metalcore. Smialek goes on to explain that most complaints of "abject genres of metal- glam metal, nu-metal, and metalcore alike, are overly simplistic", following overly repeated formulae of breakdowns and pop choruses. Stevens holds a similar view to Smialek, stating in *What the heck is metalcore* (2013) that "metalcore is an extension not of metal, but the post-hardcore movement using metal technique, and thus it should be analyzed as more like hardcore instead of having us project our metal expectations upon it."

As previously mentioned, metalcore ranks below NWOBHM on Hill's *Metal Subgenre Extremity Spectrum,* when most would consider it to be a more aggressive style. The fact that a genre with largely clean vocals and uplifting melodies ranks as more extreme than one which is heavily based on screaming and breakdown highlights the subculture's skewed views of metalcore as a whole.

4.4 Melodic Death Metal

Melodic death metal is often described as the marriage of the chromaticism and dissonance of Swedish death metal, with the melodies and Aeolian chord structures of the new wave of British heavy metal (Bowar 2019). Containing almost exclusively screamed or growled vocals, the word "melodic" in the name refers mainly to the fact that the lead guitar work and occasional keyboards are providing the melodic content, distinguishing it from "true" death metal where keyboards and consonant melodic work are far more sparse (Smialek 2015).

The origin of melodic death metal lies in Sweden, with three bands who helped pioneer what came to be known as "The Gothenburg Sound" (Hillier 2020a). These three albums; At The Gates' *Slaughter Of The Soul* (1995), Dark Tranquility's *The Gallery* (1995), and In Flames' *The Jester Race* (1996). Through the mid-1990s when these albums were fresh, the sound was considered local to Gothenburg and Sweden (Ekeroth 2008: 267–9), although the style quickly took hold globally becoming one of heavy metal's best selling exports, as bands like Children of Bodom, The Black Dahlia Murder and Be'lakor began to join the fray.

4.5 Progressive Metal

Progressive metal's origins, understandably, lie in progressive rock. The term "progressive" in a musical context was first used in the mid-1960s when "progressive pop" emerged (Hewitt and Hellier 2015). It was used primarily to describe the fusion of one's musical style with other forms of music not seen in the mainstream, such as jazz or world music. Moore (2004, p.22) comments, "musicians acquired the facility to move between styles - the umbilical link between idiolect and style had been broken". Bands like The Beatles and The Yardbirds fused their rock 'n' roll sounds with Indian ragas and oriental melodies (Prown and Newquist 1997), laying the groundwork for progressive rock to evolve as a self-contained genre in the 1970s and beyond.

The influence of progressive music on metal bands is almost as old as heavy metal itself. Wagner (2010, p. 11-14) discusses how Black Sabbath 'began to integrate accentuated progressive influences into pioneering records such as Sabbath Bloody Sabbath (1973) and Sabotage (1975)'. The band

widely considered to be the first to bridge the gap between progressive rock and heavy metal, however, is Rush (Wagner 2010, p. 22). Rush went on to influence the works of Dream Theater, Queensryche, and Fates Warning, who became known as “the big three of progressive metal”, and continued to set the scene for what was to follow in the movement (Travers 2021).

While it is a genre I felt was worth covering in this research, Progressive metal is not as simple to define as other subgenres. It is potentially more helpful to think of “prog” as a prefix to other subgenres, rather than a subgenre in and of itself, for example, bands like Periphery are often referred to as “progressive metalcore” (AltPress 2016), early Opeth being described as “progressive death metal” (Altpress 2016), and Symphony X being labelled “progressive power metal” (Metalstorm 2013). However, there are certainly bands that self-identify and are most usually identified by others as progressive metal.

Musically, *progrockandmetal.net* lists five features that constitute progressive music: longer songs, time changes, complex instrumentation, superior (difficult) vocals, and conceptualised lyrics. Despite harmony not mentioned here, I aim to determine whether progressive metal has its own niche of harmonic techniques and how the progressive “tag” affects the harmonic palette when applied to the other subgenres I am covering.

5. Harmonic Analysis

The following chapter will discuss the findings I have made through analysing the data I collected in the listening process. The chapter is divided into two sections, covering the chords used, modulations, and modes, discussing each subgenre individually and comparing them.

5.1 Chord patterns

Here I will discuss the choices of chords that are commonly used within each subgenre, aiming to identify any common tropes of each and discuss how varied their uses are.

5.1.1 Power Metal

The power metal tracks I analysed included eighteen out of twenty-four possible consonant triads, showing a fairly wide range of both diatonic and non-diatonic chord patterns, with some notable omissions. Interestingly, both major and minor versions of #III/#iii and #VI/#vi are neglected entirely, along with bii and #iv. The lack of these #III/#iii and #VI/#vi chords indicates power metal bands' desire to keep their chord progressions "pretty". As non-diatonic triads are indeed used, but generally speaking, they have some function in the chord progression as a whole (see below). These alternate mediant and submediant variations are more reminiscent of the neo-Riemannian, romantic progressions (the minor variants of which being integral to the Weitzmann regions discussed in chapter 5.1.2), where chords hold their purpose within a progression regardless of key signature, rather than being used as a device to aid in, for example, changing key (see chapter 5.2.1)

Secondary Dominant / Diminished 7th Chords

Keeping in line with power metal being the most based on baroque and classical harmony, secondary dominants, and diminished seventh chords (as described in George Heussenstamm *Harmony and Theory: Part 2, Chromatic*, 2011) are used commonly by power metal bands. One of the tracks used above to illustrate the importance of the aeolian chromatic mediant modulation also employs these techniques.

Heavenly use a sequence of secondary dominants at 0.52 in the last bars of the instrumental introduction of "Keepers of the Earth" from *Dust To Dust* (2004) to transition smoothly from A minor to E minor (Figure 2.1):

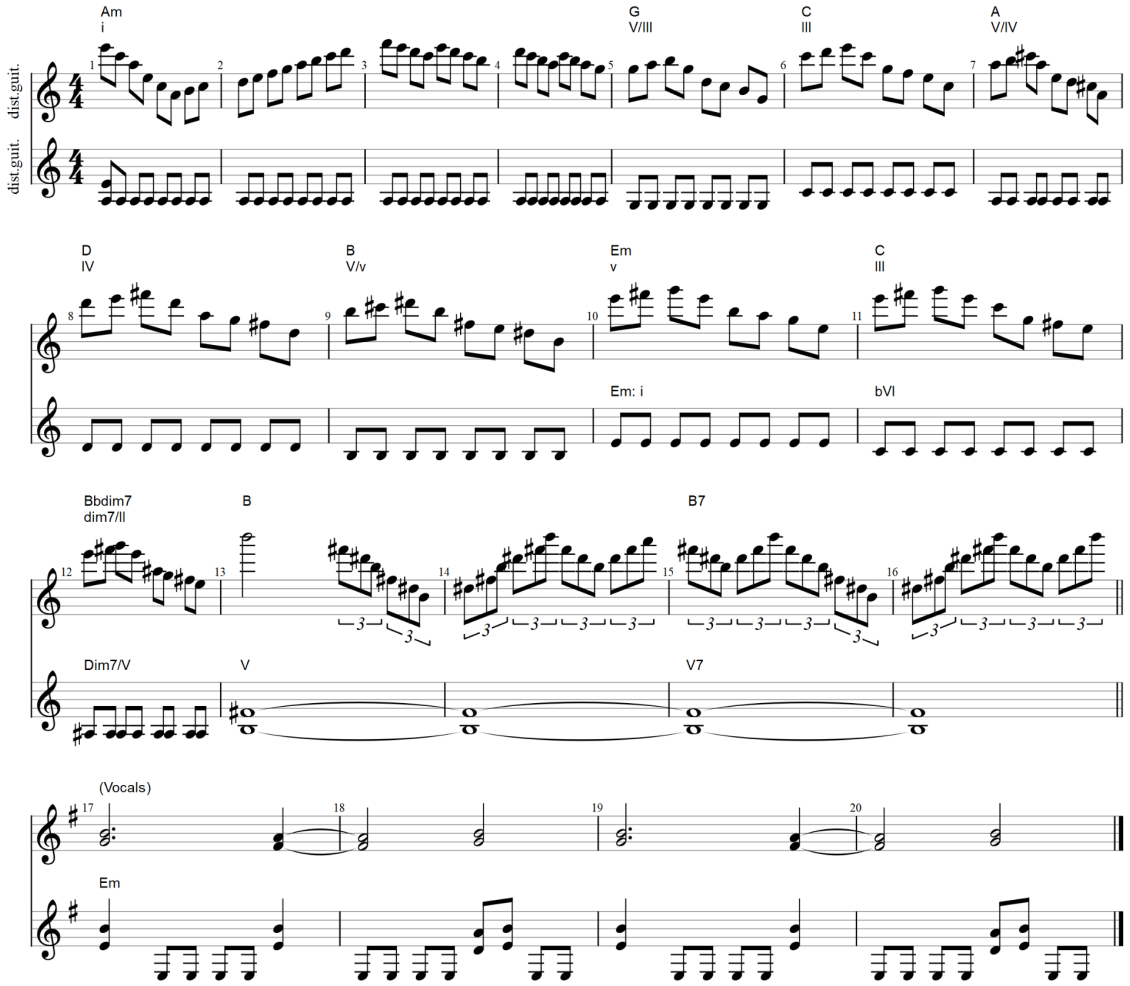

Figure 2.1: Introduction to Heavenly's "Keepers Of The Earth", showing secondary dominants used as modulation devices. (0'49")

Beginning with an A Aeolian run in the lead guitar, three successive secondary dominants follow rising by a tone each time. Firstly with a perfect cadence in C major, with both chords G and C being diatonic to the original key, then the first non-diatonic chord of A major occurs resolving to D major. Now that the tonality has been destabilised, the next secondary dominant of B major resolving to E

minor is where the modulation begins, and is where we first hear the new tonic in this progression (depicted in the transcription with the Roman numerals of the new key being on the lower stave). At this point, it is somewhat ambiguous as to whether we are still in A minor or have moved to E minor, especially with the next chord of C major, which is diatonic to both. Heavenly use the next chord, Bbdim7, as a secondary leading tone chord which resolves to B major (which is later turned into B7 by the A natural in the guitar arpeggio), creating a long drawn out perfect cadence into the verse, which begins firmly in E minor.

Galneryus use secondary dominants to add color and movement to a progression in the instrumental introduction of “Destiny” from *Resurrection* (2010) (Figure 2.2).

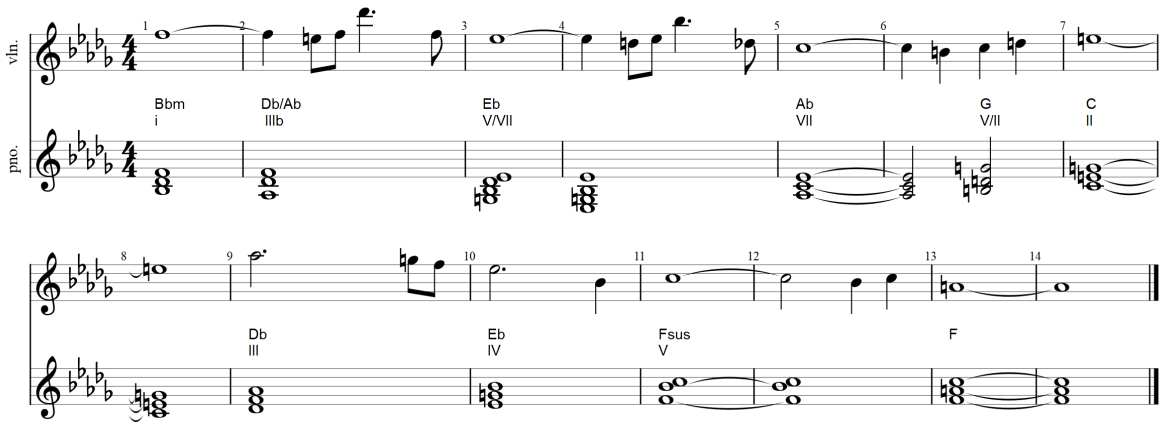

Figure 2.2: Reduction of the intro to Galneryus’ Destiny, using secondary dominants. (0’00”)

Here the non-diatonic Eb major7 chord creates gravity towards the Ab major, which is then itself followed by another quasi-perfect cadence of G major to C major, neither of which are diatonic to Bb minor. These examples demonstrate how secondary dominants can be used within power metal to add colour to a progression whilst maintaining order. The cadences that they create add a sense of drive to the passage and help it continue to flow naturally, with the non-diatonic chords sounding justified, whether they are paired with a diatonic one, or with each other.

With power metal being the modern subgenre of metal that is sonically closest to "classic" heavy metal, it is fitting that this type of chord progression is lifted straight from the pages of baroque and

classical composers like Bach or Mozart. Heavy metal has long had connections to classical music, with many classic heavy metal performers being classically trained (Walser 1993).

Affinity for the III chord

Power metal bands use the III chord (the tonic of the relative major) much more often than other subgenres, making up 11.4% of all the chords used. This fits power metal's lyrical themes, often ones of fantasy, with frequent uplifting passages about freedom, power and glory, and victory in battle. The III chord is the obvious choice when one wants to portray a more lighthearted, jovial atmosphere.

The abundance of the chord is primarily due to its use as the first chord of the chorus, which all of the following do:

- Galneryus - Destiny (2012)
- Heavenly - Keepers of the Earth
- Dragonforce - Operation Ground and Pound
- Angra - Spread Your Fire
- Helloween - Mr. Torture
- Avantasia - Reach Out For The Light
- Timeless Miracle - Curse of the Werewolf
- Epidemia - Chas Ispytaniya

This helps these bands to achieve a more obvious contrast between the verse and chorus sections of a song.

5.1.2 Black Metal

Coggins (2019) states that in black metal, "Chord progressions are repeated, usually straightforward patterns of one chord strummed for one bar, changing chord when changing bar, cycling through predictable and extensively repeated progressions without much variation." (pg. 406). In the listening research, this was mostly true; however, the chord progressions are not as predictable and straightforward as Coggins suggests. Often straying from the simple Aeolian harmonic ostinati of its lighter cousins, Black Metal artists frequently use non-diatonic chord sequences written in a neo-Riemannian framework to create the ethereal, otherworldly sound that is so intrinsic to the genre.

Black metal was one of two genres that at some point used all twenty-four consonant triads. In direct contrast to power metal, "#iii" appeared in 25% of tracks, and "vi" appeared in 15%, with their major counterparts both being used at some point as well, albeit less so, appearing once each. This reflects the differences between power metal and black metal's lyrical themes and paratextual aesthetics, with black metal's chord choices being as sonically transgressive as they are visually, with power metal being quite the opposite.

Neo-Riemannian Theory in Black Metal

One idea discussed in-depth in *Audacious Euphony* (2012) is that of the Weitzmann region, named after Carl Weitzmann, who first wrote about them in 1853. Weitzmann regions are a collection of 6 consonant triads that are each a single unit of work away from the same augmented triad (Figure 3.1).

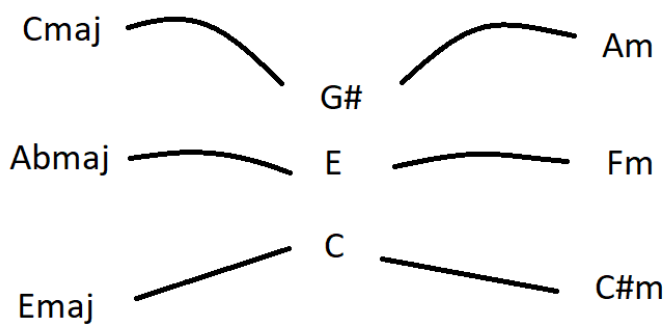

Figure 3.1 Weitzmann Region Diagram

Weitzmann regions have proven useful in the analysis of black metal chord progressions. As Schacter and Salzer (1989) state, a "lack of diatonic frame of reference creates, as it were, a suspension of tonal gravity". One such example is in Leviathan's "Fucking Your Ghost In Chains Of Ice" from the album *The Tenth Sub Level Of Suicide* (2003), a harmonic ostinato appears at 0.44 in much the way Coggins describes, one chord per bar of Ebm, Bm Gm, and Bb (Figure 3.2). These four chords all belong to the same Weitzmann region, constructed in such a manner with the three non diatonically related chords one after another, in descending major thirds, then the final chord also acting as the dominant of the antecedent Ebm, providing a smooth transition back to the start of the harmonic ostinati with a perfect cadence.

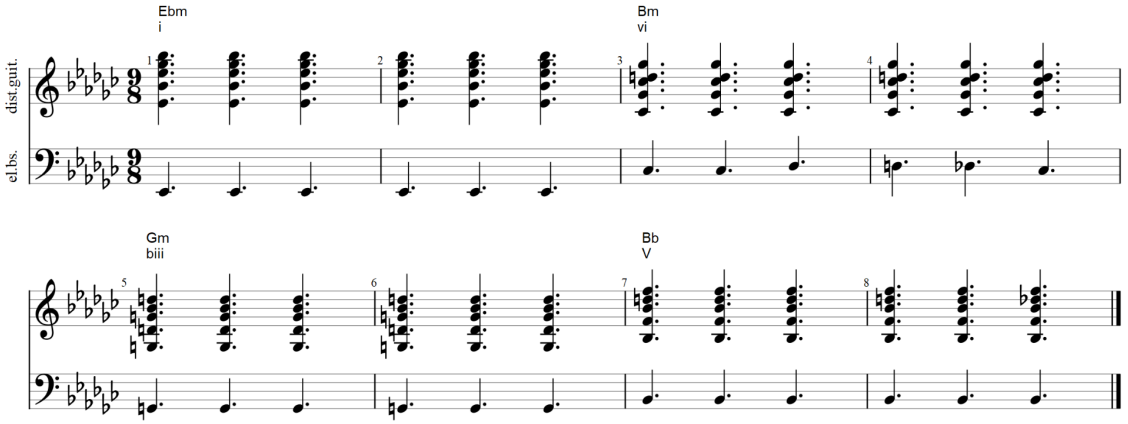

Figure 3.2: Weitzmann region-based progression in Leviathan's "Fucking Your Ghost In Chains Of Ice" (0'42")

This chord progression provides an excellent example of where the neo-Riemannian progressions of black metal provide a dark contrast to the brighter, generally Aeolian or diatonic-based chord progressions of the other metal subgenres. The second chord of this progression, B Minor, achieved in neo-Riemannian terms with an LP[4] transformation from Eb Minor, is a triad whose root is a major third below the previous chord's tonic. Heavy metal is no stranger to this relation; however, in the vast majority of cases outside of black metal, this triad would be major, providing the ever-familiar VI chord that so much of metal harmony is built around. This triad is shown in the listening data to appear vastly more in black metal than anywhere else, over five times as often as in any other subgenre of metal. The third chord of this progression, G Minor, follows the same LP transformation again, taking the listener further from the "home" of Eb minor to a #iii chord, which is also more popular in black metal than other subgenres, the only contender being progressive metal.

Another track that uses this chord transition extensively is Shining's "Yttligare Ett Steg Narmare Total Javla Utfrysning" (2007). The track opens, after a lengthy spoken-word monologue introduction, by alternating every other bar between B minor and G minor in the guitars. Interestingly, these guitar parts follow the voice leading patterns described by neo-Riemannian theorists more strictly than other black metal chord progressions have, by playing the initial B minor as an inverted chord with the F# in the bass, the B moves down and the F# moves up in true "maximally smooth" style to achieve the G minor, as shown in figure 3.3.[5]

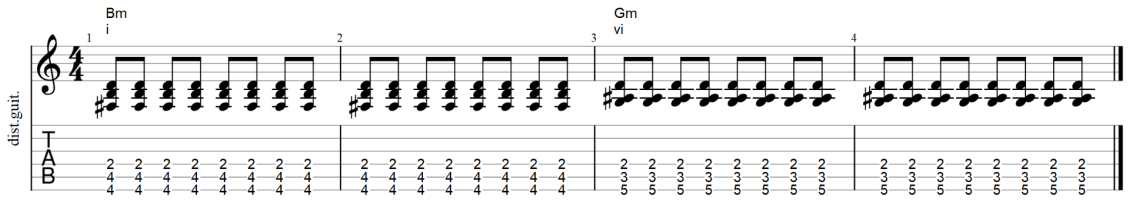

Figure 3.3: Maximally smooth chord voicings in Shining's "Yttligare Ett Steg Narmare Total Javla Utfrysning" (0'21")

[4] In neo-Riemannian theory, "L" stands for leading tone exchange, where the 5th of a minor chord is moved up one semitone to transform the chord into a major, and "P" stands for "Parallel transformation" where a major triad is transformed into a minor one by lowering the third (or vice versa).

[5] Here, tablature is shown in the figures as the left hand position is intrinsic to the voice-leading pattern.

Later in the track, Shining uses the same progression in a different key during the guitar solo, albeit without the "true" neo-Riemannian voice leading. During the acoustic passage beginning at 1.15 (figure 3.4), Shining forego the transition between one consonant triad to another and instead alternate between F#m and the augmented chord that its Weitzmann region stems from: F A C#.

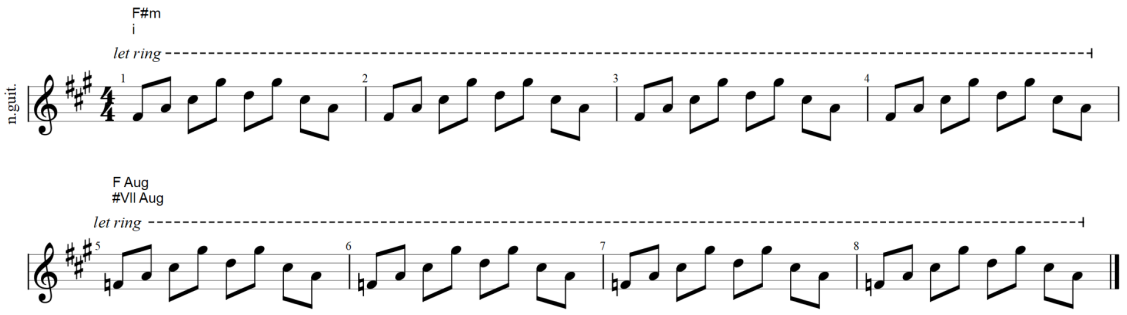

Figure 3.4: Acoustic passage in Shining's "Yttligare Ett Steg Narmare Total Javla Utfrysning", transitioning a minor chord and it's closest-by-voice leading augmented chord (1'18").

This passage returns to the use of maximally smooth movement between the triadic first and final three notes of each bar, with the F# moving down to F natural, with the extra chromatic notes D natural and G# on top providing extra dissonance, and giving the passage a feeling similar to that of a suspended chord that refuses ever to resolve

This sequence repeats for over two whole minutes, by the end leaving the listener almost begging for some return to normality. This in itself is a reflection on the lyrics of the track, pertaining to suicide as black metal often does: "All night and day, I pray for the decline of life".[6]

Other than Weitzmann regions and other sequences based around minor triads a major third apart, black metal artists also frequently employ minor triads that are a minor third from the tonic, another example of consonant chords not related to each other under traditional western music theory. Aquilus' "Nihil" (2011) gives us an example of this with a sequence of triads: Em, C#m, Em, Bbm, Em, Gm, whose roots create a complete E diminished 7th chord (Figure 3.5). The way the progression

[6] translated from Swedish by genius.com.

goes back to Em between each new chord helps to establish Em as the "base", but none of the other chords are diatonically related to Em no matter what key the piece was in. The order in which the C#m, Bbm, and Gm appear is noteworthy: the first and third chromatic chords, C#m and Gm are both equally close to Em as they both share a common tone with Em, the E and G naturals respectively. The Bbm, however, does not. The sequence moves gradually further away from its "home" of Em, to the chord that is as distantly unrelated as possible, and back to where it started, while maintaining some degree of consistency by building this "diminished seventh of minor chords".

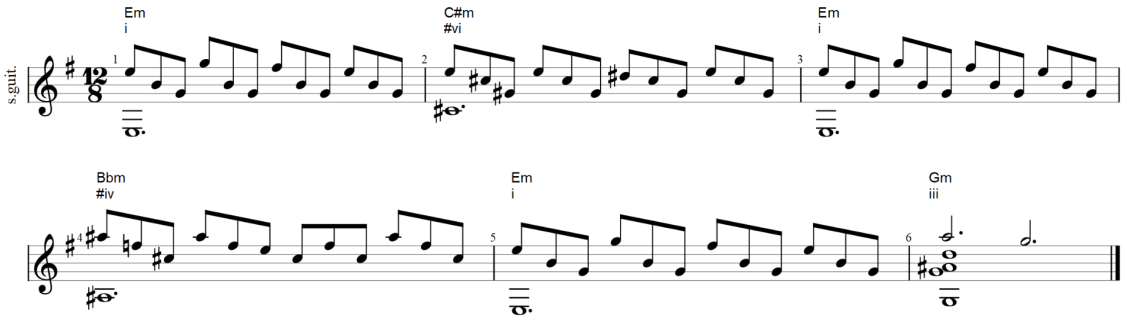

Figure 3.5: Broken chords in Aquilus' "Nihil", the roots of which make a diminished seventh. (5'40")

Dødsengel use a very similar progression in "Azonei Wyrdwalker" from *Mirium Occultum* (2010). Beginning on Ebm, then moving through Am and F#m before returning to Ebm and repeating. (Figure 3.6)

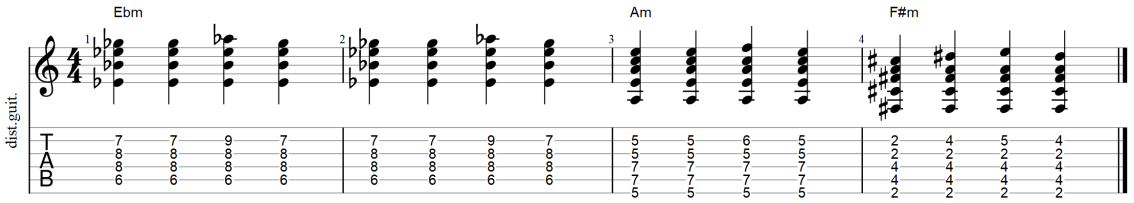

Figure 3.6: Chord progression in "Azonei Wyrdwalker", the roots of which make a diminished seventh. (1'43")

Whilst there is not much to be said about the way these chords are constructed (the only notable example of voice-leading, for example, is where the Bb and Eb in the final Ebm chord move up and

down by one semitone respectively to A and E natural, but this is just as likely to be a coincidence caused by the shapes of these chords on the guitar than deliberately smooth voice leading) the triads themselves, and the way they are decorated are exemplars of black metal chord progressions. Played as a power chord with an added third, with the top line moving to create a subtle overarching melody creating extra dissonances.

5.1.3 Metalcore

Metalcore proved to be, as expected, the least harmonically diverse subgenre. Among the tracks used in the study, only thirteen out of the possible twenty-four consonant triads were used, (the second-lowest being melodic death metal with sixteen), with dissonant triads only appearing in three tracks. Metalcore adheres reasonably strictly to aeolian or "natural minor" chord progressions, very much in line with Bjornberg's writings on popular music (1984), with 95% of all chords used being from this scale. This is a symptom of metalcore's very nature being a marriage of heavy metal and hardcore punk (Kennedy 2018), with hardcore punk's harmonic nature being more heavily focused on riffs, rather than emotive chord structures (Easley 2015). This also reinforces the success of Jamey Jasta and Michael D'Antonio's "keep it simple, stupid" philosophy (Wiederhorn and Turman 2013), especially as metalcore has risen as one of the best selling metal genres of the day.

VI, VI, VI, The Number of the Beast

The major chord on the sixth degree of the minor scale (VI) chord, whilst ever-present among most subgenres of metal as the most common chord other than the minor tonic, is especially prevalent in metalcore, totalling over 22% of chords used. Lilja's 2019 text explains this chord from a neo-Riemannian perspective as being chosen for its strong subdominant function and is an easy "maximally smooth" choice for a consequent chord to "i" as it shares two notes with the tonic (the first and third degrees of the scale).

The strong subdominant function chord this chord possesses makes it a strong candidate for the first chord of a contrasting chorus section, as we can see in "Reincarnate" from *Reincarnate* (2014) (figure

4.1) by Motionless In White and "Beautiful Tragedy" from *Beautiful Tragedy* (2007) by In This Moment (figure 4.2).

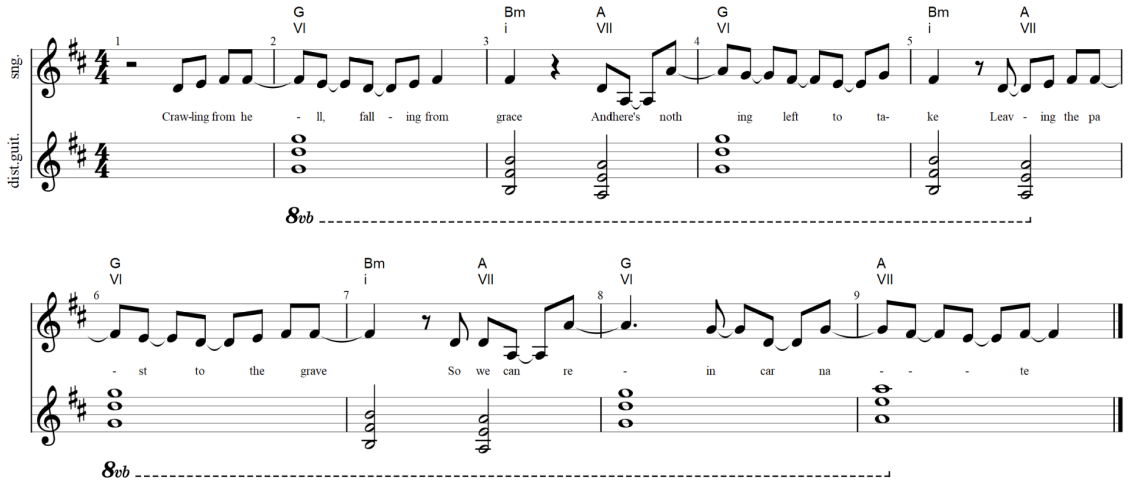

Figure 4.1: Chorus of “Reincarnate”, using VI as the first chord of the chorus. (0’42”)

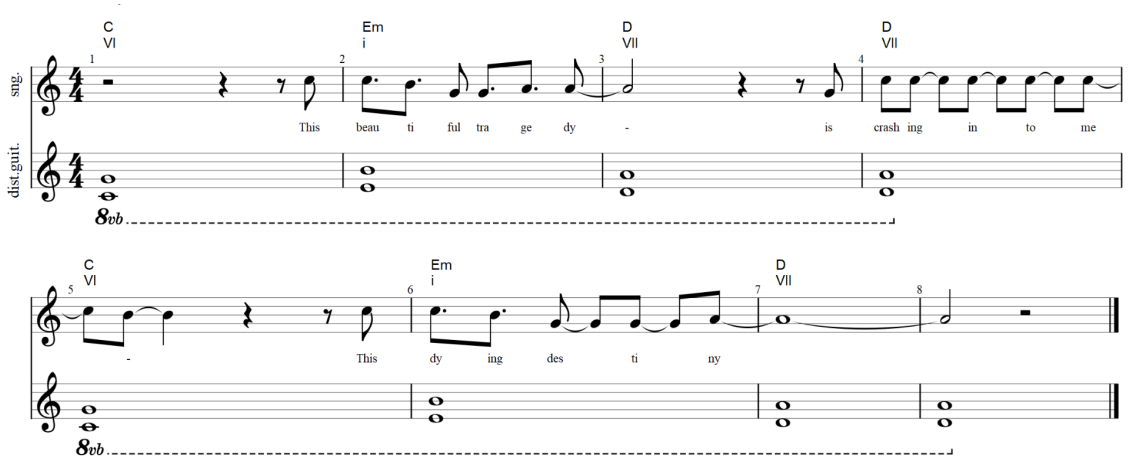

Figure 4.2: Chorus of “Beautiful Tragedy”, using VI as the first chord of the chorus (1’05”)

Both of these track's chorus sections begin on VI (C major and G major respectively), and both only use i, VII, and VI for the entirety of the section. The choice to use VI as the first chord of the chorus allows for a clean slate harmonically, making the first chord of the chorus major, without using the relative major chord III, which in the context of metalcore may come across as too "cheesy".

In *Reincarnate,* this first G major chord (power chord in the guitars with the third being played in the keyboard ostinato) provides immediate contrast to the bouncy B Phrygian riff that proceeds it, instantly recognisable as marking a new section as it moves from modal to diatonic. Also, the vocal melody singing the F#, effectively turning it into a Gmaj7 gives it that melancholic feel that a band with such an image as Motionless In White (corpsepaint-like makeup) like to portray.

Whilst there is less of a difference between the harmonic content of the verse and chorus in *Beautiful Tragedy,* as the verses are diatonic in E minor, beginning the chorus on C major has the same effect of marking a new section. In This Moment also enjoy the 5th degree of the scale becoming the 7th in what is effectively a Cmaj7 chord in the 5th bar of this section.

5.1.4 Melodic Death Metal

Using seventeen out of twenty-four possible consonant triads, melodic death metal is shown to be, in terms of harmonic complexity, in a middle ground between the ambitious power/black metal and the more mainstream focused, basic progressions of metalcore. As melodic death metal is, in essence, a marriage between the sounds of Swedish metal and NWOBHM (Hillier 2020a). The data collected on melodic death metal's harmonic content shows this to be true, borrowing the "classic" Aeolian chord progressions that underscore the lead guitar work, combined with riffs made of darker modes, including Phrygian and Locrian.

The chord progressions used by melodic death metal bands make it out to be one of the more harmonically typical genres. The prevailing theme is that most chords come from the Aeolian mode, with relatively limited use of either non-diatonic triads, diminished and augmented chords. Hillier (2020a, p.3) discusses how early melodic death metal bands such as In Flames and Dark Tranquility are all influenced heavily by the harmonic material of NWOBHM bands like Iron Maiden and Judas Priest, using Aeolian progressions with lead guitars harmonised in thirds, with heavy use of Lilja's "Aeolian Cadence" (2009, 85-7). This is exemplified in the outro of In Flames' "Pinball Map" from *Clayman* (2000) (figure 5.1).

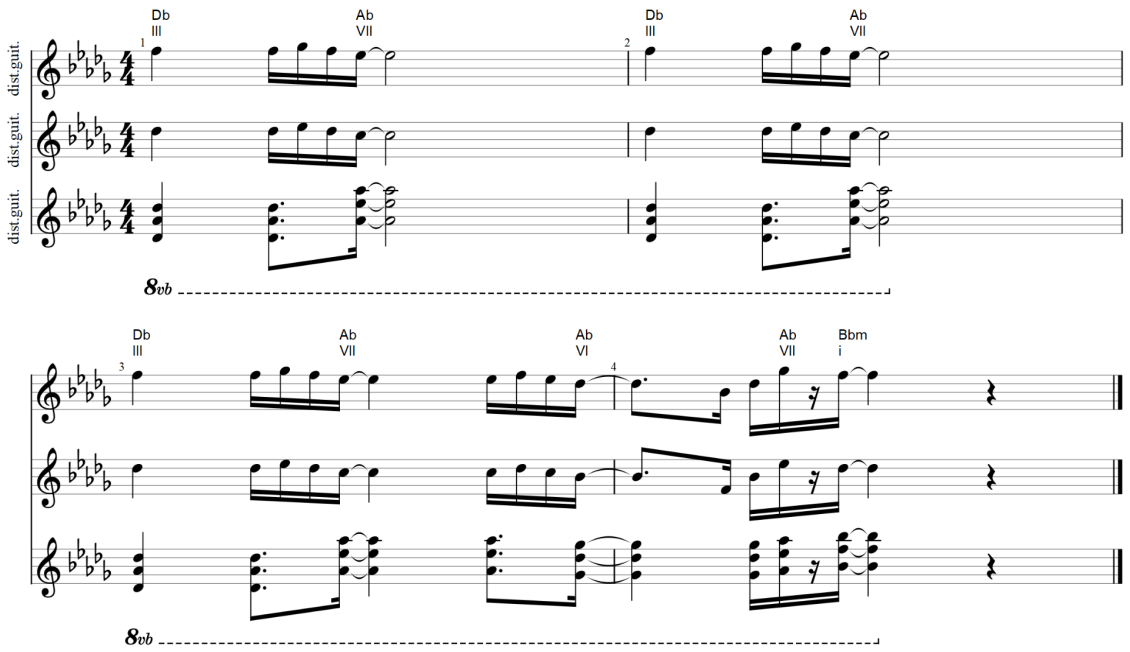

Figure 5.1: Outro of In Flames' "Pinball Map", using NWOBHM inspired progressions. (3'37")

Here we see a very typical example of a NWOBHM influenced guitar duet. The two lead guitars play a simple repeating melody, in parallel thirds with one another, while the rhythm guitars provide a power chord-based accompaniment. The chord sequence is borrowed from the chorus, repeating the III and VII chords before finally ending with an Aeolian VI VII i cadence in Bbm, which leads back into the main riff that finishes the song.

Children of Bodom offer another example of this style, albeit with the melody being shared by the lead guitar and keys, rather than two lead guitars, and playing in unison with one another in "Hate Me" from the album *Follow The Reaper* (2000) (figure 5.2)

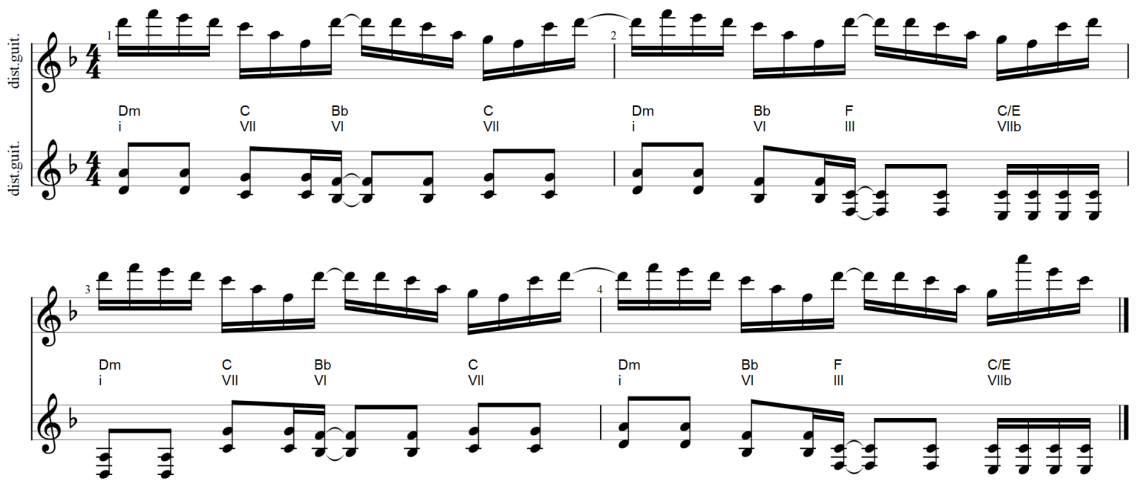

Figure 5.2: Lead ostinato in Children Of Bodom's "Hate Me", using NWOBHM inspired progressions (0'10")

Here Children of Bodom alternate between what are perhaps the two most quintessential NWOBHM chord progressions: the Aeolian i VII VI VII cycle, and the inverted "four-chord pattern" of i VI III VII.

Arch Enemy take the NWOBHM guitar duet and adapt the sound for a modern, death metal-tinged atmosphere in "Burning Angel" from *Wages of Sin* (2002), forgoing the typical Aeolian progressions for something a little darker (figure 5.3). Which reflects the track's lyrics, concerning death, hell, and sin.

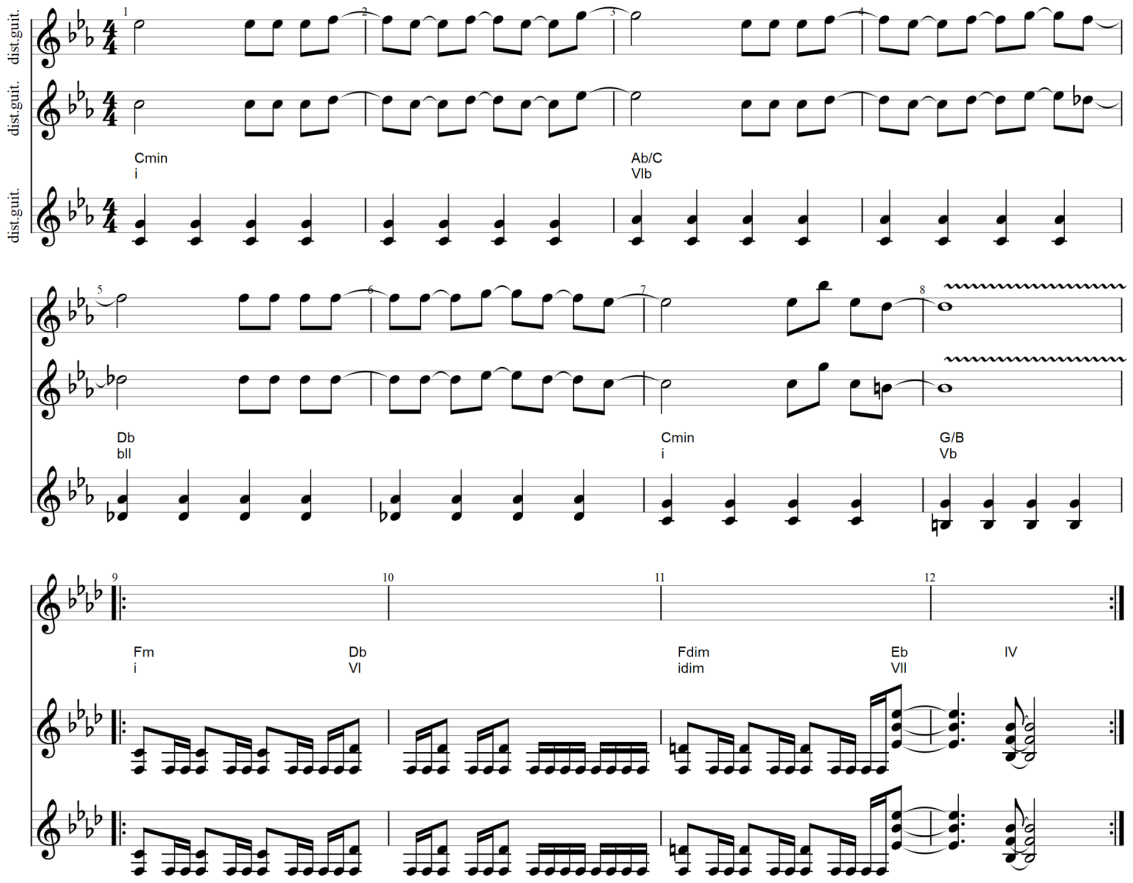

Figure 5.3: Guitar duet in "Burning Angel", using diminished and inverted chords (0'37")

The first two chords, i and VI, are fairly typical, except the VI chord is played as a first inversion, leaving the bass note as a pedal C. This is immediately less stable than the more typical root position power chords and sets the scene for the next more colorful chord, the bII (or Neapolitan chord) Db major. The two lead guitar lines digress from the C minor scale to accommodate for this. The rhythm guitar then returns to the tonic for one bar before the final chord, V (G major), which provides an authentic perfect cadence back into C minor when the progression repeats. The use of a traditional V-i perfect cadence, with its undeniably dominant function provided by its true leading note, gives the phrase a more austere sound than if Arch Enemy had opted for a more NWOBHM influenced Aeolian cadence. This final chord is also played as a first inversion chord, omitting the 5th in the rhythm guitars.

These first inversion chords not only provide a less stable, more fluid sound but also set up for very smooth voice leading in the rhythm guitars, with most of the chord changes only needing one unit of work, the only exception being that both notes move down from the Db to the C. This is made possible by the rhythm guitars only ever playing two notes at a time, omitting the 3rd in the root position power chords and the 5th in the inverted ones. However, by having the melody in parallel thirds, Arch Enemy makes sure that the omitted tone is always present, ensuring that each bar's harmonic material is fully fleshed out.

5.1.5 Progressive Metal

Progressive metal was found to be, as one would probably expect, the most harmonically diverse subgenre of those covered. Progressive metal was the second of the subgenres to, at some point, use all 24 available consonant triads, and uses the most dissonant triads of any subgenre. It also had a wide range of modes used in riff-writing, and frequent and varied modulations, being the only subgenre to include at least one modulation to every possible subsequent (minor, at least) key.

Progressive metal is a much broader term than any of the other subgenres covered, spanning the power metal-esque melodies of Symphony X and Evergrey, to the darker hues of Opeth and Edge of Sanity, to the crushingly heavy rhythmic intricacy of Meshuggah. Therefore it makes sense that such a wide range of harmonic techniques are applied. To gain more insight into progressive metal's harmonic makeup, I will be aiming my focus on tracks that use a wide range of techniques, rather than on tracks that, whilst they may be very different from one another, most of their harmonic makeup is borrowed from another subgenre of metal.

The first of these tracks is Opeth's "The Drapery Falls" from *Blackwater Park* (2001). This nearly eleven-minute-long epic offers many examples of progressive metal's distinctive use of harmony to create its idiosyncratic sound. After a short introduction of some strummed chords on a classical guitar, Opeth begin with a simple melodic line accompanied by a tonally ambiguous chord progression provided by the rhythm guitar and bass (Figure 6.1).

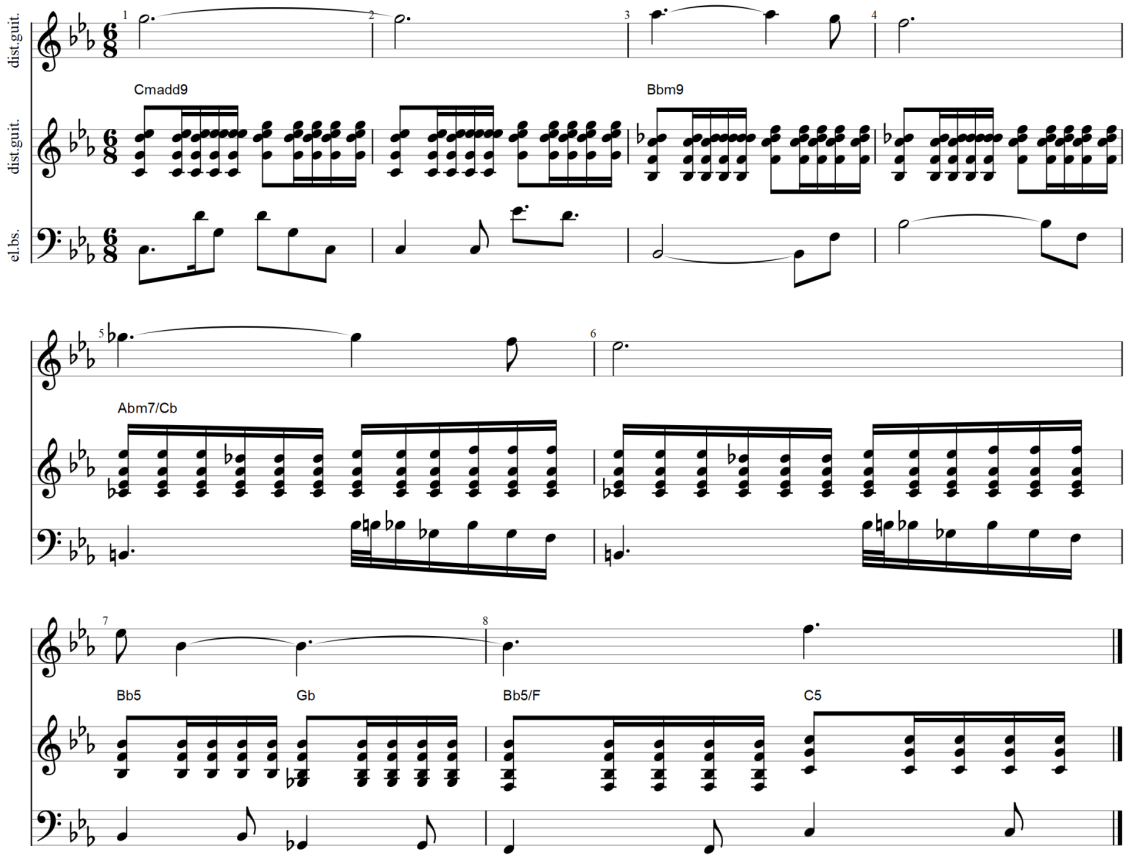

Figure 6.1: Tonally ambiguous sequence in the introduction to Opeth's "The Drapery Falls" (0'08")

Here Opeth can be seen to subvert the listener's expectations in a similar way to Leviathan's work discussed in the previous chapter. That is, to take a standard metal progression and make what would be normally, under Aeolian pretences, major triads, into minor triads instead. This gives these first three chords of what would otherwise be an unremarkable i VII VI in C minor a much more jarring, unsettling feeling. Further colour is added to the progression by the extensions on every chord; an added 9th over the C minor in the first two bars, played in both the rhythm and bass guitars, a 7th and a 9th over the second chord, the 9th once again being in the rhythm guitar and the 7th in the lead. The third chord, Abm7/Cb, is an interesting one. It could equally well be analysed as Abm7/Cb or as B major with an added 6th, as both contain the same notes, and neither is diatonic to Cm. The choice to analyse it as Abm7/Cb was based on the rhythm guitar beginning on an inverted Abm triad, with the

lead guitar providing the added 7th as it does in the previous chord. Both options, however, make for interesting analyses on how the chord is approached, the Abm7/Cb being, as discussed, part of a standard metal progression flipped on its head by making the triads minor, and the Badd6 (#VII) being the "slide transformation"[7] chord of the tonic, which is an exemplar of progressive metal's non-diatonic chord choices, with progressive metal being the genre it is most commonly found in.[8]

This phrase's final two bars provide a short link back to C5, accelerating the harmonic rhythm to two chords per bar rather than the previous two bars per chord, quickly moving through the chords as shown. Because of the heavily destabilised sense of tonality established by the first three chords, the Gbmaj7 sounds less out of place than it would if the passage had remained diatonically in C minor. The way bar seven plays out with the bass falling from Bb to Gb, and the low Gb being simply added to the chord in the rhythm guitars makes it more reminiscent of an Aeolian progression in Bbm, beginning on Bb5. One could analyse this section as changing key in the second bar, with the third chord being a Neapolitan chord (see figure 6.2).

[7] Cohn (2012) describes the transition between a minor chord, and a major chord one semitone lower than it, as a slide transformation, the idea being that the tonic and fifth “slide” down one semitone each, creating a major triad with the same third.
[8] #VII is also one of the most frequently occurring non-diatonic chords in progressive metal, making up 1.7% of its total chords.

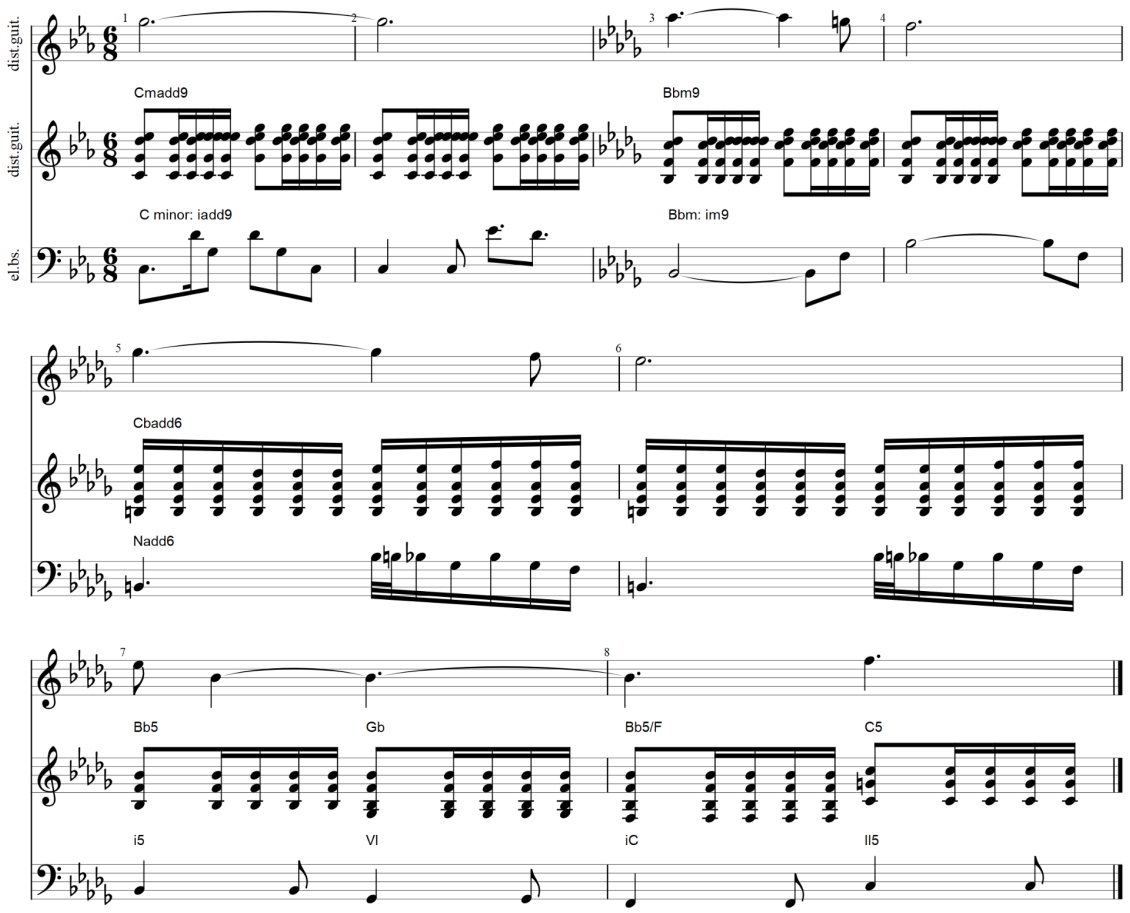

Figure 6.2: "Drapery Falls"' intro with key change from second bar. (0'08")

After another similarly non-diatonic chord progression beginning on A minor comes "The Drapery Falls"' verse section, based around an acoustic guitar and Akerfeldt's voice. (Figure 6.3)

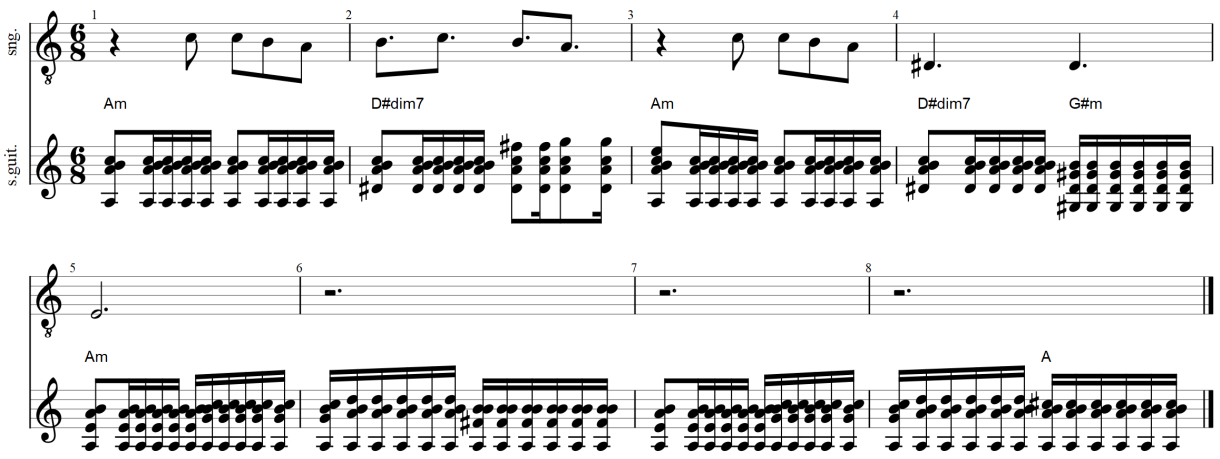

Figure 6.3: Non-diatonic progression in "Drapery Falls" verse section. (2'17")

This section sees the acoustic guitar alternating between Am and D#dim7, which shares enough notes with Am that the only moving part is the root note (as the fifth is omitted from the Am chord). The initial Am is embellished by an added ninth which is then carried over to become an added 6th on the D#dim7. These two chords are then repeated with D#dim7 becoming a G#m halfway through the fourth bar. This gives an added purpose to the suspended B note we hear across the first four chords in that it becomes the third of this new triad. In the vocal line's three bars rest, a short line of passing notes ends with the melody on C#, turning the Am in to an A major chord for just half a bar before the repeat.

This non-diatonic progression with chords that share so many common tones suits the lyrics of the track very well. Its tonal ambiguity and eerie aesthetic provided by the diminished chords and the chromatic chords G#m and A major is great word-painting for the lines "Please remedy my confusion…" and "I'm counting nocturnal hours, drowned visions in haunted sleep".

At two minutes and 46 seconds into the track, we are given our first "normal" chord progression, aptly used for the chorus (Figure 6.4). This break from chromatic, ominous progressions is short-lived however, lasting only three bars before the verse begins again.

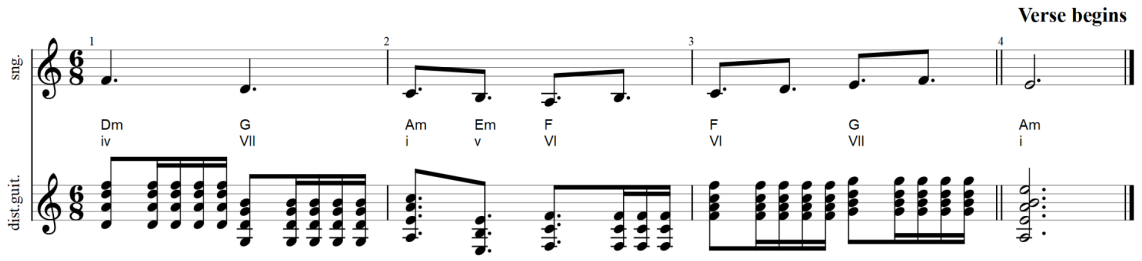

Figure 6.4: Diatonic progression in "The Drapery Falls" Chorus (2'48")

After a repetition of the verse and chorus material, the second key change occurs. A sudden, direct key change up by four semitones to C# minor. This next sequence (Figure 6.5) functions similarly to the introduction, making use of a minor chord on the seventh degree of the scale.

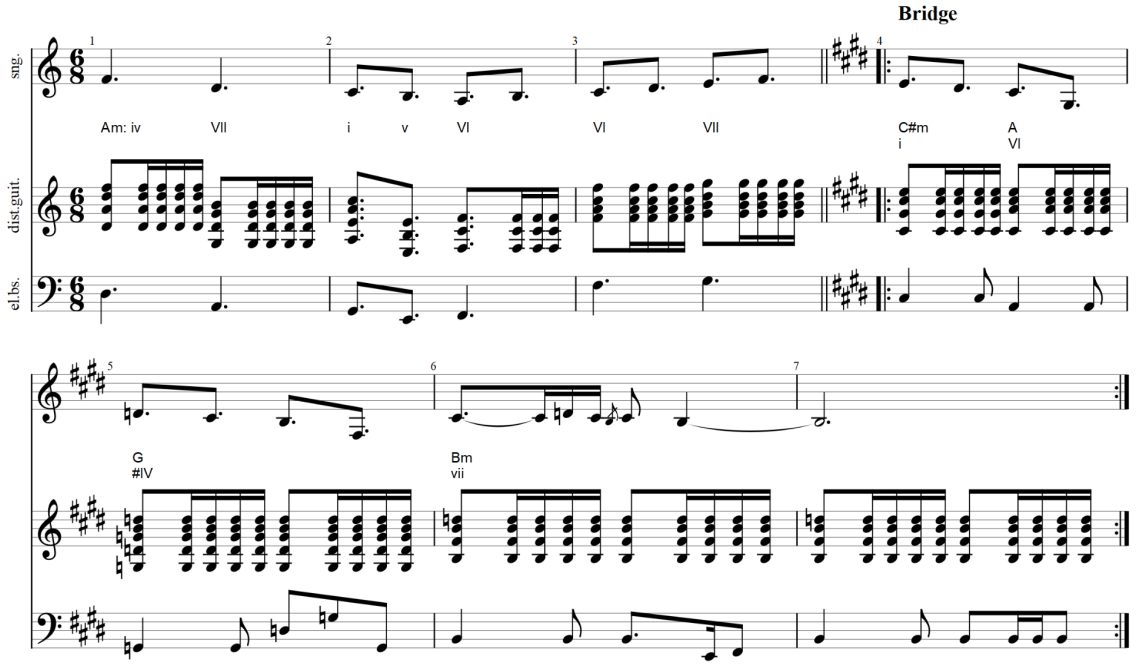

Figure 6.5: "The Drapery Falls" Chorus into Bridge/Solo section, borrowing harmonic material from the introduction (3'56")

The four chords that make up this progression make it almost bitonal: the former two being i and VI in C# minor, and the latter being VI and i in B minor. This dyadic interaction enables both the first bar,

and the following three bars, sound familiar and customary enough on their own, but gives the passage as a whole a rather dissociative feel to it. This passage is repeated for the duration of the guitar solo, which keeps to notes from B-Aeolian throughout for tonal consistency in the melody.

After another similar progression that makes use of the same idea of simultaneously using chords from C# minor and B minor, Opeth draw from their death metal roots for several minutes of heavily discordant material, climaxing in this distinctly dissonant duo of arpeggios (Figure 6.6).

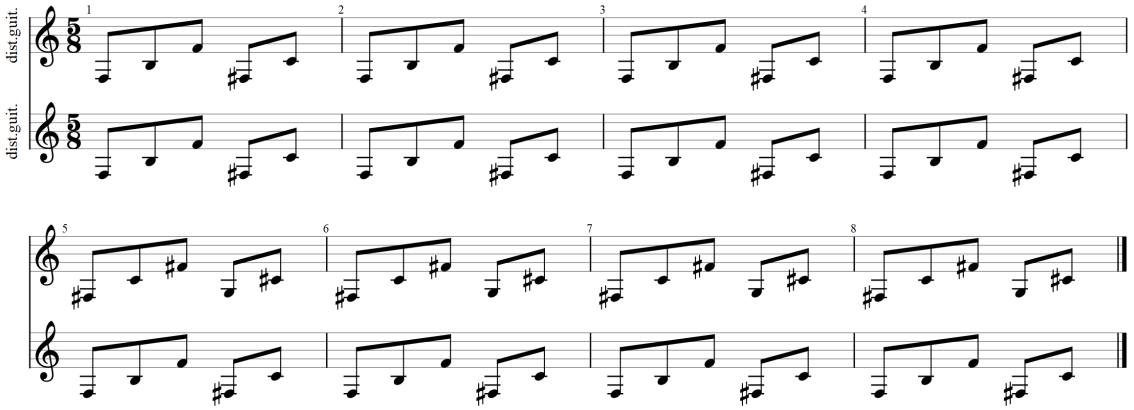

Figure 6.6: "The Drapery Falls" Atonal passage, melodic tritones in parallel minor 2nds. (5'50")

This passage speaks to metal's ability to (especially by a band whose origins are deeply rooted in death metal) sound positively noisy. This was one of the only passages I came across in the whole listening process of this thesis that truly stumped me as to what to record it as. Two alternating melodic tritones a semitone apart from one another, and if that wasn't discordant enough, having the same passage played a semitone up at the same time.

For the following instrumental section (Figure 6.7) Opeth elect to use typical functional harmony for the first time in the track.

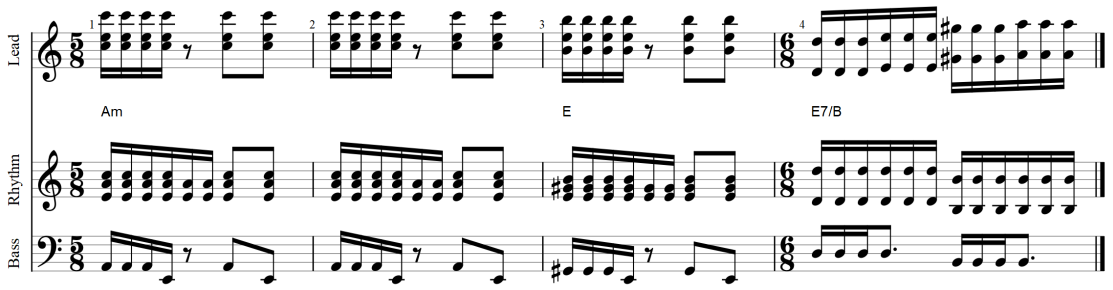

Figure 6.7: "The Drapery Falls" instrumental passage using functional i-V harmony. (6'10")

Despite sticking entirely to chords i and V in A minor, this excerpt manages to keep to progressive metal's engaging discourse with the off-kilter time signature changes, and the way the chords are voiced. Containing no conventional power chords, nor keys/synth lines, the chords are fully fleshed out between the two guitar lines in such a way where both have very smooth voice leading. To make the transition between A minor and E major, the A and C in the rhythm guitar move down a semitone each to land on G# and B respectively, and both Cs in the lead guitar part move down to B. The closeness of the notes voiced as inverted chords on a distorted guitar gives the passage a more dense, opaque sound than if it was arranged more traditionally with power chords in the rhythm guitar and a monophonic melody line in the lead guitar/keys part. The final bar of this phrase provides the perfect cadence that links back to the first. Initially starting with all three instruments in unison, they split off to give a full E7 chord (in second inversion).

These sections of "The Drapery Falls" demonstrate Opeth's ability to keep a listener interested for a ten-plus minute track by varying the harmonic techniques used, in a way that no single style of harmony reigns dominant for too long. The different harmonic techniques used are also employed in such a way that they suit the lyrics and the track's structure from a songwriting point of view, exemplary of what progressive metal as a whole sets out to do.

Nevermore's "The Heart Collector" (2000) use many subtle yet effective techniques to bring extra colour to a track that otherwise consists of fairly traditional harmonic structures.

The track begins with an Aeolian i VI III v progression accompanied by a guitar melody (Figure 6.8 bars 1-8).

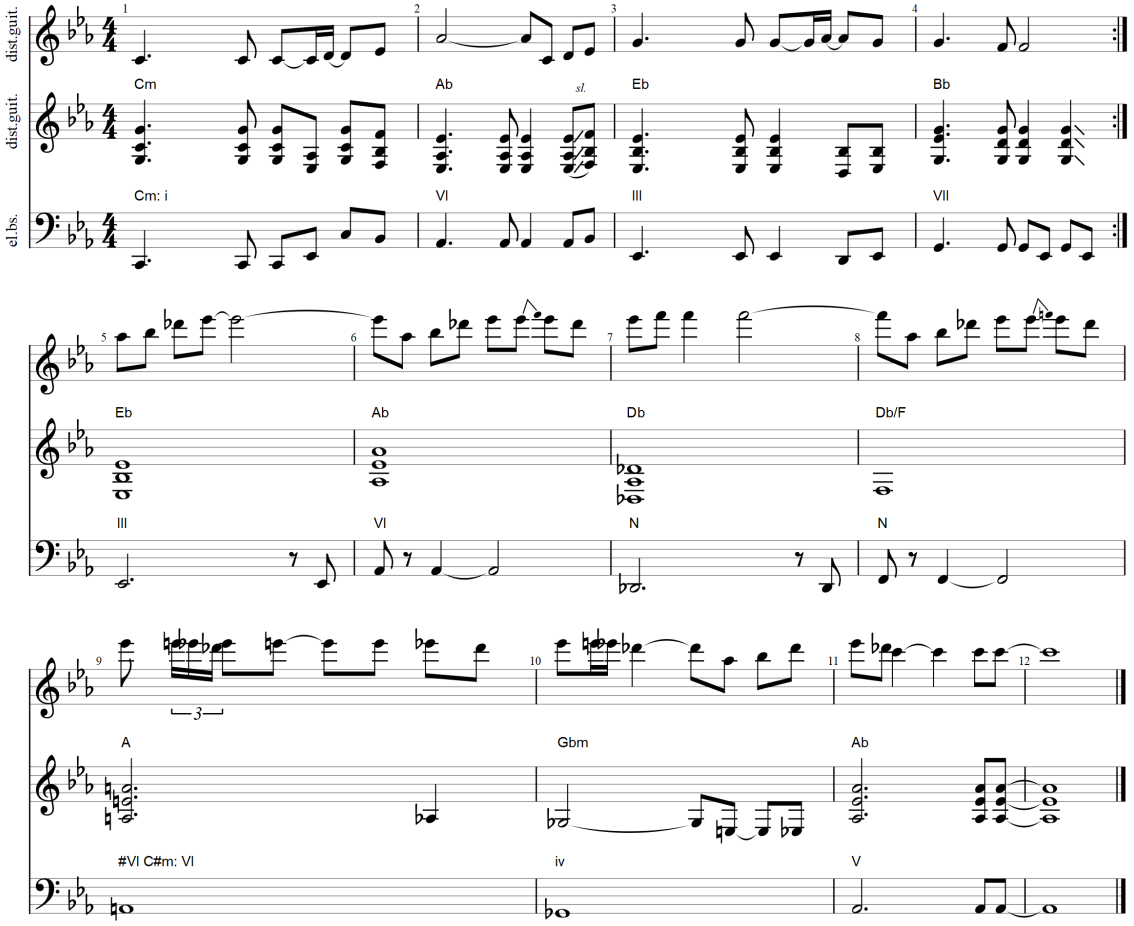

Figure 6.8: "The Heart Collector" Intro section using typical Aeolian progression followed by non-diatonic chords used to prepare a modulation. (0'00")

The guitarist Jeff Loomis elects to play the first two chords of this progression as inverted three-note power chords, with the fifth played as the lowest note. This is likely to be due to the second chord (Ab) being lower than the bottom string of the tuning Nevermore used (seven-string guitars tuned a semitone down, from Bb to Eb). Having these chords voiced in such a way creates a thicker sound than a more traditional open fifth with an octave. Which in conjunction with the bass adding root notes in the lower octave, may create an illusion for the listener that the chord is lower (and in the opinion of some, therefore heavier) than it is.

Nevermore use a conjunction of non-diatonic chords to modulate smoothly upwards by a semitone. A Neapolitan chord in bar 7 of figure 6.8, whilst not being bizarre on its own, helps to destabilise the tonality preparing for the following A major, which becomes the main link chord to the following key. The rest of the progression then continues naturally into a perfect cadence in C# minor, which the verse continues in (Figure 6.9).

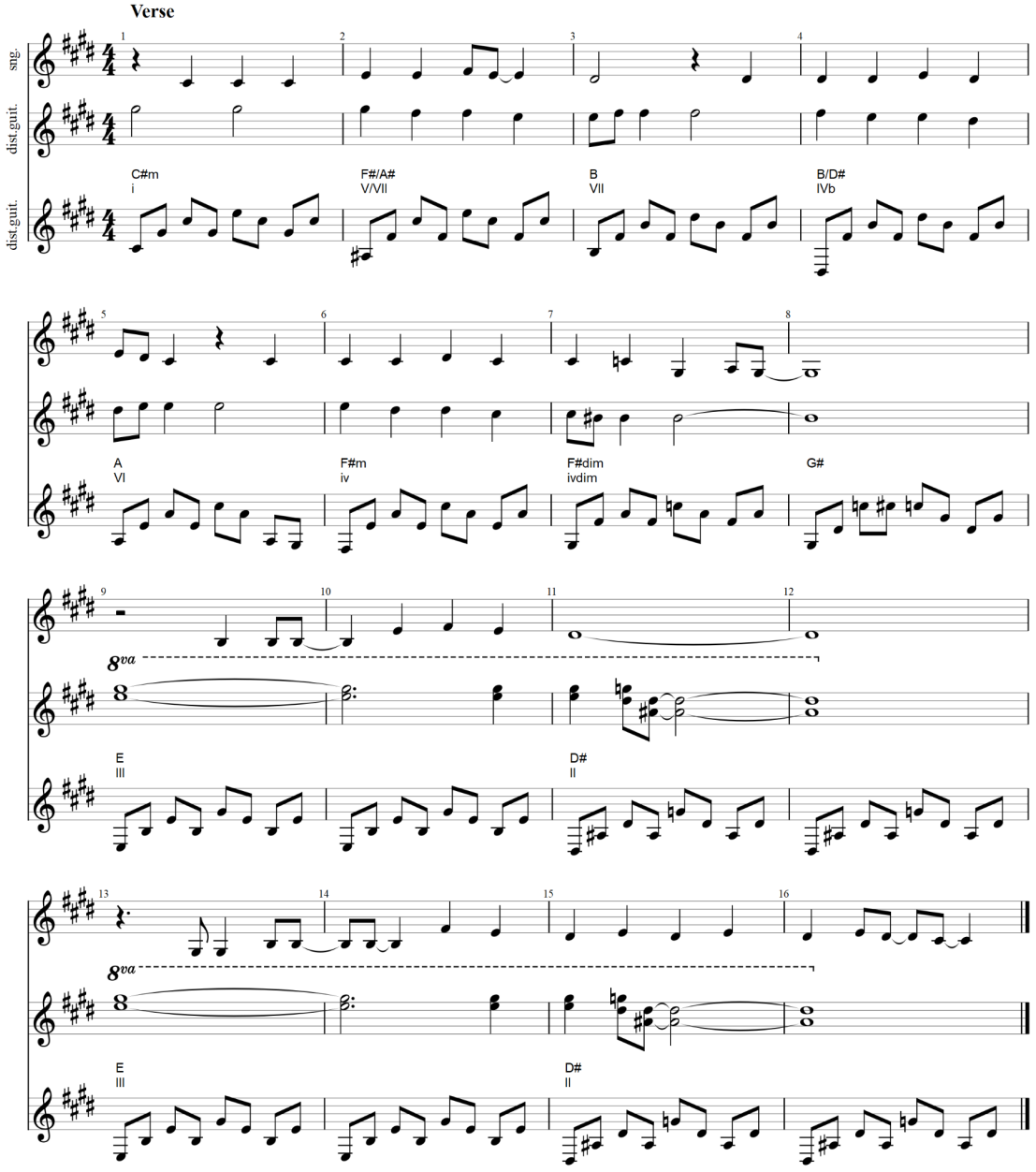

Figure 6.9: "The Heart Collector" Verse section, beginning diatonically then preparing a modulation into the chorus (0'45")

After the initial tonic chord, Nevermore use a secondary dominant, in this case, an F# major chord acting as a V/VII, followed by B major. This F# major is voiced with the third in the bass (the lowest note of the chord, not the bass guitar, which is tacet). In bar 4 the root note of the B major chord moves up to D#, setting up for the same technique to be used again and subtly making the listener expect E major to follow, which it does not. Instead, we are given A major, the augmented 4th jump in the bass note giving a melancholic feel, mirroring the lyrics in this section “I own your tears anyway”. The chords that follow are almost identical to the earlier passage (bars 9-12 of figure 6.9) except the dominant is delayed to make room for a diminished chord which augments the somber tone of the progression.

Working to prepare for another key change into the chorus is the passage from bars 9-16 of figure 6.9. The E major broken chord in the acoustic guitar moves down by a semitone to become II, acting both as a non-diatonic chord to add colour to the progression, and the dominant of the chorus’ key, G#m. The chorus (figure 6.10) reprises the i VI III v progression from the intro, transposed up a minor sixth from the original key.

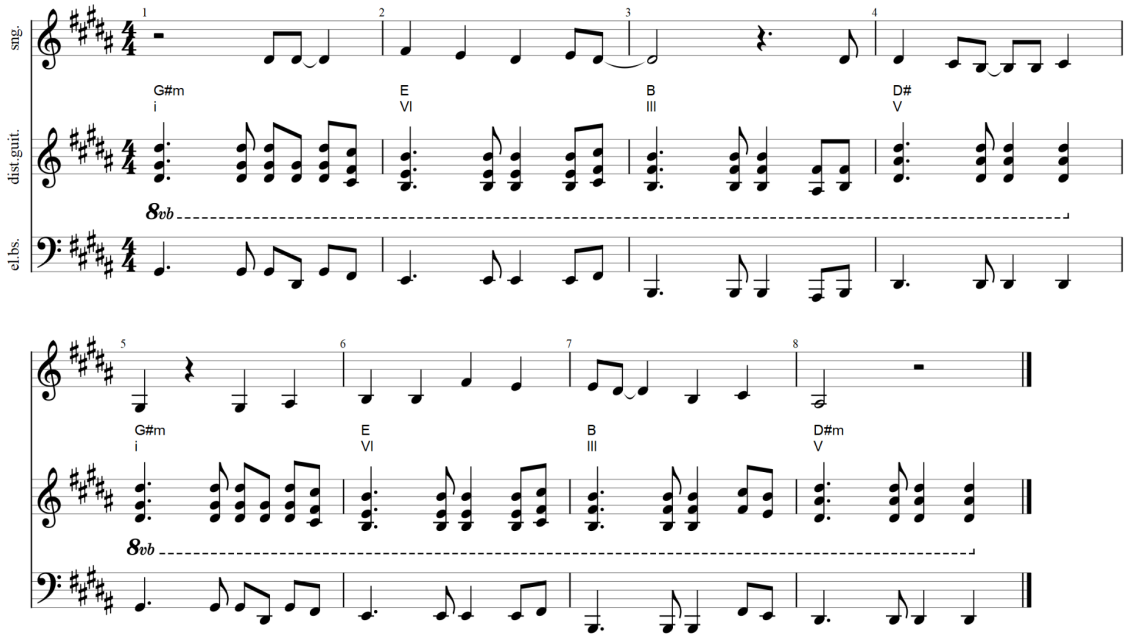

Figure 6.10: “The Heart Collector” Chorus Section, using Aeolian progression from introduction (1’31”)

The next noteworthy section is the outro, where Nevermore use an augmented chord in conjunction with a key change to destabilise the tonality and create an esoteric atmosphere. (Figure 6.11).

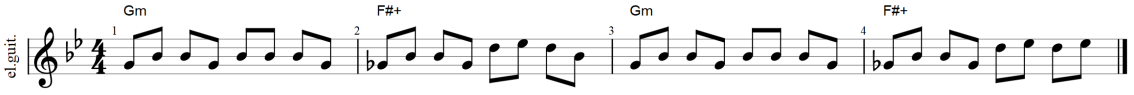

Figure 6.11: "The Heart Collector" Outro including broken augmented chords. (4'52")

This passage, played on a clean electric guitar, is then reharmonized when the band comes back in to use a minor chord on the flattened 6th degree, similar to the Weitzmann region-based techniques discussed in chapter 5.1.2. (Figure 6.12)

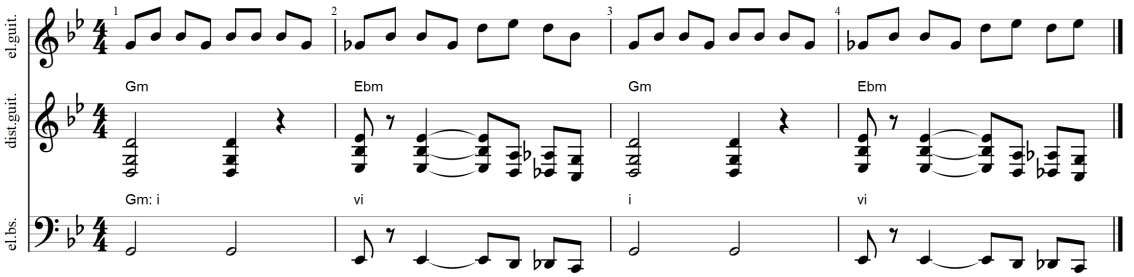

Figure 6.12: "The Heart Collector" Outro reharmonized to include a minor chord on flattened 6th degree (5'23") .

Here we see the clean guitar ostinato remains the same but the addition of the power chords in the rhythm guitars and bass transforms the F sharp augmented triad into an E flat minor one. The passing notes in the 4th bar descend chromatically, further emphasising the loose tonality of this final section.

Nevermore's combined usage of Aeolian-based four-chord choruses, intricate, meticulously prepared modulations, and neo-Riemannian-based, atonal yet consonant material is another example of how progressive metal can fuse a wide range of heavy metal's existing harmonic palettes together to create something more.

There are, of course, some outliers, tracks that I did not expect to be as simple as they were, considering the bands that released them. Dream Theater's "These Walls" and Periphery's "Scarlet"

fell into this category, both largely containing entirely diatonic progressions, with little deviation. This could speak to progressive metal's broadness as a genre, especially considering that one may expect that what these songs might lack in harmonic diversity, they make up for in rhythmic intricacy, as progressive acts often do. On the contrary, however, "Scarlet" remains in 4/4, with limited syncopation, and "These Walls" is largely the same, other than the middle-eight. This also highlights how bands may deliberately choose more commercially palatable tracks as singles, leaving their more musically intricate material for the album release.

5.1.6 Comparisons

In summary of this chapter, heavy metal bands in the 21st century simultaneously take influence from the "classics" of the genre, making frequent use of Aeolian progressions as Walser (1993) and Lilja (2009) discuss, while also having their own signature features. Power metal makes heavy use of Baroque and Classical influenced secondary dominants and diminished sevenths to add colour to progressions, while also brightening their sound with frequent passages beginning the relative major.

The most contrasting subgenre to power metal is black metal; although it too takes influence from western orchestral music, it employs a different school of harmony described by neo-Riemannian theorist Richard Cohn (2012). This different take on harmony that bypasses traditional ideas of tonality instead of focusing on chords' relationships to one another in terms of voice leading helps black metal bands create their chilling, ethereal sound. This approach to harmony saw black metal bands use all 24 possible consonant triads, which only one other subgenre achieved: progressive metal. Progressive metal was, as expected, highly diverse in terms of chord progressions. This is due to progressive metal being an incredibly broad term, comprising many different styles under the same umbrella, along with progressive metal bands having a higher affinity for the avant-garde than other bands, containing several diminished and augmented chords, along with noisome atonal passages.

As Hillier (2018) discusses, melodic death metal takes heavy influence from NWOBHM, namely using duet guitar melodies over Aeolian progressions, but also mixing in darker, non-diatonic triads to achieve a more transgressive aesthetic than the NWOBHM bands of the 1980s. Most similar to melodic death metal, but far more straightforward, was metalcore. Metalcore follows simple formulae

to achieve its "radio-friendly", sonically conformist sound, making very little use of any triad outside of the ones that fit within Aeolian and or harmonic minor progressions.

5.2 Modulations

Here I shall discuss what key changes are used in each subgenre, analysing how they are approached and what effects they achieve.

5.2.1 Power Metal

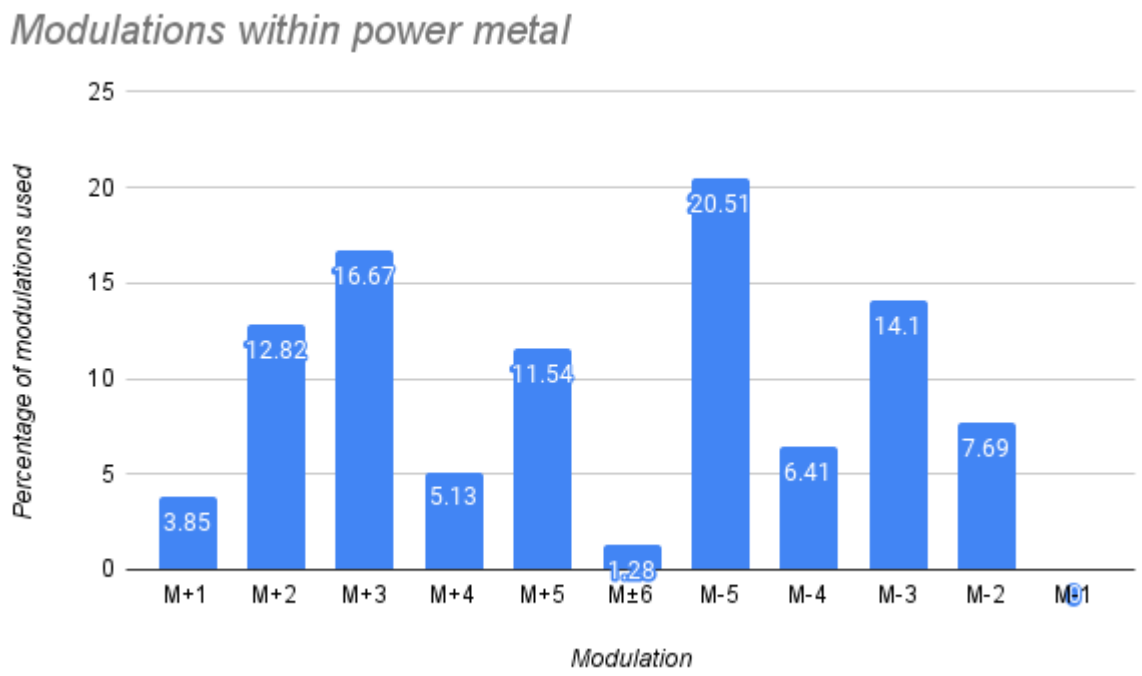

Figure 7.1: Modulations within power metal

The above graph shows the frequency with which power metal bands modulate to each key, relative to the antecedent one.

Power metal was one of the genres that used the most key changes overall; at some point modulating to every possible relative key bar one (down a semitone). Keeping in line with power metal's relationship with western orchestral music, particularly of the baroque and classical periods, power metal most frequently modulated by a fifth either up or down, making up 32% of its total modulations, this is commonly achieved by preparing with a secondary dominant as discussed on page eleven.

A similar technique using a diminished seventh to prepare a major triad on the second degree (vii°7/II), then using this as the dominant to execute a perfect cadence into a new key up a fifth from the original is also common, seen in Angra's "Spread Your Fire" below (figure 7.2).

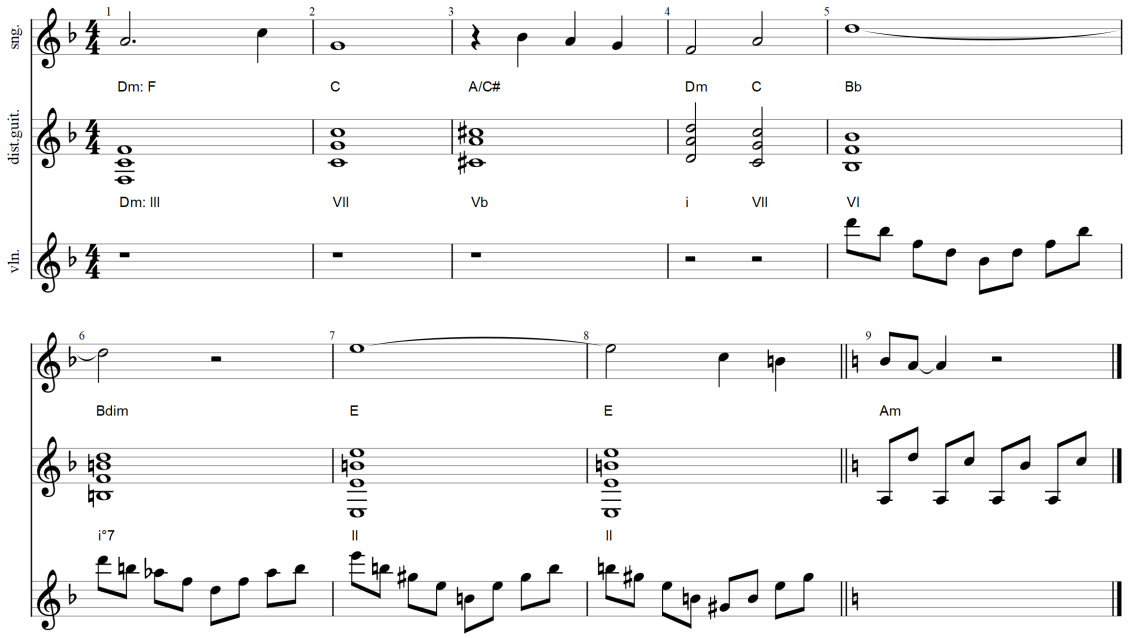

Figure 7.2: "Spread Your Fire" chorus into the bridge section using a secondary diminished 7th to prepare a modulation. (1'53")

The diminished seventh here appears at first glance to be executed in the same manner as that in Heavenly's "Keepers of the Earth" (2004). Whilst both are the crescendo towards a cadence, both ending with the dominant of the new key preceded by a diminished seventh which is preceded by another major chord, the execution is subtly different, seen in figures 7.3 and 7.4.

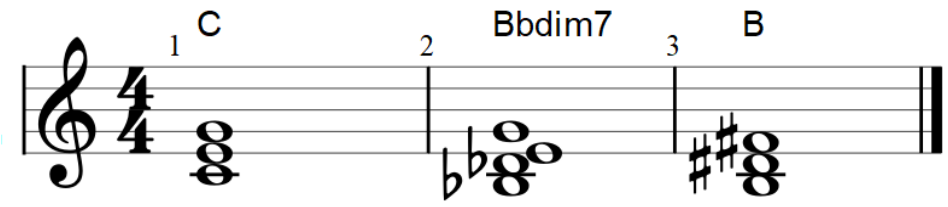

Figure 7.3: three chords before modulation in Heavenly's "Keepers of the Earth" Intro (0'57")

Here we can see the function of the diminished seventh in this context: to destabilise the tonality sufficiently so that the B major chord can convincingly act as the dominant of the new key, and more importantly to provide a bridge between the B major and the preceding C major. Similarly to the "maximally smooth" chord changes discussed by Cohn (2012), the diminished seventh here allows for minimal movement between notes. The third and fifth of the C major are maintained for the diminished chord, and both move one semitone down for the B major.

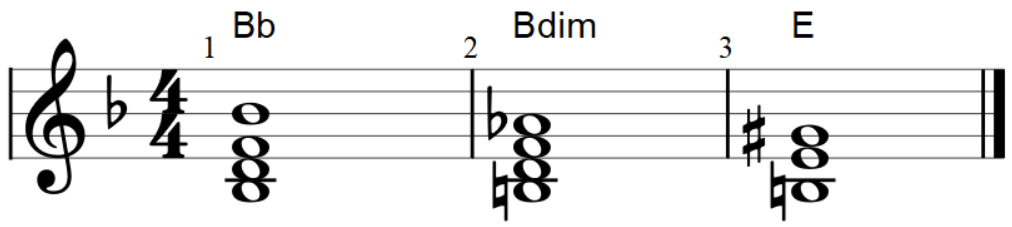

Figure 7.4: three chords before modulation in Angra's "Spread Your Fire" (1'59")

Angra utilises the same idea but with a slightly different execution. The third and fifth of the Bb major are still maintained into the diminished seventh, but here the Ab/G# and B natural are also carried over from the diminished chord into the E major. Whilst this is not a true secondary diminished seventh, it fulfills the same goal, just ending in a different key relative to the starting point.

These examples demonstrate the usefulness of diminished sevenths in the context of modulating within power metal, as they help to build the intensity toward a cadence (whether or not the function of the cadence itself is to change key). Due to their nature of almost being four chords at once (Cdim7 shares all of its notes with Ebdim7, F#dim7, and Adim7, for example), and having four notes to choose from for notes that will be carried over into the next chord for maximal smoothness, they have unmatched versatility when it comes to modulating.

Whilst these modulations reflect power metal's relationship with classical music and help to establish that generally speaking, for power metal, harmonic interest comes from preparing and executing modulations, rather than intrinsically "strange" chord choices, they are not the only modulation

techniques used within power metal. The listening data showed another technique that was far more common in power metal than in any other subgenre.

The Aeolian Chromatic Mediant Modulation

One technique found very often in Power Metal is a simple but effective modulation technique, henceforth referred to as the Aeolian Chromatic Mediant modulation. This is a common-chord modulation that takes a piece from one minor key to another that is three semitones away from the original. To go upwards this is achieved by using the VII chord of the original key as the dominant of the new key, for example, a piece in C minor would use a Bb major chord as the pivot chord to modulate to Eb minor (figure 7.5),

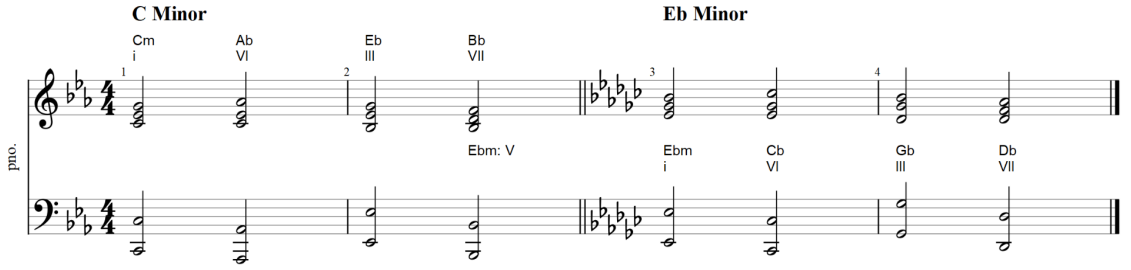

Figure 7.5: Example of ascending Aeolian chromatic mediant modulation

To go down by three semitones, simply the opposite is used, the dominant of the antecedent key is used as the VII of the new key.

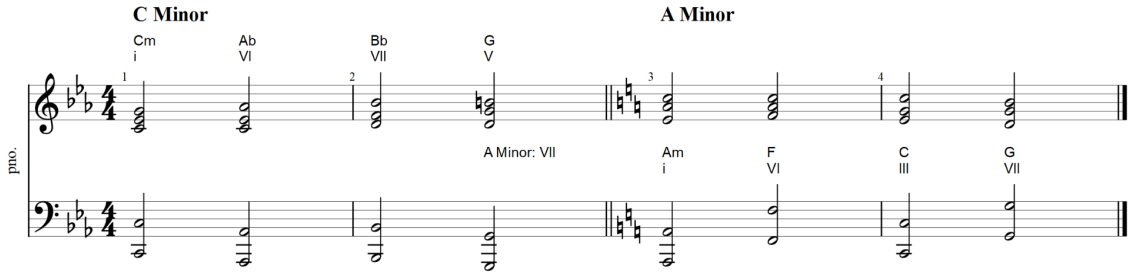

Figure 7.6: Example of descending Aeolian chromatic mediant modulation

As Bjornberg (1984) points out the VII chord often assumes a dominant function as part of a cadence, giving composers flexibility to change keys with this method very smoothly. The harmonic palette of Power Metal allows for easier access to this modulation than the other subgenres of metal, with chords V and VII combining to make around 25% of the chords used.

This modulation is typically used to add emphasis to a new section of a song, for example in Dragonforce's "Operation Ground and Pound" from the album *Inhuman Rampage* (2005), the song starts with a typical power metal lead guitar duet section in D minor, with both guitarists playing in parallel thirds over power chords in the rhythm guitars, bass, and keys, using quintessential Aeolian chords i, III, iv, v, VI, VII, ending on A major to hint at a perfect cadence to begin the verse on the tonic of D minor, but instead moving to B minor for the verse and chorus (figure 7.7).

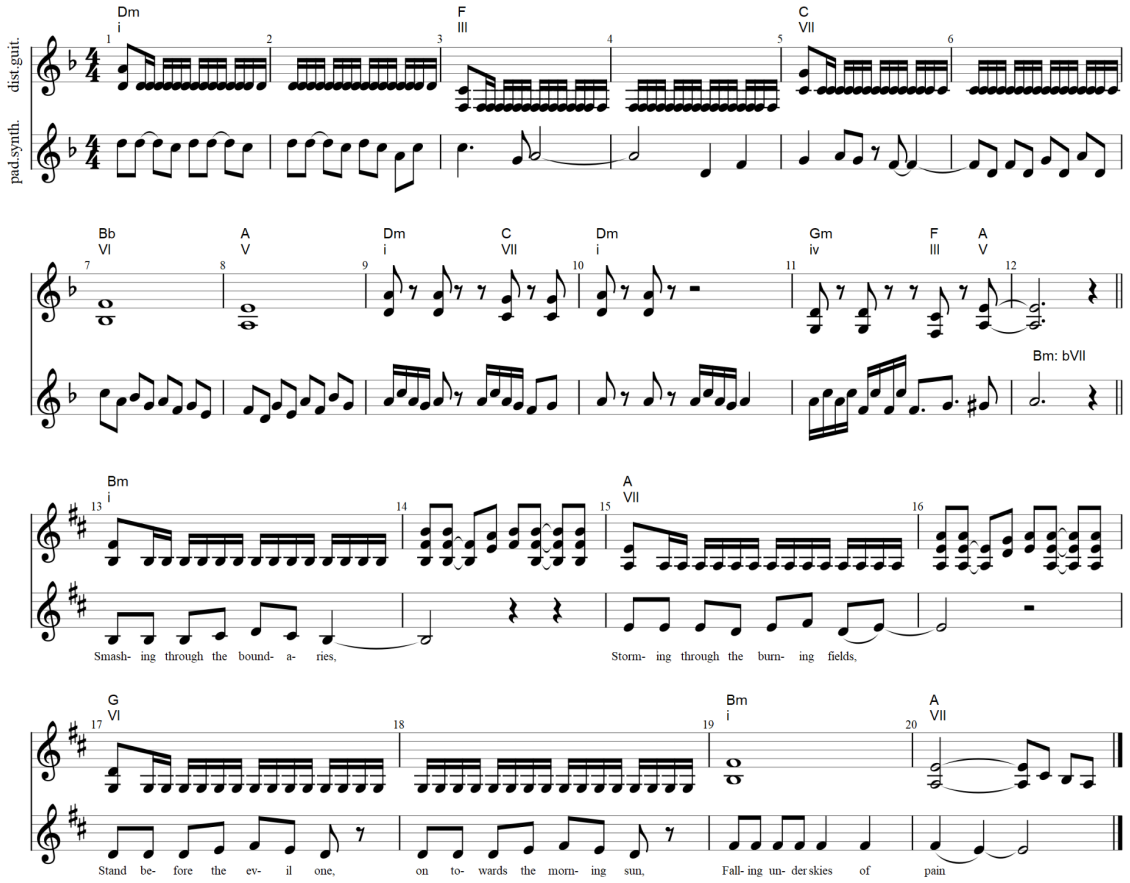

Figure 7.7: Descending Aeolian chromatic mediant modulation in "Operation Ground and Pound" (0'56")

Dragonforce used this exact technique again, in the same keys nonetheless, on their next album *Ultra Beatdown* on the single “Heroes Of Our Time”. The opening guitar duet starts in D minor, with the verse in B minor after a bar of A major, the only real difference being the latter song uses an implied chord with a repeating pattern of notes A D E A D E in the guitar, (bar 8 of figure 7.8) hinting at Asus but never fully realising the chord with a C#.

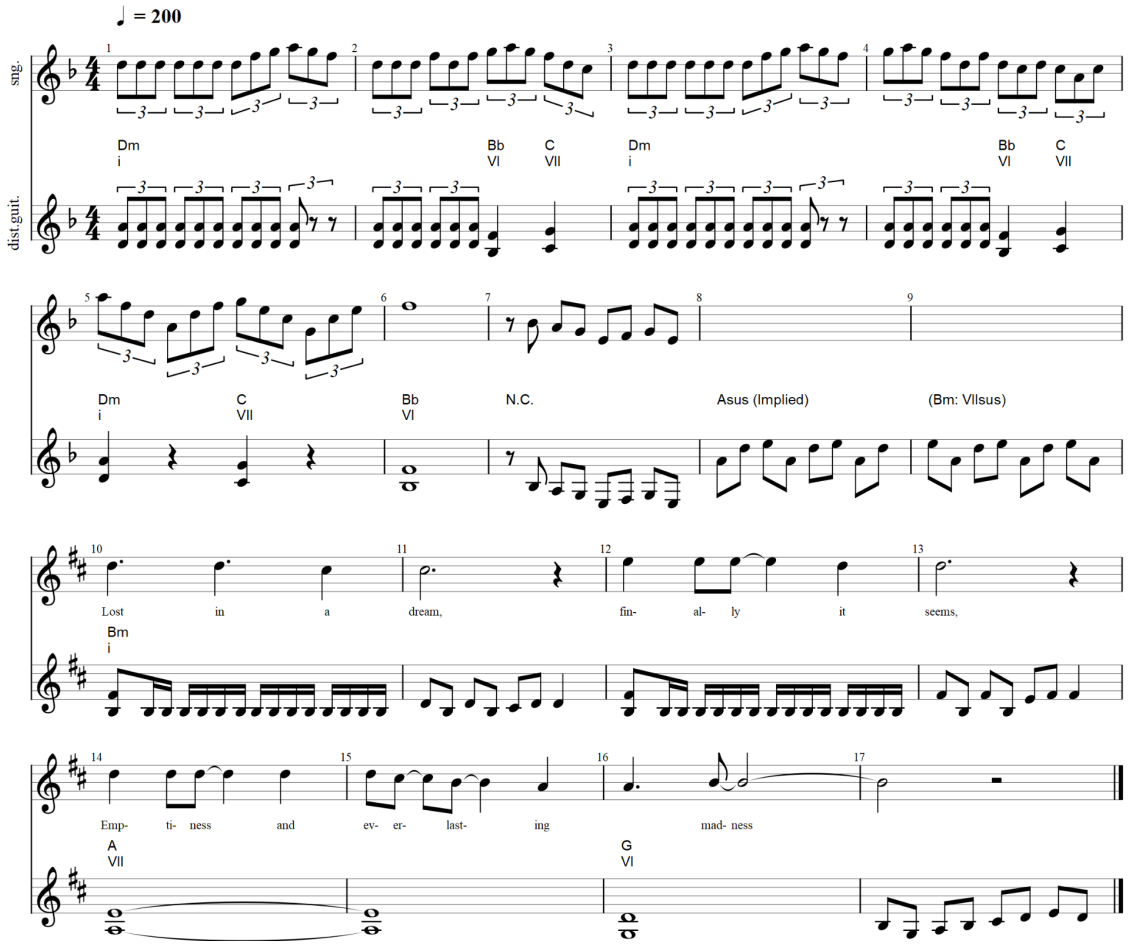

Figure 7.8: Descending Aeolian chromatic mediant modulation in “Heroes Of Our Time” (0’28”)

Another example of this technique is Galneryus’s “Destiny”, where it is used midway through the chorus, which is initially in F minor (figure 7.9) The first half of the chorus uses a fairly stereotypical baroque-influenced sequence, being almost identical to Pachelbel’s “Canon in D” (1968)[9] with a one

[9] The famous sequence in Pachelbel’s canon is D, A, Bm, F#m, G, D, G, A. Transposed to D major, the sequence in Galneryus’ “Destiny” would be D, A, Bm, A, G, D, Em, A. The two chords substituted here (F#m and G) each also share two common tones with the chords they are replaced with (A and Em).

chord per bar harmonic rhythm, ending on Eb major, which becomes the dominant of the new key, Ab minor. The same technique is used in reverse at the end of the second half of the chorus, ending on Eb major with the subsequent instrumental section beginning on F minor. This use of the technique is a good example of when it could equally be argued as an enharmonic modulation, as if the rule of treating everything as being in a minor key wasn't adhered to, the first section of this chorus would probably better suit being analysed as Ab major.

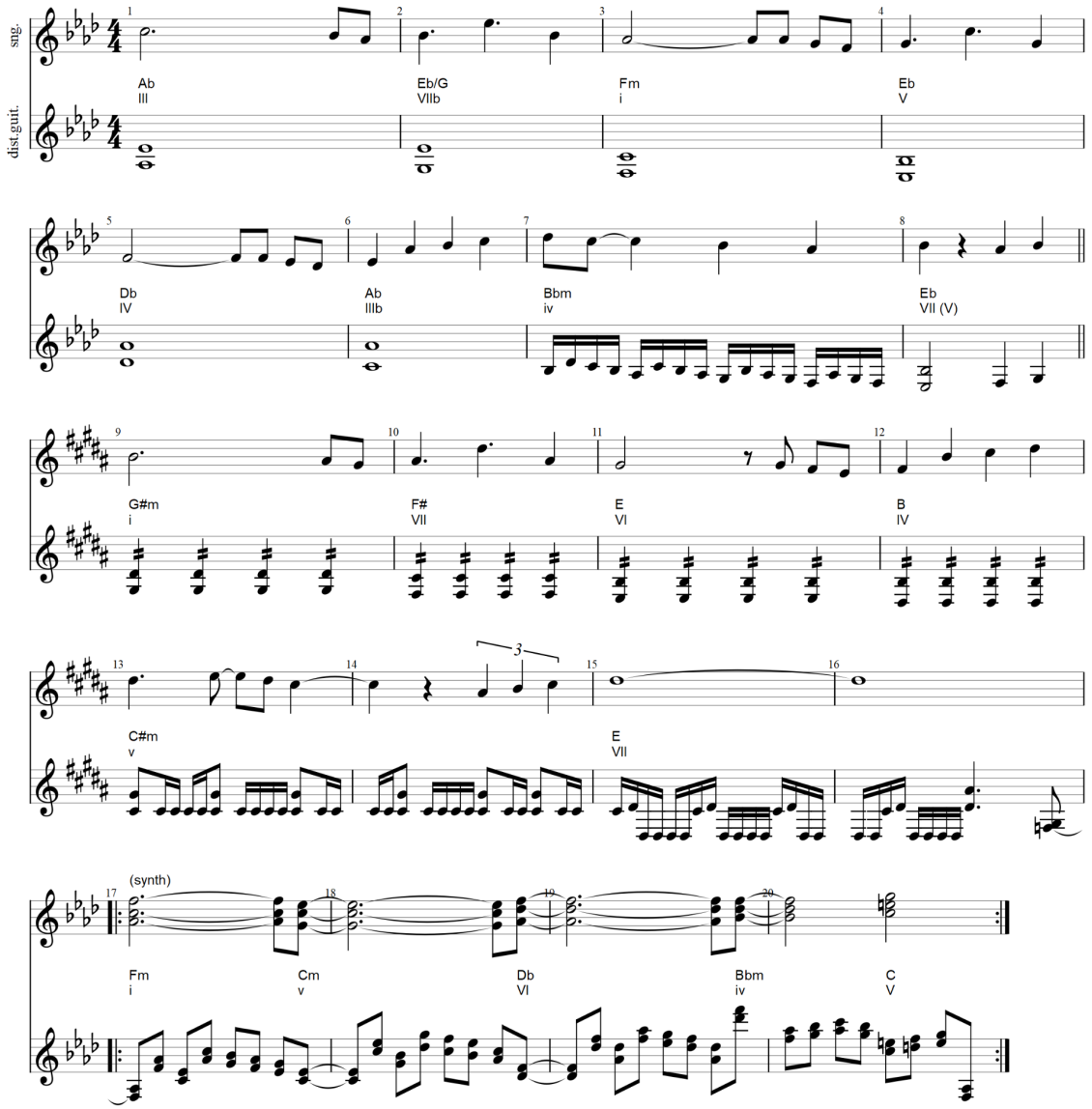

Figure 7.9: Chorus of "Destiny" including Aeolian chromatic mediant modulation (1'57")

Heavenly use the technique several times during “Keepers of the Earth”. It is used in the standard way at the end of the second and final choruses, using D major as a pivot chord between E minor and G minor (V=VII) to transition into the instrumental sections (figure 7.10).

At 3.42, however, the return to E minor is not done in the more common way of reversing the modulation by using a VII=V, but rather using ending on the flattened seventh of the antecedent key (F major in G minor), which becomes the Neapolitan 6th of the new key, E minor.

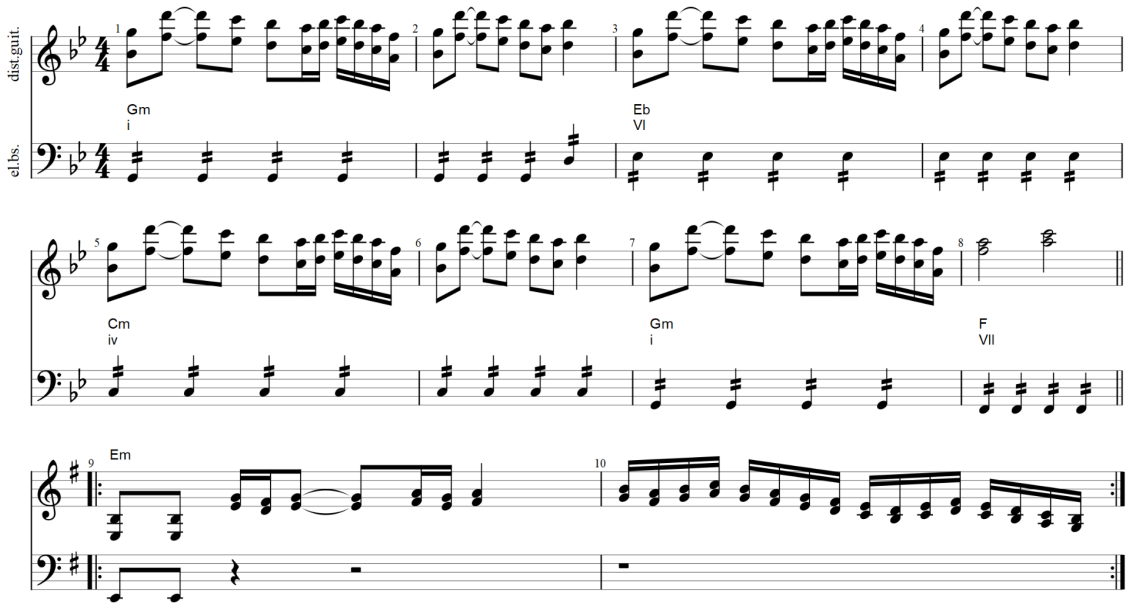

Figure 7.10: Descending aeolian chromatic mediant modulation in “Keepers Of The Earth” (3’30”)

This version of the modulation gives it a more serious, darker atmosphere, with the descending semitone sequence not providing the same instantly satisfying smooth change as the more predictable options of a perfect or Aeolian cadence. The prevalence of this technique within power metal is backed up by the data, with modulation by minor 3rd (up or down) making 32% of modulations used in power metal.

The Aeolian chromatic mediant modulation allows for a fast, smooth change of key that may even go unnoticed by the listener the first time they hear it, whilst fulfilling the desire for power metal to be more harmonically sophisticated than other types of metal. This fits in with power metal’s close relations with western orchestral music, being one of the subgenres that uses key changes more

frequently than others much, like how orchestral composers use modulations to denote new sections in, for example, sonata form. Whilst it certainly isn't the only method of changing key used by power metal bands, its predominance was the first indication that each subgenre may have their own specific modulation tropes. Its effectiveness is reinforced by the fact that, when descending, the tonic of the new key is "vi" of the previous, which as mentioned is never used in power metal as a standalone non-diatonic triad. This means that every time this modulation is used (or at least, used for the first time in a track) that chord is entirely fresh to the listener's ear.

Another common key change within power metal is to modulate up a tone. Commonly done into the chorus, this "lifts" the harmonic space adding to power metal's inspirative semblance. This key change reinforces claims that power metal has "poppy" tendencies, being an incredibly common modulation in mainstream pop songs, often jokingly dubbed "the Westlife key change".[10]

5.2.2 Black Metal

Discussing modulations within black metal is a perplexing topic. Can they truly be classed as a change of key if so many chords in the antecedent section were non-diatonic in the first place? To keep the data collection consistent with the other subgenres, they must be recorded in the same manner. However, it is potentially more useful to view them as shifts of tonal centre, rather than true changes of key signature.

[10] Here in Smooth Radio's list *Best Keychanges In Pop Music,* almost every single one is up a tone, the article also remarks on how common this modulation is in the music of Westlife.

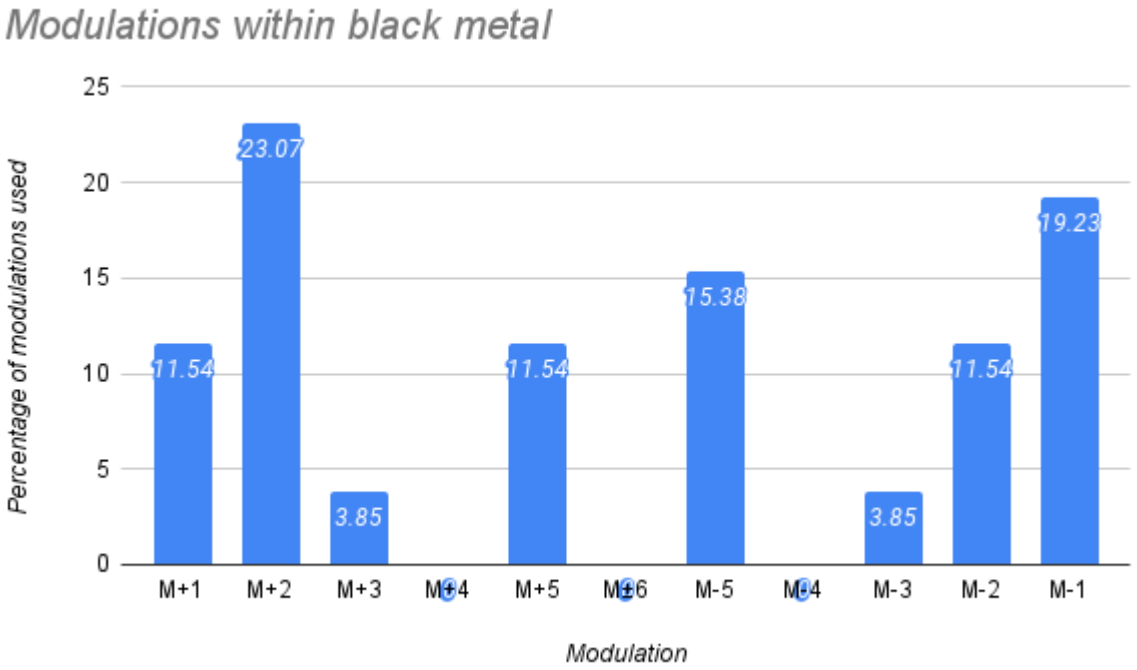

Figure 8.1: Modulations within black metal

The key changes in black metal tend to be very abrupt, and unprepared. Like in most subgenres of metal (and indeed in most genres of music) they are used to signify a change of section. One feature of the data is that, in the tracks that were included, no key change was to a key separated from the original by a major third. This is likely to be because so many of black metal's progressions are based around this interval. It makes sense that in a genre that so heavily includes these chords, when a composer wants to announce a new section with a change of key/tonal centre, that this would be avoided. If the listener is accustomed to the vi triad as one of the norms of the genre, it might be perceived by the listener as an expected chord to hear anyway, defeating the object of a startling key change.

5.2.3 Metalcore

Keeping in line with the genre's deliberate simplicity, changes of key within metalcore are few and far between.

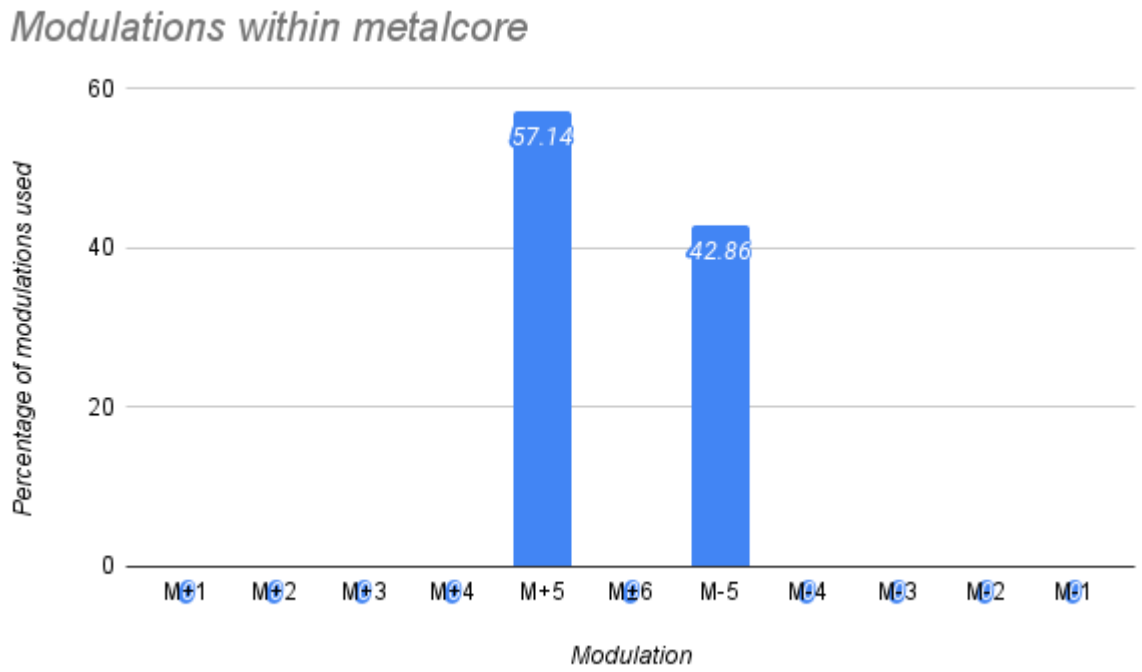

Figure 9.1: Modulations within metalcore

Only two of the songs that were analysed contained any modulations whatsoever, with there being seven modulations recorded in total and all of them were either up or down by a perfect 5th. They were found in the tracks *To Live Or Not Remain* by Anterior and *Carrion* by Parkway Drive, these two tracks share the trait of modulating up a perfect fourth for a section, then changing back to the original key later. This lack of modulation is in stark contrast to all other subgenres of metal, where over 75% of each track contains at least one, and most contain multiple.[11]

5.2.4 Melodic Death Metal

Similarly to how the chord progressions in melodic death metal were found to mostly stay within the “rules" of the genre, whilst still allowing for some deviation in the more adventurous tracks, they lie in a sort of middle ground between metalcore and the more “art music” focused genres. Containing

[11] The lack of harmonic variety in metalcore may be part of the reason “true” metalheads show so much disdain for the subgenre, forum posts on *Ultimate Guitar* and *Wrestlezone* call out metalcore for being boring and repetitive, with one user referring to it as “I Can’t Believe It’s Not Metal”.

some key changes when they were appropriate, but less frequently and in a less audacious fashion than power metal and black metal bands do.

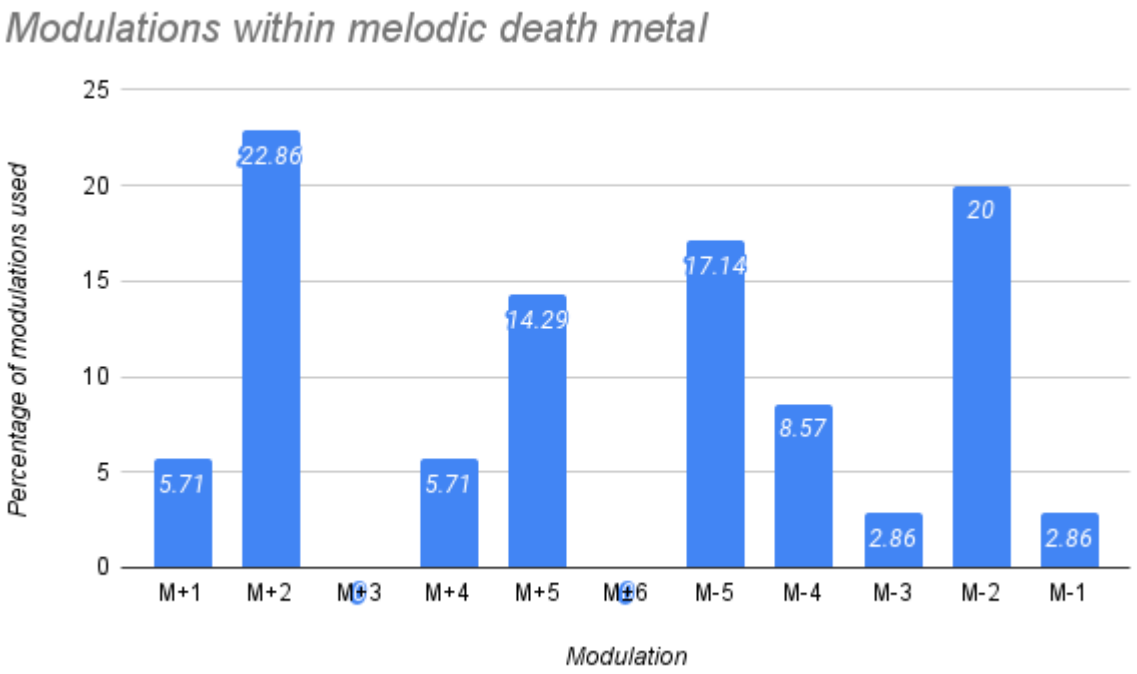

Figure 10.1: Modulations within melodic death metal

Modulations in melodic death metal were found to be predominantly either up/down a perfect 4th (31%) or by a whole tone (41%). Arch Enemy's "Burning Angel" (2002) (figure 10.2) provides a good example of how the use of non-diatonic chords, particularly the Neapolitan chord, offers a smooth transition to the subdominant key.

As discussed above, the chord sequence behind the introductory guitar duet breaks the NWOBHM habit of Aeolian i VI VII etc patterns, instead opting for a Db major chord in C minor. As Db major is also the VI chord of F minor, the next key, the modulation to F minor for the verse section could be seen as a common chord modulation, although the final chord of the introduction is still a G major, so the modulation still comes with a sudden, unanticipated impact.

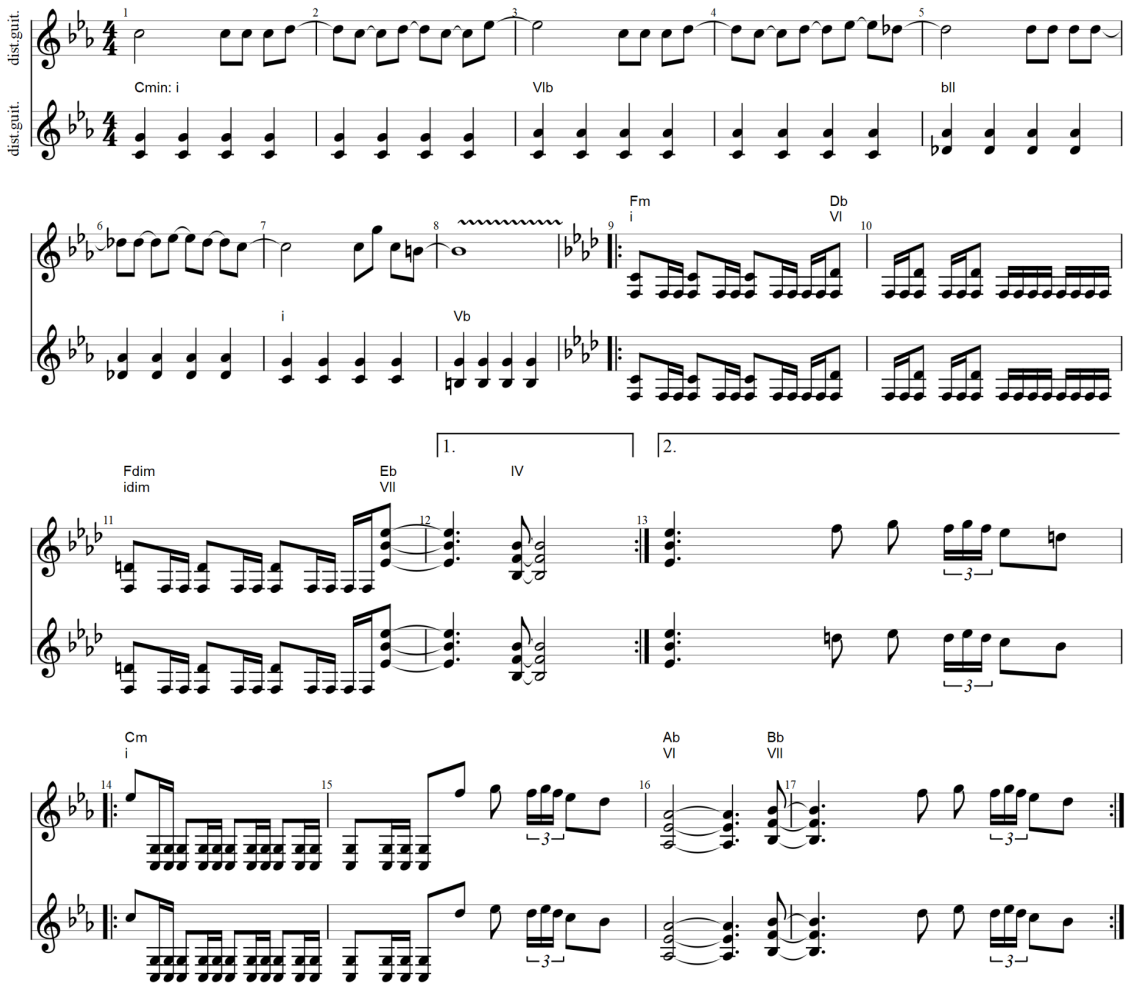

Figure 10.2: Two modulations in Arch Enemy's "Burning Angel" both up/down a perfect fourth (0'37")

The return to C minor for the chorus is given a smoother transition, with the verse ending on VII, Eb, which is diatonic to C minor, with the lead guitars ending the verse with a short lick ending on C and Eb respectively.

Children of Bodom use many modulations up and down a tone in "Hate Me" (2000) (figure 10.3), switching quickly between D minor and C minor several times.

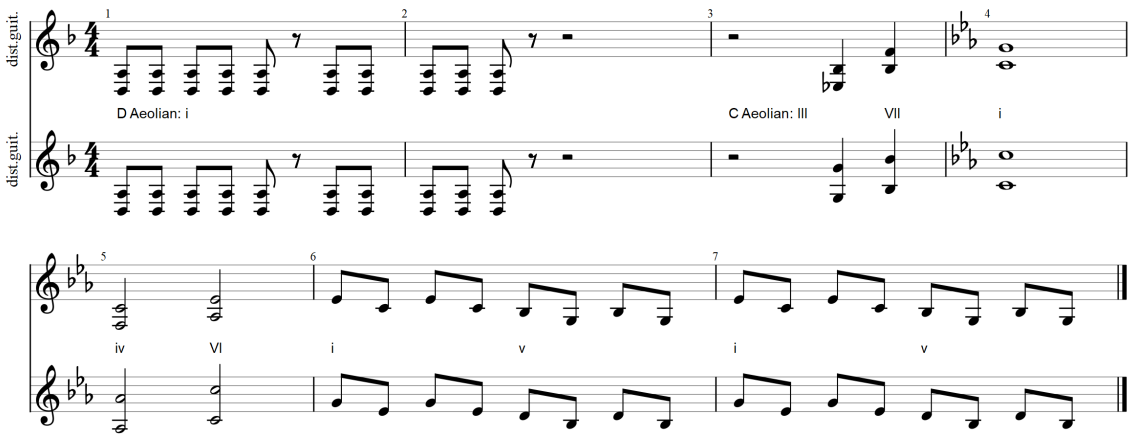

Figure 10.3: Modulation down one whole tone in "Hate Me" (1'29")

Here, the chorus ends firmly on D minor, in rhythmic unison with the vocal line "I don't give a fuck if you hate me", Children Of Bodom use a quick III VII Aeolian cadence in C minor after a few beats of silence to establish the new key of C minor.

Soilwork also frequently modulate up and down a whole tone, doing so multiple times in "The Chainheart Machine" from *The Chainheart Machine* (2000) (figure 10.4).

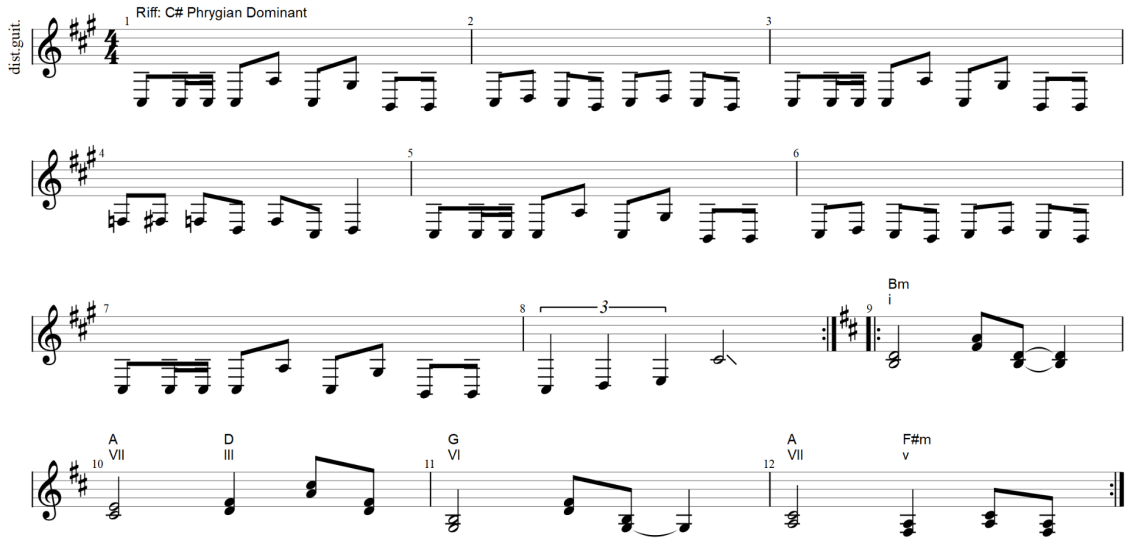

Figure 10.4: Modulation down a whole tone into the chorus of "The Chainheart Machine". (0'28")

“The Chainheart Machine” perfectly encapsulates melodic death metal’s harmonic content: a repeated Phrygian dominant riff that moves up a key into a NWOBHM influenced Aeolian progression. Soilwork move between this C# Phrygian dominant riff to B Aeolian passages with duet guitar work a total of six times throughout the song.

5.2.5 Progressive Metal

As with their use of chords in general, progressive metal’s modulations are widely varied. (Figure 11.1)

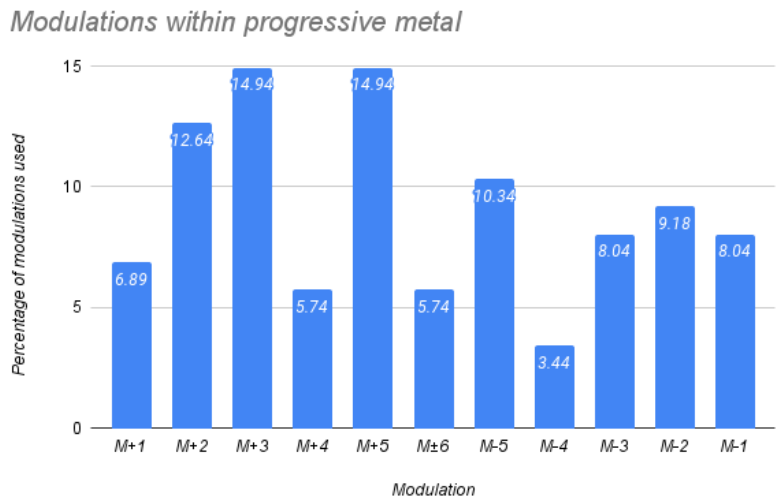

Figure 11.1: Modulations within progressive metal.

As figure 11.1 shows, the two most common modulations within progressive metal are up by a minor third, and up by a perfect fourth. As discussed in chapter 5.2.1, modulating up or down a minor third has shown to be popular amongst power metal bands. The fact that this same technique is used amongst progressive metal bands is unsurprising, however, when we look into which progressive metal bands are using this technique. Namely, Symphony X and Circus Maximus used this modulation a total of seven times between them, making up over half of this type of modulation within progressive metal, with there being thirteen in total.

This is where the broadness of progressive metal starts to show. These two bands are often described as having power metal influences, Symphony X being described as “progressive power metal” by metalstorm.net, and Circus Maximus’ own biography explaining that the musically their style “walked a tightrope between prog metal and power metal” (Rivadavia 2000).

Symphony X demonstrate their blend of power metal with progressive metal with the shifts of tonal centre in Inferno (2002). The off-kilter ostinato that frequently changes time signature is in F Phrygian dominant for the first few minutes of the song, the last few bars of which are shown in figure 11.2 below. A similar figure is played on the keyboards in G# Phrygian dominant after this passage ends, backed by power chords that end on a D5, an augmented fourth away from G#. Although it is not prepared and executed in the same manner that typical power metal bands would, it raises the tonality by three semitones.. This shows a standard power metal trope being used in a more “progressive” manner by augmenting it with dark chord choices, as well as the virtuosic lines being in a darker mode, the Phrygian dominant, rather than Aeolian which would be standard for power metal.

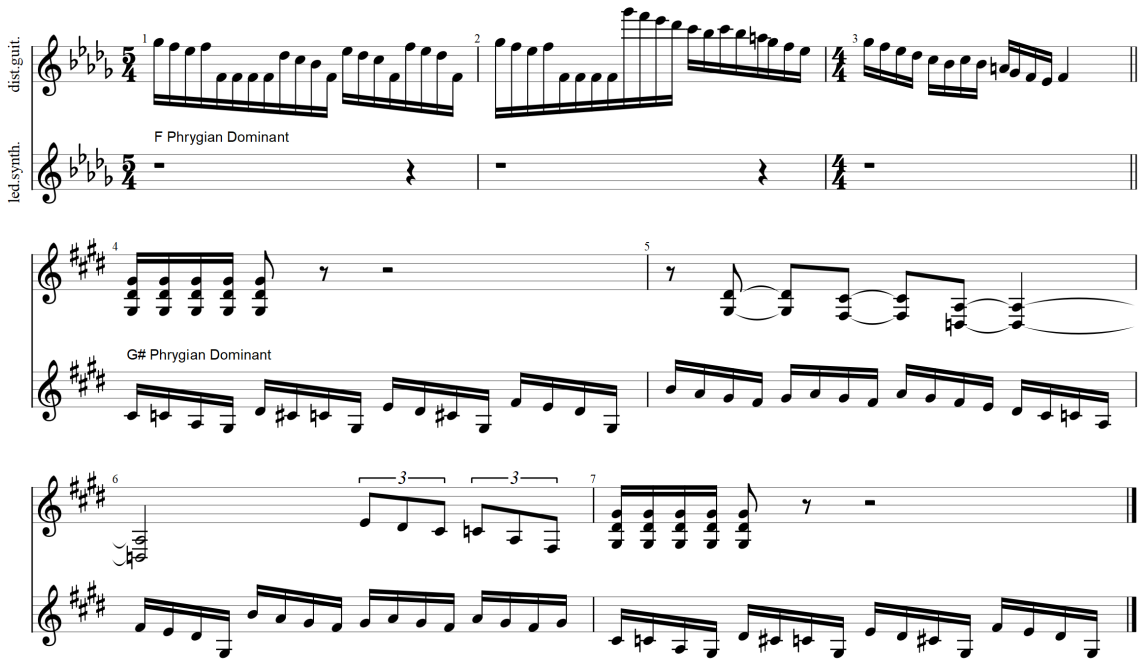

Figure 11.2: Shift of tonal centre in Symphony X’s “Inferno”, moving up three semitones. (0’24”)

Circus Maximus demonstrate both ascending and descending Aeolian chromatic mediant modulations in “Alive” (2005). Here at 1:37 (Figure 11.3), they modulate from E minor to C# minor for the clean section.

This plays out much the same as the descending modulation in “Keepers of the Earth”, with no perfect cadence, but rather the D major (VII) becoming the Neapolitan chord of the new key. Proceeding into a standard Aeolian VI, VII, i passage.

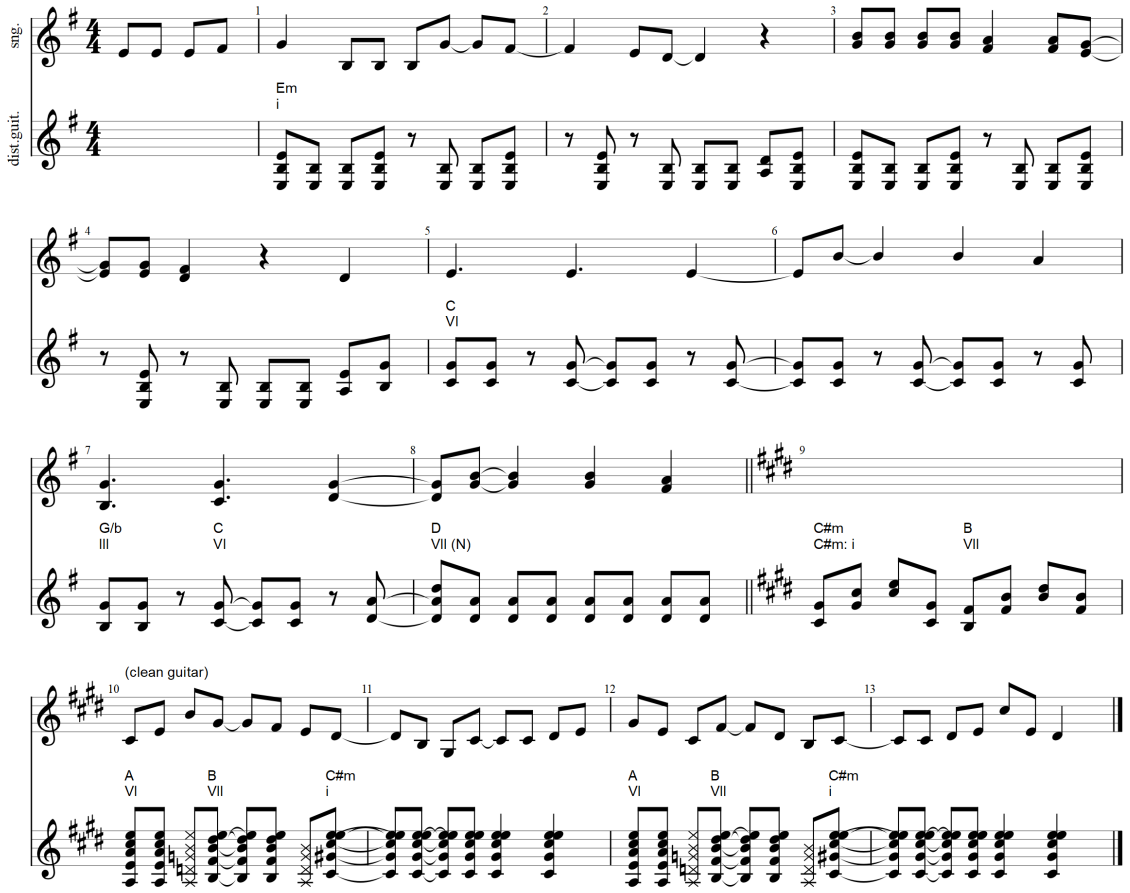

Figure 11.3: Descending Aeolian chromatic mediant modulation in “Alive”. (1’37”)

In the final key change of “Alive” (Figure 11.4), Circus Maximus use an unprepared ascending Aeolian chromatic mediant into the outro section, with both the modulation and the section itself being more progressive than the one discussed above. The key change happens immediately at bar 5 of figure 11.4, with the Eb major chord abruptly disrupting the tonality, beginning an Aeolian cadence into G minor, solidifying the new key.

The passage that follows utilises off-kilter chords such as the A major in bar 11 and the Db major in bar 13, the inherent progressiveness of which is accentuated by the frequent time signature changes.

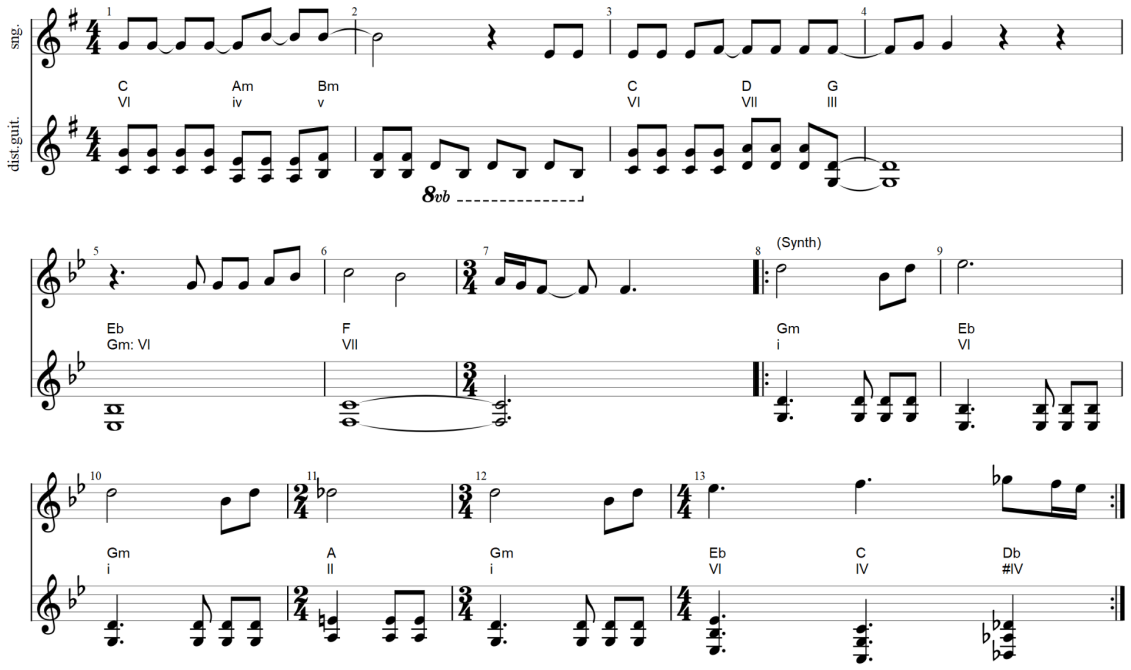

Figure 11.4: Final key change of “Alive”, using a non diatonic chord to instantly begin an Aeolian cadence into an Aeolian chromatic mediant modulation. (4’34”)

Hollenthon’s “Y Draig Goch” from *With Vilest Of Worms To Dwell* (2001) shows how modulation techniques frequented by melodic death metal bands can be brought into progressive repertoire by bands who walk the line between the two.[12] “Y Draig Goch” frequently moves its tonal centre up and

[12] *With Vilest Worms To Dwell* appears in *rateyourmusic.com’s* “The top 50 highest rated progressive metal albums of all time” despite the band being categorised as a melodic death metal band as well my *metalstorm.net*

down two semitones just as Children of Bodom's "Hate Me" and Soilwork's "The Chainheart Machine" do as discussed in chapter 5.2.4 (figure 11.5).

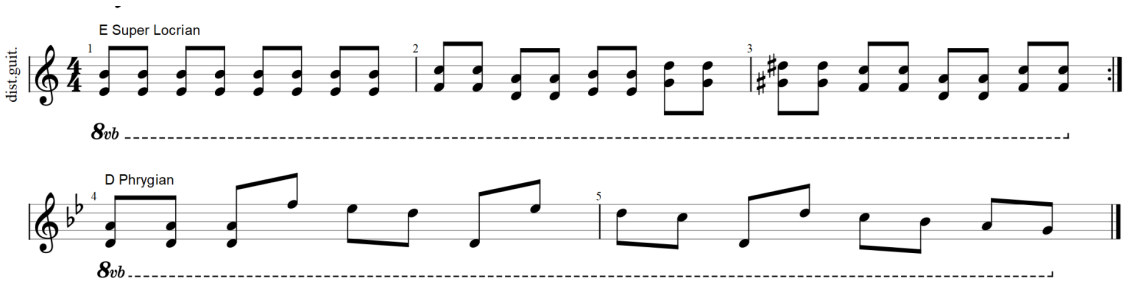

Figure 11.5: Riffs in Hollethon's "Y Draig Goch", shifting the tonal centre down one tone (2'19")

Hollenthon switch between this E Super Locrian riff and the subsequent D Phrygian riff multiple times throughout "Y Draig Goch", with no preparation between shifts of tonal centre.

5.2.6 Comparisons

Once again we can see the similarities and differences between how heavy metal subgenres treat harmony in the way they choose to change key. Whilst modulating up by a perfect fifth/down by a perfect fourth is something they all share, similar to the section on chord patterns we begin to see that each subgenre has its trademarks that set it apart from the rest.

Power metal's "Aeolian chromatic mediant modulation" is a technique used extensively within power metal, and has a few formulae that tend to be adhered to for its execution, namely which chords are used as common chords to smooth out the key change. The technique accounts for around 30% of power metal's modulations, being almost as frequent as each other with a 16/14 split. The data shows that modulating up by a tone is the third most popular, behind aeolian chromatic mediants and modulating up a fifth. Modulating up a tone is common amongst most popular music, and is especially prevalent within melodic death metal, making up 22% of its total key changes. However, what sets melodic death metal apart from power metal (other than the Aeolian chromatic mediant) is that melodic death bands seem to enjoy reverting to the original key after going up a tone, as a further 20% of their modulations were down a tone. In the work of Children of Bodom and Soilwork, we can

see that melodic death metal bands frequently shift up and down a tone between sections of a track, something that is not as common in power metal, where modulations down a town were only 7.7% of the total.

Modulations within progressive metal were where progressive starts to look like a prefix to a full subgenre title, rather than its own entity. Bands that are self-described and seen by the media as “progressive power” bands frequently employed Aeolian chromatic mediants, both following the exact formulae outlined in chapter 6.2.1 and by adding their own inflections. Bands that had a crossover between progressive metal and melodic death metal did the same and followed melodic death metal’s signature pattern of modulating up and down a tone between sections.

While progressive metal has been demonstrated to borrow modulation techniques from power metal and melodic death metal when a band’s style overlaps the two, the same can be said for progressive metalcore. Neither Periphery’s “Scarlet” from *Periphery II: This Time It’s Personal* (2012) nor Protest The Hero’s “Bloodmeat” from *Fortress* (2007) contain any changes of key.

6. Discussion and Conclusion

6.1 Summary of findings

This research aimed to determine what harmonic techniques metal bands are using in the 21st century and investigate how different subgenres handle things differently to achieve their desired sonic aesthetic. The results indicate that while, as a whole, metal bands are still using the techniques borrowed from bands of the 1970s and 1980s discussed by writers Lilja (2009) and Walser (1993), some subgenres have developed their own signature harmonic repertoire that further distinguish them from the rest.

The most compelling findings concerned power metal and black metal. Whilst power metal's close relation to baroque and classical chord progressions was a likely outcome, given power metal is the closest to "classic" heavy metal where the affinity for western orchestral music is well known (Walser 1993), the Aeolian chromatic mediant modulation is a technique used almost exclusively within power metal, employed very frequently by power metal bands from across the globe.

The data I collected suggests that black metal is the most far removed from heavy metal's origins when it comes to harmonic content. The Aeolian/Dorian structures discussed by previous literature have been replaced by a darker palette that seems to borrow, intentionally or not, from the ethereal non-diatonic progressions of the late romantic composers, more easily analysed with a neo-Riemannian perspective than with a traditional, Roman numeral-based one. The results show that Weitzmann regions in particular are an important part of 21st-century black metal harmonic technique. The findings on black metal contradict Coggins (2019) claim that black metal's chord progressions are "predictable" and "straightforward". The data shows that black metal bands use a large amount of non-diatonic chords, and in sequences like the one in Leviathan's work (figure 3.2) and other chord progressions discussed in chapter 5.1.2 indicate that whilst they might be repeated as Coggins states, they are less predictable than he suggests. Similarly, Stabler's claim that black metal bands conform to a "musical cage of flattened supertonics and parallel fifth chords" (2016, pg. 111) is contradicted in the work of Leviathan (figure 3.2), Shining (figure 3.4) and Dødsengel (figure

3.6). These three examples all forego the common power chord in favour of fully fleshed out minor chords, confirming Herbst (2018, pg. 96) assertion that black metal bands are more likely to use minor and altered chords, whereas other subgenres might use power chords or major triads. This also supports Hagen's (2011, pg. 184) finding that black metal bands prefer "full chord voicings".

I found these subgenres the most compelling not only because of their distinct features but also because of how different they both are. Black and power metal are perhaps the two most contrasting styles I covered in this study regarding their sonic aesthetic and their paratextual features such as lyrical themes, visuals, and subcultures. I believe the way these two subgenres treat harmony speaks to their overarching ambiences. The virtuosic, eccentric build-ups towards climactic cadences in power metal help to evoke the lyrical themes of embarking on quests, marching into battle, and so on, as it provides the music with a focus of this "end goal", just as in the lyrics there is often the end goal of slaying the dragon or reaching one's destiny. This is contrasted perfectly in black metal's use of harmony, with the ambiguous tonality and chilling repeated chord progressions reflecting the darker lyrical themes of hell, depression, and suicide. To summarise the difference between both, I would say that power metal is focused on the destination, and everything deliberately builds to a point, whereas black metal is focused on the journey, where each new chord-change continues to add to its sinister aesthetic.

Regarding metalcore and melodic death metal, the results affirm the works of Wiederhorn & Turman (2013) and Hillier (2020a), respectively. Both subgenres showed little deviation from "the norm" of Aeolian and Dorian-based progressions discussed in Lilja's work. The deliberate simplicity of metalcore is seen in both their limited choice of chords, and in their lack of modulations. Melodic death metal proved to stick to its NWOBHM influences fairly consistently, with only a few Neapolitan or otherwise colorful chords as exceptions.

Progressive metal proved to be not only one of the most difficult subgenres to define but also the one that was the least consistent in its use of non-diatonic harmony. The results show that, as expected, progressive metal is at the top of the list when it comes to a variety of both chord choices and key changes, but there was little to grasp onto as a defining feature of the genre as a whole, as there was

with power metal and black metal. The data on modulations, however, did suggest that when progressive metal bands are tied to a secondary subgenre, their harmonic practices are likely to conform to the norms of that subgenre. Progressive power metal bands often used the Aeolian chromatic mediant modulation, and progressive melodic death metal frequently shift up and down a tone between sections.

6.2 Methodological Limitations

Although the data showed clear patterns that I have used to demonstrate how metal subgenres use harmony differently, my work has some limitations. The data was recorded by ear, by a single listener. Although I have had near-perfect pitch since a young age and took great care to record the data as accurately as possible, my ear is not infallible. If further research was conducted in the same style as mine, having another listener work with the same tracks and record their analyses of the harmonic content would help any inaccuracies by either party be dealt with. Furthermore, similar to Clerq and Temperley's study (2011) this would mean we could quantitatively measure how much material was agreed upon and how much came down to my own biases. Another potential method would be to use tracks that have scores available (although this would limit the sampling method somewhat) and have multiple participants analyse the material. This would not only eliminate listener biases entirely, but also would help remove subjectivity in the analysis.

Another factor that may have affected the outcome of the data is the sampling method. Songs that were chosen to be released as singles or first tracks of albums means there could be a trend towards more "mainstream" sounding songs, which likely have simpler harmonic content than other tracks on the album if a band saved their more adventurous material for the back-end of the record. Further research would be needed to see if this is true, but it would not be surprising to see the numbers change if the study had included full albums rather than single tracks. How it would have affected the data, however, can only be guessed until a study is conducted.

As so many of Black Metal's chord progressions are inherently non-diatonic, the semantic of them being in a traditional western key signature makes less sense than with most of the other subgenres of metal. However, for consistency, all songs were treated in the same way, but it is potentially more

useful to view the key signatures and modulations in black metal more as tonal centres, and shifts thereof, rather than traditional keys.

Another possible criticism of my work is that as Clerq and Temperley before me, I have treated harmonic structure as a one-dimensional plane. Other authors have used Schenkerian hierarchical analysis, at least for rock harmony (Everett 2004), which differentiates between structural and decorative harmonies.

Further research in the area could also consider different types of chords, like extended chords or inversions. As my research only covers triads, more knowledge on how chord extensions and non-root note bass notes would be a valuable addition to the discussion. Additional subgenres would also want to be considered to provide a more holistic view of heavy metal harmony. Folk metal, “true” death metal, and thrash metal all come to mind as subgenres that may want to be analysed in a new study. Another obvious way of expanding the study would be to include more tracks from each subgenre.

6.3 Implications

These results build on the existing literature surrounding harmony within heavy metal music, and with the other research only covering music up until the mid-1980s (Lilja 2005), or 2006 (Wiederhorn and Turman 2013), they help to bring the discussion of the harmonic devices used by heavy metal bands into the modern-day. They show that, whilst all falling under the umbrella term “heavy metal”, each of the covered subgenres has its tropes that set it apart from the rest.

The differences between each subgenre’s harmonic palettes speak to the various subgenres differing internal definitions of heaviness. As Berger (1999, pg. 59) argues, ‘any element of the musical sound can be heavy if it evokes power or any of the grimmer emotions’. For example, a baroque influenced, colourful power metal progression would probably be perceived as too lighthearted by a black metal audience, but in the context of power metal, the intense buildup toward a cadence, or intricate preparation before a modulation can help the music to evoke this feeling of power that Berger discusses. Whereas in black metal, the darker hues are provided by both the chord progressions

themselves, often with each chord change being a jarring transition from the last, and by the increased unpleasantness of the timbre caused by the distortion of altered and minor chords.

Black metal, power metal, and progressive metal seem to all fit within Calder Hannan's (2018) assertion that the subcultural capital we call "heaviness" can be achieved through complexity, albeit through the complexity of their harmonic content, rather than the intricate rhythms that Hannan discusses. Each of these subgenres looks to break from the norms of older bands and expand the boundaries of the heavy metal genre, often in ways quite distinct from one another.

The results can be utilised in a few different ways. The data may prove useful to metal artists (or composers of any genre) for branching out into a subgenre unfamiliar to them. The findings on black metal could spark a new interest in neo-Riemannian theory, particularly for Cohn's (2012) *Audacious Euphony.* If the world of metal studies became more enthusiastic about complex harmony as a whole, it could create demand for another Lilja (2009) style book that explains these techniques in more depth.

Future genre taxonomies may wish to take into account the differences noted between subgenres. For example, Thomas Rönnberg's (2020) masters thesis that aims to classify heavy metal subgenres with machine learning, a phenomena that is not specific to heavy metal, with Hayes (2019) also discussing how music can be categorised with the help of artificial intelligence. Using machine learning may be a much more efficient method for a study that expands on this work, which in turn could be used for a future artificial intelligence-based taxonomy.

While I do not wish to understate the importance of non-musical factors in the discussion of genre within heavy metal, I hope this thesis can help bridge the gap between metal musicology and music theory and open up the conversation of how harmony can relate to it.

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Edge Of Sanity. (2003). *Crimson II*. Black Mark Productions.

Edguy. (2001). *Mandrake*. AFM Records.

Elderwind. (2012). *The Magic of Nature*. Deleting Soul Records.

Enslaved. (2003). *Below The Lights.* Osmose Productions.

Epidemia. (2004). *Elfiyskaya Rukopis*. Moroz Records.

Evergrey. (2001). *In Search Of Truth*. Inside Out Music.

Falconer. (2001). *Falconer.* Nuclear Blast Records.

From Autumn To Ashes. (2001). *Too Bad You're Beautiful.* Ferret Music.

Furia. (2009). *Grudzień Za Grudniem*. Pagan Records.

Galneryus. (2010). *Resurrection*. VAP.

Heaven Shall Burn. (2013). *Veto.* Century Media.

Heavenly. (2004). *Dust To Dust.* Noise Records.

Helloween. (2000). *The Dark Ride.* Victor Entertainment.

Hollenthon. (2001). *With Vilest of Worms to Dwell.* Napalm Records.

Immortal. (2002). *Sons of Northern Darkness.* Nuclear Blast Records.

In Flames. (1996). *The Jester Race.* Nuclear Blast Records

In Flames. (2000). *Clayman*. Nuclear Blast Records.

In This Moment. (2007). *Beautiful Tragedy.* Century Media.

Insomnium. (2006). *Above The Weeping World.* Candlelight Records.

Into Eternity. (2004). *Buried In Oblivion*. Century Media.

Jinjer. (2016). *King Of Everything.* Napalm Records.

Kalmah. (2003). *Swampsong*. Spinefarm Records.

Kamelot. (2005). *The Black Halo.* SPV/Steamhammer.

Killswitch Engage. (2002). *Alive or Just Breathing*. Roadrunner Records.

Leviathan. (2003). *The Tenth Sub Level of Suicide*. Moribund Cult.

Lost Horizon. (2003). *A Flame To The Ground Beneath.* Music For Nations.

Masterplan. (2003). *Masterplan*. AFM Records.

Mastodon. (2009). *Crack The Skye.* Reprise Records.

Mercenary. (2004). *11 Dreams*. Century Media.

Mistur. (2009). *Attende*. Einheit Produktionen.

Morgana Lefay. (2005). *Grand Materia*. Black Mark Productions.

Mörk Gryning. (2001). *Maelstrom Chaos*. No Fashion Records.

Mors Principium Est. *Inhumanity.* Listenable Records.

Motionless In White. (2014). *Reincarnate*. Fearless.

Nevermore. (2000). *Dead Heart in a Dead World.* Century Media.

Nightrage. (2003). *Sweet Vengeance.* Century Media.

Opeth. (2001). *Blackwater Park.* Music For Nations.

Orphaned Land. (2004). *Mabool: The Story of the Three Sons of Seven.* Century Media.

Pachelbel, Johann, 1653-1706. (1968). Canon and Gigue for strings and basso continuo [recorded by Jean-François Paillard]

Pagan's Mind. (2005). *The Celestine Prophecy.* Limb.

Pain Of Salvation. (2002). *Remedy Lane.* Inside Out Music.

Parkway Drive. (2007). *Horizons.* Resist Records.

Periphery. (2012). *Periphery II: This Time It's Personal.* Roadrunner Records.

Porcupine Tree. (2002). *In Absentia.* Lava Records.

Primordial. (2007). *To The Nameless Dead.* Metal Blade Records.

Protest The Hero. (2008). *Fortress.* Vagrant Records.

Rhapsody. (2000). *Dawn Of Victory*. Limb.

Riverside. (2007). *Rapid Eye Movement.* Inside Out Music.

Rotting Christ. (2007). *Theogonia.* Season of Mist.

Scar Symmetry. (2008). *Holographic Universe.* Nuclear Blast Records.

Septicflesh. (2008). *Communion*. Season of Mist.

Seventh Wonder. (2008). *Mercy Falls.* Lion Music.

Shining. (2007). *V - Halmstad.* Osmose Productions.

Soilwork. (2000). *The Chainheart Machine.* Century Media.

Sonata Arctica. (2003). *Winterheart's Guild.* Spinefarm Records.

Suidakra. (2000). *The Arcanum.* Last Episode Productions.

Summoning. (2001). *Let Mortal Heroes Sing Your Fame*. Napalm Records.

Swallow The Sun. (2003). *The Morning Never Came*. Firebox Records.

Symphony X. (2002). *The Odyssey*. Inside Out Music.

The Black Dahlia Murder. (2011). *Ritual.* Metal Blade Records.

The Devil Wears Prada. (2011). *Dead Throne.* Ferret Music.

The Elysian Fields. (2001). *12 Ablaze*. Black Lotus Records.

Tierra Santa. (2001). *Sangra de Reyes*. Locomotive Records.

Timeless Miracle. (2005). *Into the Enchanted Chamber.* Massacre Records.

Trivium. (2005). *Ascendancy*. Roadrunner Records.

Underoath. (2006). *Define the Great Line.* Tooth & Nail.

Unearth. (2004). *The Oncoming Storm*. Metal Blade Records.

Watain. (2003). *Casus Luciferi.* Drakkar Productions.

White Skull. (2009). *Forever Fight.* Dragonheart.

Whitechapel. (2019). *The Valley.* Metal Blade Records.

Windir. (2001). *1184*. Head Not Found.

Wintersun. (2004). *Wintersun*. Nuclear Blast Records.

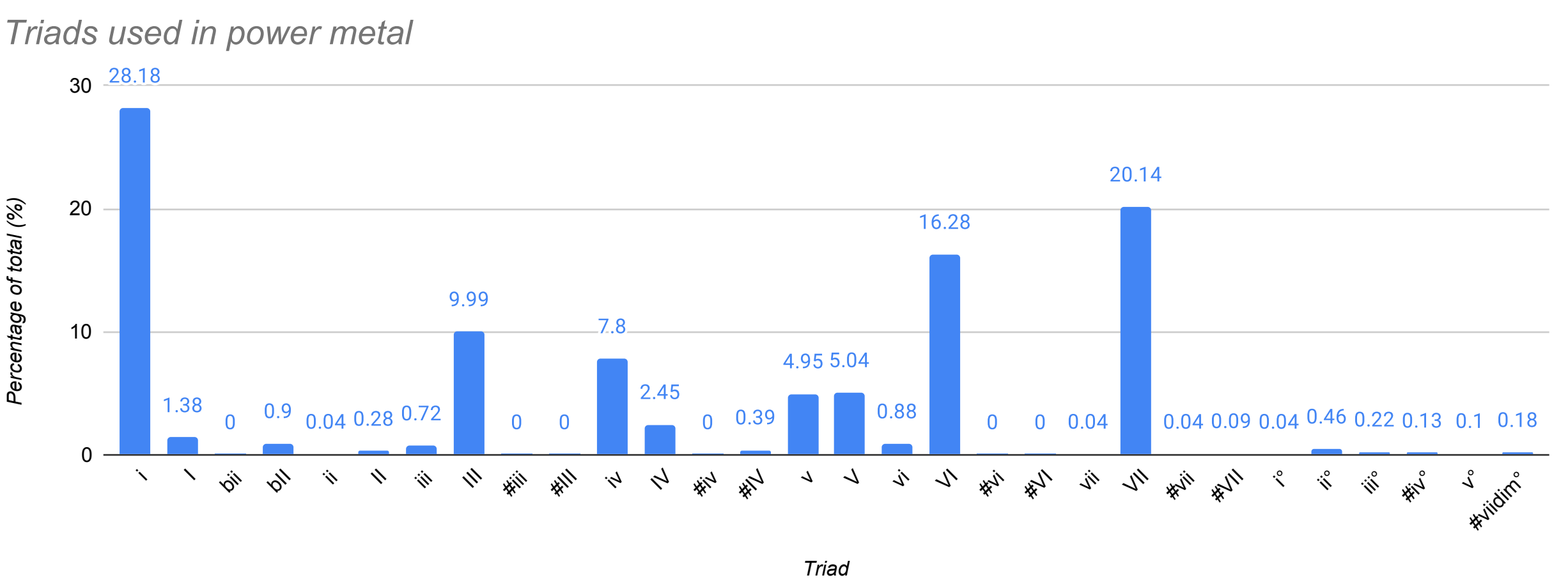
Witherfall. (2018). *A Prelude To Sorrow.* Century Media.

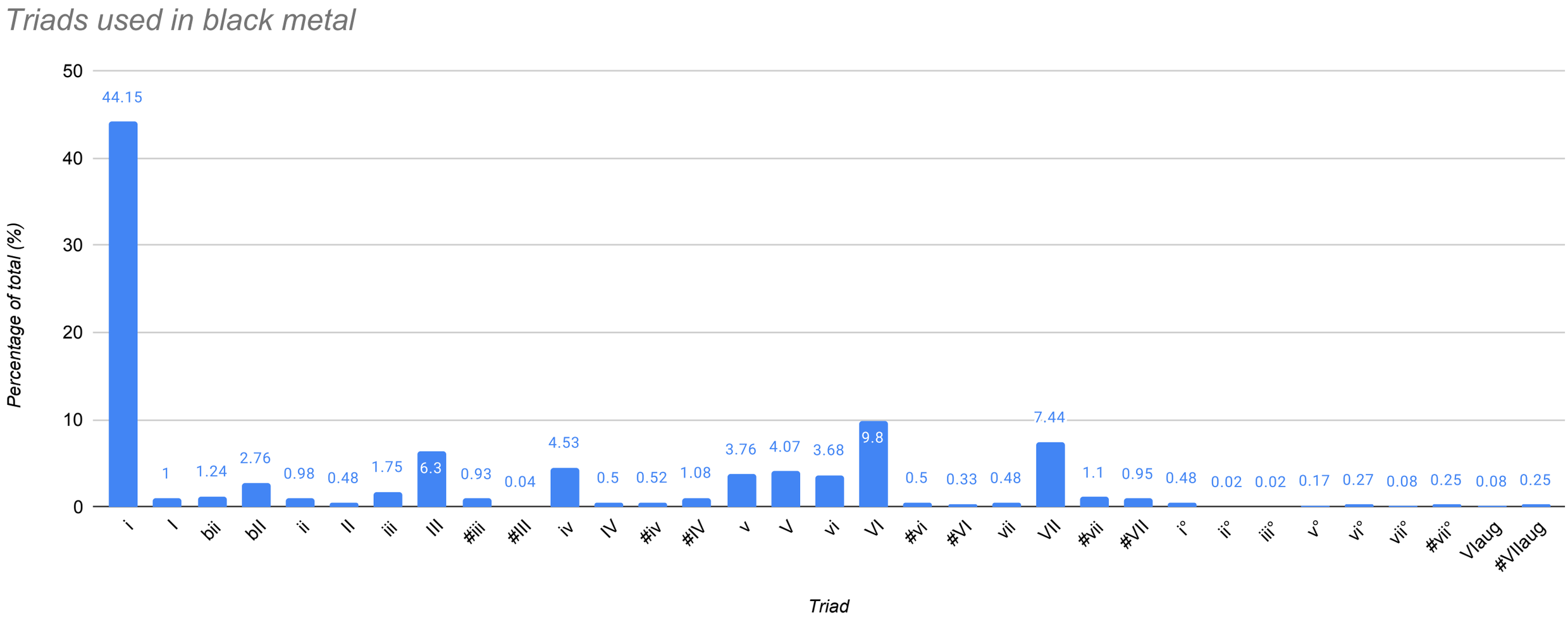
Witherscape. (2016). *The Northern Sanctuary.* Century Media.

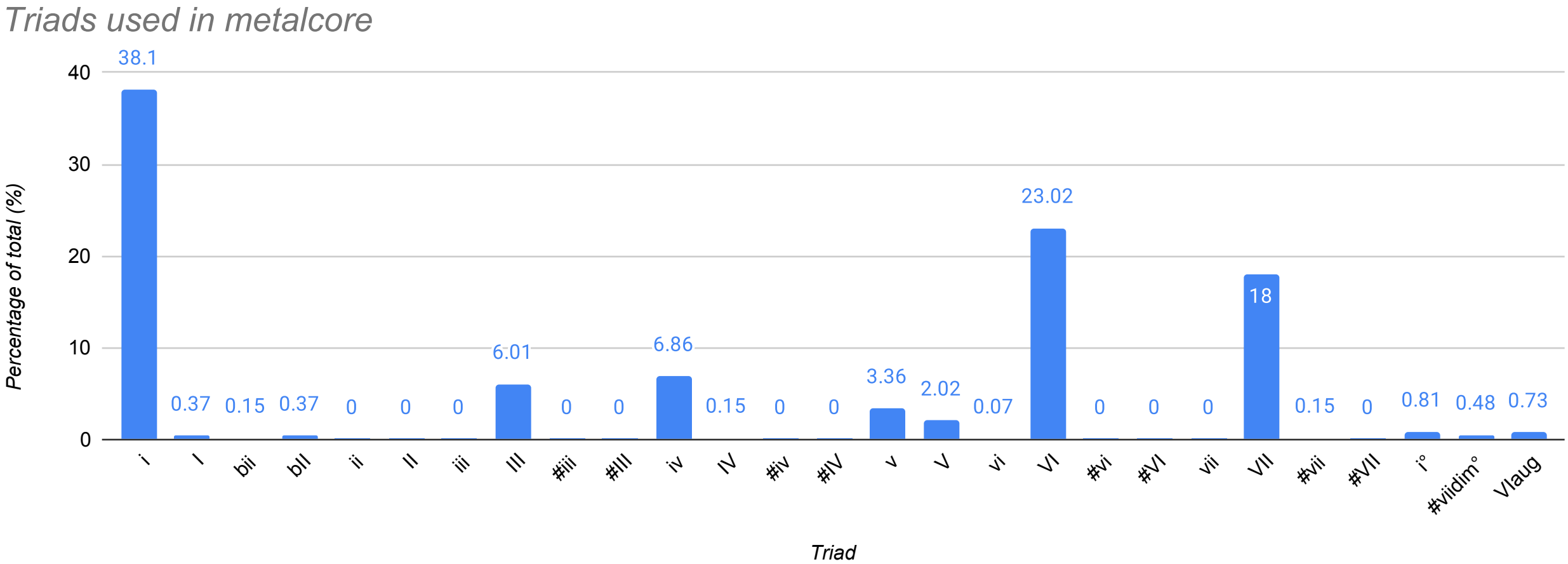
Within The Ruins. (2013). *Elite.* eOne Music.

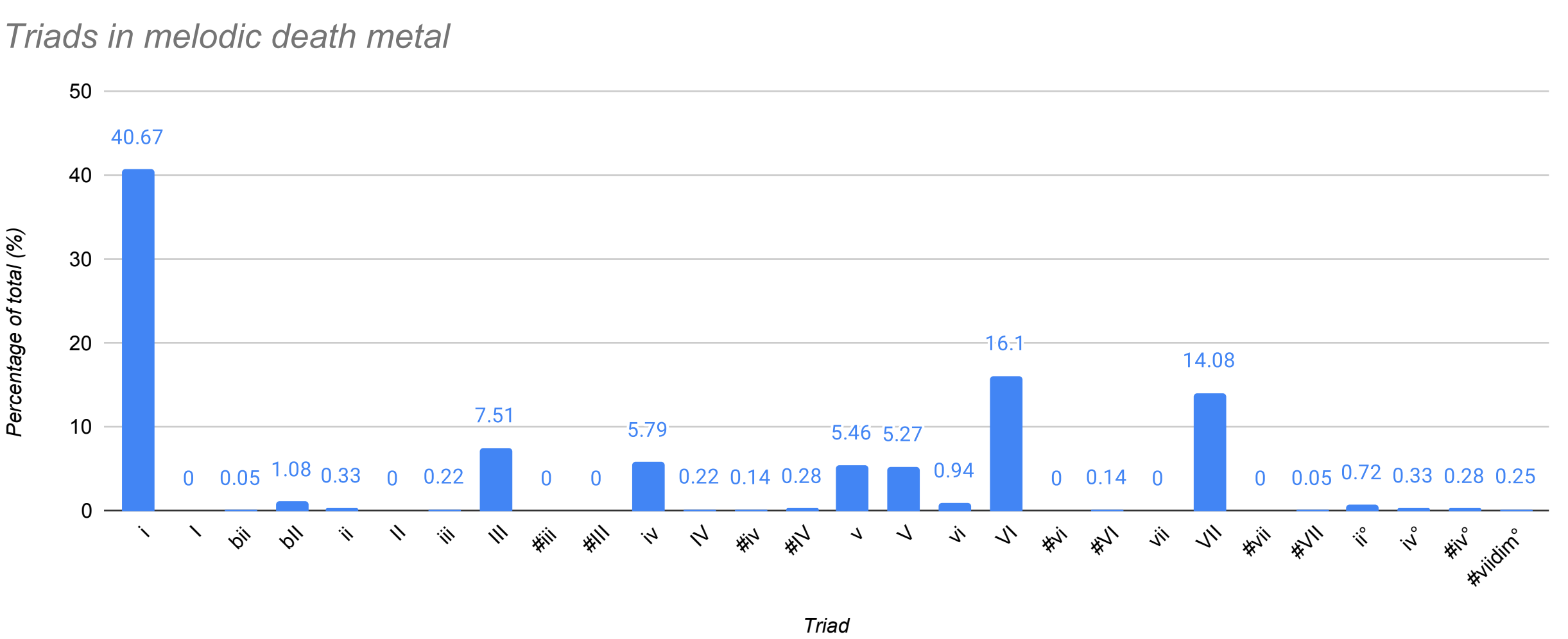
Appendix

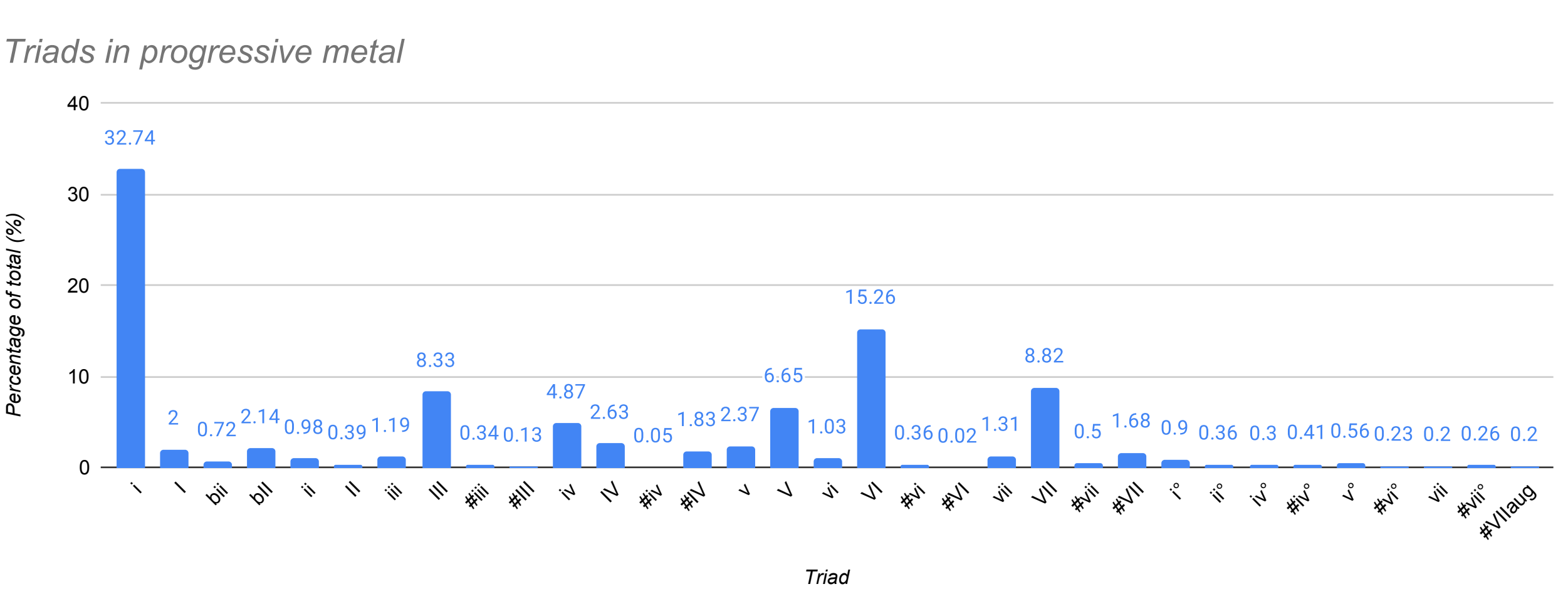
This appendix includes all other related charts and spreadsheets from the work, including charts showing the distribution of triads within each subgenre, and the raw data from which they were made.


Triads used in power metal
Percentage of total (%)
30
20
10
0
28.18
1.38
0
0.9
0.04
0.28
0.72
9.99
0
0
7.8
2.45
0
0.39
4.95
5.04
0.88
16.28
0
0
0.04
20.14
0.04
0.09
0.04
0.46
0.22
0.13
0.1
0.18
i
I
bii
bII
ii
II
iii
III
#iii
#III
iv
IV
#iv
#IV
v
V
vi
VI
#vi
#VI
vii
VII
#vii
#VII
i°
ii°
iii°
#iv°
v°
#viidim°
Triad


Triads used in black metal
Percentage of total (%)
50
40
30
20
10
0
44.15
1
1.24
2.76
0.98
0.48
1.75
6.3
0.93
0.04
4.53
0.5
0.52
1.08
3.76
4.07
3.68
9.8
0.5
0.33
0.48
7.44
1.1
0.95
0.48
0.02
0.02
0.17
0.27
0.08
0.25
0.08
0.25
i
I
bii
bII
ii
II
iii
III
#iii
#III
iv
IV
#iv
#IV
v
V
vi
VI
#vi
#VI
vii
VII
#vii
#VII
i°
ii°
iii°
v°
vi°
vii°
#vii°
VIaug
#VIIaug
Triad


Triads used in metalcore
Percentage of total (%)
40
30
20
10
0
38.1
0.37
0.15
0.37
0
0
0
6.01
0
0
6.86
0.15
0
0
3.36
2.02
0.07
23.02
0
0
0
18
0.15
0
0.81
0.48
0.73
i
I
bii
bII
ii
II
iii
III
#iii
#III
iv
IV
#iv
#IV
v
V
vi
VI
#vi
#VI
vii
VII
#vii
#VII
i°
#viidim°
VIaug
Triad


Triads in melodic death metal
Percentage of total (%)
50
40
30
20
10
0
40.67
0
0.05
1.08
0.33
0
0.22
7.51
0
0
5.79
0.22
0.14
0.28
5.46
5.27
0.94
16.1
0
0.14
0
14.08
0
0.05
0.72
0.33
0.28
0.25
i
I
bii
bII
ii
II
iii
III
#iii
#III
iv
IV
#iv
#IV
v
V
vi
VI
#vi
#VI
vii
VII
#vii
#VII
ii°
iv°
#iv°
#viidim°
Triad


Triads in progressive metal
Percentage of total (%)
40
30
20
10
0
32.74
2
0.72
2.14
0.98
0.39
1.19
8.33
0.34
0.13
4.87
2.63
0.05
1.83
2.37
6.65
1.03
15.26
0.36
0.02
1.31
8.82
0.5
1.68
0.9
0.36
0.3
0.41
0.56
0.23
0.2
0.26
0.2
i
I
bii
bII
ii
II
iii
III
#iii
#III
iv
IV
#iv
#IV
v
V
vi
VI
#vi
#VI
vii
VII
#vii
#VII
i°
ii°
iv°
#iv°
v°
#vi°
vii
#vii°
#VIIaug
Triad

Raw Data: Power Metal

Artist	Song	Genre	i	I	bii	bII	ii	II	iii	III	#iii	#III	iv	IV	#iv	#IV	v	V	vi	VI	#vi	#VI	vii	VII	#vii	#VII	vdim	vidim	ivdim	#vdim	#vidim	i dim	#vidim	vidim	iidim	iiidim
Dragonland	Supernova	Power Metal		57	12		6			2	7			14		8	22	1		41				49												
Avantasia	Reach Out For The Light	Power Metal		48	4						28			14	7		14	16		40			1	42												
Pagan's Mind	The Celestine Prophecy	Power Metal		54	11		4				13			28	9	10				41				23			4									
Helloween	Mr. Torture	Power Metal		55			8				21			2						14				10												
Timeless Miracle	Curse of the Werewolf	Power Metal		98							72			12	13		9	26		47				63	2	47										
Morgana Lefay	Grand Materia	Power Metal		101			3							30	16		4	17		18				55												
Gamerycus	Destiny	Power Metal		43	6		3	1	1		39			33	5		7	33		50				74							3				5	
Dragonforce	Operation Ground and Pound	Power Metal		67							36			18			4	7		60				62												
Heavenly	Keepers of the Earth	Power Metal		78	5		9				17			16	10		3	32		38			1	36							2					1
Angra	Spread Your Fire	Power Metal		47	2		1		5		22			14	5		5	4		27				28			1					8		10		
Kamelot	The Haunting	Power Metal		52							43			14	2			3		4				62												
Edguy	Tears Of A Mandrake	Power Metal		78			4				16			10	4		8	16		39				62												
Lost Horizon	Pure	Power Metal		63										32	7			2		87				102												
Sonata Arctica	The Cage	Power Metal		44	2			1	1		45				17		11	4	4	53				37												
Masterplan	Spirit Never Die	Power Metal		85			3				29			28			42	2		60				56			4						2			
Tierra Santa	David Y El Gigante	Power Metal		44	21													12		16				40												
Rhapsody	Dawn of Victory	Power Metal		95					4		23			20			43	7		28				26							1				6	
White Skull	Escape	Power Metal		77							13			21	17		15	21		14				42											10	
Epidemia	Chais Isqytanlya	Power Metal		45						31				44			39			49																
Falconer	Upon The Grave of Guilt	Power Metal		55					2		32			8				27		17				50												
		Total	4563	1286	63	0	41	2	13	33	456	0	0	356	112	0	18	226	230	4	743	0	0	2	919	2	4	5	0	0	6	8	2	10	0	21	1	0
		%	100	28.1632128	1.380670611	0	0.8985316678	0.04383081306	0.2849002849	0.7232084155	9.993425378	0	0	7.801884725	2.454525531	0	0.3944773176	4.952881876	5.040543502	0.08766162612	16.28314705	0	0	0.04383081306	20.1402586	0.04383081306	0.08766162612	0.1095770327	0	0	0.1314924392	0.1753232522	0.04383081306	0.2191540653	0	0.4602235371	0.02191540653	0

Artist	Song	Genre	M+1	M+2	M+3	M+4	M+5	M+6	M-5	M-4	M-3	M-2	M-1
Dragonland	Supernova	Power Metal											
Avantasia	Reach Out For The Light	Power Metal		2								2	
Pagan's Mind	The Celestine Prophecy	Power Metal			1			2		4	2	3	
Helloween	Mr. Torture	Power Metal		1									1
Timeless Miracle	Curse of the Werewolf	Power Metal											
Morgana Lefay	Grand Materia	Power Metal											
Gamerycus	Destiny	Power Metal			4	1	1	1		1		1	
Dragonforce	Operation Ground and Pound	Power Metal	2	4								3	
Heavenly	Keepers of the Earth	Power Metal			2		2			1		1	
Angra	Spread Your Fire	Power Metal					1			4			1
Kamelot	The Haunting	Power Metal	1										
Edguy	Tears Of A Mandrake	Power Metal			4							2	
Lost Horizon	Pure	Power Metal				3					3		
Sonata Arctica	The Cage	Power Metal		1						2			1
Masterplan	Spirit Never Die	Power Metal		1	2					1		1	
Tierra Santa	David Y El Gigante	Power Metal		1									1
Rhapsody	Dawn of Victory	Power Metal											
White Skull	Escape	Power Metal					3			3			
Epidemia	Chais Isqytanlya	Power Metal											
Falconer	Upon The Grave of Guilt	Power Metal											
		Total	3	10	13	4	9	1	16	5	11	6	0
		%	3.846153846	12.82051282	16.66666667	5.128205128	11.53846154	1.282051282	20.51282051	6.41025641	14.1025641	7.692307692	0

Raw Data: Metalcore

Artist	Song	Genre	i	I	bii	bII	ii	II	iii	III	#iii	#III	iv	IV	#iv	#IV	v	V	vi	VI	#vi	#VI	vii	VII	#vii	#VII	vdim	vidim	ivdim	#vdim	#vidim	i dim	#vidim	vidim	iidim	iiidim	VIa	VIaug
Heaven Shall Burn	Godiva	Metalcore		93							26			3			6			32				30														
Motionless In White	Reincarnate	Metalcore		26																36				18														
August Burns Red	Thirty And Seven	Metalcore		57										25					8	13																		
All That Remains	This Calling	Metalcore		128										18			4			50				30														
Anterior	To Live Or Not Remain	Metalcore		65							4						16			52				53														
Killswitch Engage	My Last Serenade	Metalcore		51							20									41				37														
Underoath	Writing On The Walls	Metalcore		39										18						20				6														
Avenged Sevenfold	Unholy Confessions	Metalcore		47							8			4			8	10	2	22				25								1						2
Bring Me The Horizon	Shadow Moses	Metalcore		10										16				9		9																		
Trivium	Like Light To The Flies	Metalcore		59							14			6			8	4		50				18								12						
Bullet For My Valentine	All These Things I Hate	Metalcore		41							4							3		56				44														
Parkway Drive	Carrion	Metalcore		25							4			7	4		4			17				33														
Jinjer	Pisces	Metalcore		87							24			16			16			26				10										22					
As I Lay Dying	The Darkest Nights	Metalcore		66							15			29			29			53				24														
In This Moment	Beautiful Tragedy	Metalcore		45							8									30				70														
Within The Ruins	Solace	Metalcore		70	6	4	8							15					16				2			4		0										
From Autumn To Ashes	Cherry Kiss	Metalcore		30																27				19														
Whitechapel	When A Demon Defiles A Witch	Metalcore		31							16			12						32				7														
The Devil Wears Prada	Dead Throne	Metalcore		2	4		2							2				4		2																	
Unearth	Zombie Autopilot	Metalcore		61							20			15				1		56				64														
		Total	2711	1033	10	4	10	0	0	0	163	0	0	186	4	0	0	91	55	2	624	0	0	0	488	4	0		0	0	0	13	22	0	0	0	0	0	0	2
		%	100	38.10402066	0.3688675765	0.1475470306	0.3688675765	0	0	0	6.012541498	0	0	6.860936924	0.1475470306	0	0	3.356694947	2.028771671	0.07377351531	23.01733678	0	0	0	18.00073774	0.1475470306	0	0	0	0	0	0.4795278495	0.8115086684	0	0	0	0	0	0.07377351531

Artist	Song	Genre	M+1	M+2	M+3	M+4	M+5	M+6	M-5	M-4	M-3	M-2	M-1
Heaven Shall Burn	Godiva	Metalcore											
Motionless In White	Reincarnate	Metalcore							0				
August Burns Red	Thirty And Seven	Metalcore											
All That Remains	This Calling	Metalcore											
Anterior	To Live Or Not Remain	Metalcore						2		1			
Killswitch Engage	My Last Serenade	Metalcore											
Underoath	Writing On The Walls	Metalcore											
Avenged Sevenfold	Unholy Confessions	Metalcore											
Bring Me The Horizon	Shadow Moses	Metalcore											
Trivium	Like Light To The Flies	Metalcore											
Bullet For My Valentine	All These Things I Hate	Metalcore											
Parkway Drive	Carrion	Metalcore						2		2			
Jinjer	Pisces	Metalcore											
As I Lay Dying	The Darkest Nights	Metalcore											
In This Moment	Beautiful Tragedy	Metalcore											
Within The Ruins	Solace	Metalcore											
From Autumn To Ashes	Cherry Kiss	Metalcore											
Whitechapel	When A Demon Defiles A Witch	Metalcore											
The Devil Wears Prada	Dead Throne	Metalcore											
Unearth	Zombie Autopilot	Metalcore											
		Total	0	0	0	0	0	4	0	3	0	0	0	0
		%	0	0	0	0	0	57.14285714	0	42.85714286	0	0	0	0

Raw Data: Black Metal

Artist	Song	Genre	I	i	bII	bII	II	II	III	III	#II	#III	IV	iV	#IV	#IV	v	V	vi	VI	#vi	#VI	vii	VII	#vii	#VII	vdim	vdim	ivdim	#vdim	#vidim	i dim	#vidim	vidim	IIdim	IIdim	VIa	VIaug	Vaug	Vaug	#VIaug	IIaug
Windir	Todeswalzer	Black Metal		108						24			37				16	24						15																	
Dimmu Borgir	Blessing Upon The Throne of Tyranny	Black Metal		128	20	7	37		20		4						16							8	16															
Leviathan	Fucking Your Ghost in Chains of Ice	Black Metal		54		28			5	1	4				5		5	11	20						4		4	1												
Watain	Devil's Blood	Black Metal		116		2	25	18	2	19							3		13	6				4	13	10														
Aquilus	Nihil	Black Metal		183		1	15	5	4	29	9	2	13	2	12	14	24	12	14	41	12	3	34	2	1		8			1	1									
Agalloch	Limbs	Black Metal		73	14		4		2	8			22	5				18		64	10		28	8																
Summoning	A New Power's Rising	Black Metal		88						39			34				17	24	8	28			16																	
Immortal	Sons of Northern Darkness	Black Metal		94				15	16	28				2			4	16	16	2		4	13			15														
Dodsgengel	Azonel Wyrdwalker	Black Metal		76		8	8		16	8	8				8		8			10				12		10	16													
Deathspell Omega	Sola Fide I	Black Metal		95		2			18					8			12	16	60	20	2																			
Shining	Ytligare Ett Steg Narmare Total Javla Ulthyrsing	Black Metal		29									4						12			10																	12	
Eldewrind	In The Snow	Black Metal		28																28																			
Enslaved	As Fire Swept Clean the Earth	Black Metal		24	4					36								4	24	69			16			8														
The Elysian Fields	Enshield My Hate Eternal	Black Metal		104			24			12			25	7			12	26					27																	
Mork Gryning	Maelstrom Chaos	Black Metal		40	10		6	16	1	16	20		12			6		6	6						11							4							
Furia	Jeszcze I Jeszcze	Black Metal		136			14			22			19				20	11		42		6	17				4												
Celadan Brood	City Of Azure	Black Metal		272						12							40			32			110																
Mistur	Slagel	Black Metal		165		20				49			16			32	4	28	4	20			4																
Rotting Christ	The Signs of Prime Creation	Black Metal		73																12			28																
Primordial	Empire Falls	Black Metal		237				8					36							82			36								12			4					
		Total	4813	2125	48	60	133	47	84	303	45	2	218	24	25	52	181	196	177	472	24	16	23	358	53	46	8	13	0	0	12	23	0	4	1	1	0	0	4	0	12	0
		%	100	44.15125701	0.9972986819	1.246623727	2.763349262	0.9765219188	0.4778724288	1.745273218	6.295449823	0.9349677556	0.04155412425	4.529386543	0.498649491	0.5194265531	1.08040723	3.760648244	4.072304176	3.677539566	9.805773322	0.498649491	0.3324132994	0.4778724288	7.438188624	1.101184283	0.9557448577	0.166216497	0.2701018076	0	0	0.2493247455	0.4778724288	0	0.08310824949	0.0207770212	0.0207770212	0	0	0.08310824949	0	0.2493247455	0

Artist	Song	Genre	M+1	M+2	M+3	M+4	M+5	M+6	M-5	M-4	M-3	M-2	M-1
Windir	Todeswalzer	Black Metal			1							1	
Dimmu Borgir	Blessing Upon The Throne of Tyranny	Black Metal											
Leviathan	Fucking Your Ghost in Chains of Ice	Black Metal	3			1					1		
Watain	Devil's Blood	Black Metal		2			1		1				
Aquilus	Nihil	Black Metal											
Agalloch	Limbs	Black Metal					2		1				
Summoning	A New Power's Rising	Black Metal											
Immortal	Sons of Northern Darkness	Black Metal											
Dodsgengel	Azonel Wyrdwalker	Black Metal			3						2	4	
Deathspell Omega	Sola Fide I	Black Metal											
Shining	Ytligare Ett Steg Narmare Total Javla Ulthyrsing	Black Metal							1				
Eldewrind	In The Snow	Black Metal											
Enslaved	As Fire Swept Clean the Earth	Black Metal							1			1	
The Elysian Fields	Enshield My Hate Eternal	Black Metal											
Mork Gryning	Maelstrom Chaos	Black Metal				1					1		
Furia	Jeszcze I Jeszcze	Black Metal		1			2		1			1	
Celadan Brood	City Of Azure	Black Metal											
Mistur	Slagel	Black Metal					1		1				
Rotting Christ	The Signs of Prime Creation	Black Metal											
Primordial	Empire Falls	Black Metal											
		Total	3	6	1	0	3	0	4	0	1	3	5
		%	11.53846154	23.07692388	3.846153846	0	11.53846154	0	15.38461538	0	3.846153846	11.53846154	19.23076923

Raw Data: Melodic Death Metal

Artist	Song	Genre	I	i	bII	bII	II	II	III	III	#II	#III	IV	iV	#IV	#IV	v	V	vi	VI	#vi	#VI	vii	VII	#vii	#VII	vdim	vdim	ivdim	#vdim	#vidim	i dim	#vidim	vidim	IIdim	IIdim	VIa	VIaug	Vaug	Vaug	#VIaug	IIaug
Be'lakor	Venator	Melodeath		104						20			36		5			4		22				6					4	10	8										
Nightrage	The Tremor	Melodeath		8									4				6			8				6																
Dimension Zero	Hell Is Within	Melodeath		92					4	28			30			8	16			36				40																
Septicflesh	Anubis	Melodeath		66			8	8									4		16	16		4		6															
Mercenary	World Hate Center	Melodeath		41														20		28														24						
Dark Tranquility	Lost To Apathy	Melodeath		66						24							22	11		33																				
In Flames	Pinball Map	Melodeath		85			3			24			7				5	3		33				40																
Children Of Bodom	Hate Me	Melodeath		126			8			26			14			2	22	8	6	45		1		45		1														
Amon Amarth	Twilight Of The Thunder God	Melodeath		45						24			6				4	8		16				48																
Arch Enemy	Burning Angel	Melodeath		36			18			14			20					10		26				24				8												
The Black Dahlia Murder	Moonlight Equilibrium	Melodeath		87				4	4	1			10					68		18						1													1	
Wintersun	Beyond The Dark Sun	Melodeath		35						2			15				18	9		17				37							1		1							
Insomnium	Mortal Share	Melodeath		95						40			11				10			37				48																
Soilwork	The Chainheart Machine	Melodeath		38													10	6		38				20																
SuidAkrA	Wartunes	Melodeath		116						7			5				9	2		45				60																
Swallow The Sun	Deadly Nightshade	Melodeath		110						22				6			26	16	12	32																				
Into Eternity	Buried In Oblivion	Melodeath		30						13			15				14	7		29				10																
Scar Symmetry	Morphogenesis	Melodeath		62		2	2			2				2						42				28										2						
Kalmah	Heroes To Us	Melodeath		130						15								14		30				51																
More Principium Est	Pure	Melodeath		97						9			35				22	4		30				35																
		Total	3607	1467	0	2	39	12	8	271	0	0	209	8	5	10	197	190	34	581	0	5	0	508	0	2	0	0	12	10	9	0	1	0	26	0	0	0	0	1	0	0
		%	100	40.67091766	0	0.0554477405	1.081230994	0.3326864443	0	0.2217936962	7.513168838	0	0	5.794288883	0.2217936962	0.1386193513	0.2772387025	5.461662044	5.267535348	0.9426115886	16.10758862	0	0.1386193513	0	14.08373609	0	0.0554477405	0	0	0.3326864443	0.2772387025	0.2495146323	0	0.02772387025	0	0.7208206266	0	0	0	0	0.02772387025	0	0

Artist	Song	Genre	M+1	M+2	M+3	M+4	M+5	M+6	M-5	M-4	M-3	M-2	M-1
Be'lakor	Venator	Melodeath											
Nightrage	The Tremor	Melodeath											
Dimension Zero	Hell Is Within	Melodeath						3		3			
Septicflesh	Anubis	Melodeath					1				2	1	1	1
Mercenary	World Hate Center	Melodeath											
Dark Tranquility	Lost To Apathy	Melodeath											
In Flames	Pinball Map	Melodeath											
Children Of Bodom	Hate Me	Melodeath			2							2	
Amon Amarth	Twilight Of The Thunder God	Melodeath											
Arch Enemy	Burning Angel	Melodeath	1										
The Black Dahlia Murder	Moonlight Equilibrium	Melodeath					1				1		
Wintersun	Beyond The Dark Sun	Melodeath											
Insomnium	Mortal Share	Melodeath						2		2			
Soilwork	The Chainheart Machine	Melodeath			3							4	
SuidAkrA	Wartunes	Melodeath											
Swallow The Sun	Deadly Nightshade	Melodeath											
Into Eternity	Buried In Oblivion	Melodeath											
Scar Symmetry	Morphogenesis	Melodeath	1	3						1			
Kalmah	Heroes To Us	Melodeath											
More Principium Est	Pure	Melodeath											
		Total	2	8	0	2	5	0	6	3	1	7	1
		%	5.714285714	22.85714286	0	5.714285714	14.28571429	0	17.14285714	8.571428571	2.85714285	20	2.85714285

Raw Data: Progressive metal

Artist	Song	Genre	i	I	bii	bII	ii	II	iii	III	#iii	#III	iv	IV	#iv	#IV	v	V	vi	VI	#vi	#VI	vii	VII	#vii	#VII	vdim	vidim	ivdim	#vdim	#vidim	i dim	#idim	vIdim	idim	iIdim	VIø	VIaug	Vaug	#VIaug	IIaug
Ayreon	Day 2: Isolation	Prog Metal		152			4	18		79		4	24	12			20	69		53		2		29		4												20				
Opeth	The Drapery Falls	Prog Metal		137	12				13				2	13		28	8	31			4		36	45	16	28		8			16	8	8									
Witherfall	Moment of Silence	Prog Metal		72	36	17	8			4			10					57		27				3		4				1		1									
Periphery	Scarlet	Prog Metal		36			11			1			22							50				21		2															
Edge Of Sanity	The Forbidden Words	Prog Metal		66		6	7			22			1	8			11	12		16				11					4												
Pain Of Salvation	Ending Theme	Prog Metal		59					17										16	77																				
Nevermore	The Heart Collector	Prog Metal		39			4		4	28			5	6	2		4	19	8	31		2		12					5											8	
Symphony X	Inferno	Prog Metal		13				1		12			9	8				24		11		3		2		1															
Evergrey	The Masterplan	Prog Metal		67			7			36			21				1	6		33				52											2						
Dream Theater	These Walls	Prog Metal		52						15			8	29			4			38				48																	
Circus Maximus	Alive	Prog Metal		74			7		4	32		1	16	4		8	5	11		64	4	1		37		7															
Riverside	Rainbow Box	Prog Metal		1																												8								
Beyond Twilight	The Path Of Darkness	Prog Metal		59	6		10		4	9	18	5	8	12		7	8	4		5				10																
Witherscape	Wake Of Infinity	Prog Metal		154		1			1	6	16		7	4		28	4	2	13	1	1			9	1	9	1		4		4	9								
Seventh Wonder	There and Back	Prog Metal		53			4		2	1	21		11	2			1	4	1	35			1	19		1	1					2								
Orphaned Land	Birth of the three	Prog Metal		127			17				26		39	4			23			41	1		14	21																
Porcupine Tree	Blackest Eyes	Prog Metal		3	15			19			10							15		3																				
Protest the hero	Bloodmeat	Prog Metal		21	2		3				3						3			7				13		1				12					4					
Hollenthon	Y Draig Goch	Prog Metal		32			1						4					4		5				10	2	8									8					
Mastodon	Crack The Skye	Prog Metal		53	8	4						8	2						2	104	4			10	2	8														
		Total	3879	1270	79	28	83	38	15	46	323	13	5	189	102	2	71	92	258	40	592	14	8	51	342	19	65	2	0	12	16	10	35	9	8	14	0	0	20	0	0	8	0
		%	100	32.74003701	2.036607373	0.7218355246	2.139726734	0.979633926	0.3866976025	1.185872646	8.326888373	0.3351379221	0.1288992008	4.872389751	2.629543697	0.05155968033	1.830368652	2.371745295	6.651198763	1.031192607	15.26166538	0.3609177623	0.2062387213	1.314771848	8.816705336	0.4898169631	1.675689611	0.05155968033	0	0.3093589382	0.4124774426	0.2577984016	0.9023944058	0.2320185615	0.2062387213	0.3609177623	0	0	0.5155968033	0	0	0.2062387213	0

Artist	Song	Genre	M+1	M+2	M+3	M+4	M+5	M+6	M-5	M-4	M-3	M-2	M-1
Ayreon	Day 2: Isolation	Prog Metal			3			6	1		1		1
Opeth	The Drapery Falls	Prog Metal	1			1			1	1		1	1
Witherfall	Moment of Silence	Prog Metal	1	3	1		3		3			2	1
Periphery	Scarlet	Prog Metal											
Edge Of Sanity	The Forbidden Words	Prog Metal											
Pain Of Salvation	Ending Theme	Prog Metal				1					1		
Nevermore	The Heart Collector	Prog Metal	2				1		3				1
Symphony X	Inferno	Prog Metal	1	1	4				2	1			
Evergrey	The Masterplan	Prog Metal							1	1			1
Dream Theater	These Walls	Prog Metal											
Circus Maximus	Alive	Prog Metal			3								
Riverside	Rainbow Box	Prog Metal											
Beyond Twilight	The Path Of Darkness	Prog Metal			1			2				2	2
Witherscape	Wake Of Infinity	Prog Metal		2								2	
Seventh Wonder	There and Back	Prog Metal	1	1	2	1	1			1		1	
Orphaned Land	Birth of the three	Prog Metal		2	2				1	1	1		
Porcupine Tree	Blackest Eyes	Prog Metal											
Protest the hero	Bloodmeat	Prog Metal											
Hollenthon	Y Draig Goch	Prog Metal			1	1					1		
Mastodon	Crack The Skye	Prog Metal				3				1	2		2
		Total	6	13	15	5	13	5	10	4	8	8	7
		%	6.382978723	13.82978723	15.95744681	5.319148936	13.82978723	5.319148936	10.63829787	4.255319149	8.510638298	8.510638298	7.446808511