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Harmonic structures in twenty-first-century metal music: A harmonic analysis of five major metal genres

ABSTRACT

This article investigates whether and how five of the major metal subgenres differ in their harmonic practices in the twenty-first century. One hundred metal tracks – twenty from each of the five subgenres of power metal, black metal, metalcore, melodic death metal and progressive metal – released since 2000 were analysed, capturing their chord progressions and modulation techniques. Tonal analysis indicated that although each subgenre seems to adopt the techniques used by the early heavy metal bands of the 1970s and 1980s, individual signature styles contribute to the desired sonic aesthetic. The study found pronounced harmonic practices in most subgenres, yet the most distinctive in power metal and black metal. While black metal focused on non-diatonic minor chords for a dark atmosphere and dissonant aesthetic, power metal emphasized the brighter Dorian mode and employed baroque and classically influenced secondary dominants and diminished seventh chords to add colour to progressions and brighten the sound.

KEYWORDS

harmony music theory genre power metal black metal metalcore melodic death metal progressive metal

INTRODUCTION

Compared to the rhythmical, metrical and structural features of metal music (Berger 1999; Elflein 2016; Pieslak 2007; Smialek 2015; Hannan 2018; Lucas 2018; Mynett 2019), relatively little has been written about the harmonic conventions in metal genres in the twenty-first century (e.g. Kazdan 2017; Hannan 2021; Hillier 2018, 2020; Swallow and Herbst 2022). Three of the most prevalent texts on metal harmony are Esa Lilja's Theory and Analysis of Classic Heavy Metal Harmony (2009), Robert Walser's Running with the Devil (1993) and Harris M. Berger's Metal, Rock, and Jazz (1999). 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 (see Björnberg 2007). However, they do not deal with harmony in twenty-first-century metal. Lilja covers classic heavy metal only up to 1985, arguing that bands like Dio and Deep Purple have a harmonic language closer to baroque and renaissance composers than other popular music styles of their time (see also Heritage 2016). Since the publication of these texts, or the topics thereof, new metal subgenres have emerged, such as black, death and power metal. This musical development and the lack of a corresponding academic discussion merits the questions of whether contemporary metal subgenres have advanced the harmonic traditions of the 1980s in distinctive ways and whether they use harmony differently to portray the various aesthetics in modern metal.

This study explores these questions by analysing harmonic techniques in twenty-first-century metal music based on a corpus of 100 songs released since 2000, twenty of each of the chosen five subgenres of power metal, black metal, metalcore, melodic death metal and progressive metal. The harmonic analysis was centred on function-based chord progressions and thus limited to metal genres that predominantly employ triadic harmony. The findings suggest that modern metal subgenres differ not only in their lyrical tropes, structures and rhythms but also in their approach to harmony. The two most distinctive subgenres were power metal and black metal, marking opposite ends of the spectrum. Black metal focused on non-diatonic minor chords to create its characteristic dark and dissonant aesthetic, in contrast to power metal that emphasized the brighter Dorian (minor) mode, employing baroque and classically influenced secondary dominants and diminished seventh chords to add colour and brighten the sound. Progressive metal had a varied approach to harmony, not as uniform as the other subgenres, which indicated a more original approach to songwriting by each band, apart from the general tendency to use atonal passages, diminished and augmented chords and non-diatonic chords in progressions. Metalcore and melodic death metal largely conformed to standard Aeolian (i.e. natural minor) and Dorian-based progressions, with metalcore's radio-friendly mainstream sound achieved by a limited range of chords, lack of modulation and reluctance to use non-diatonic chords in a progression. Melodic death metal showed a similarly simple harmonic palette, mainly consisting of twin guitar melodies over Aeolian progressions in the tradition of the New Wave of British Heavy Metal (NWOBHM). However, melodic death metal bands employed more non-diatonic triads to darken the sound and be more transgressive than their British precursors in the 1970s and 1980s.

METHOD

In order for the comparative analysis of harmonic chord progressions in major contemporary metal genres to be carried out systematically and within the

scope of a single article, the approach required the selection of a small number of subgenres with distinguishable harmonic palettes. In the preliminary exploratory analysis, two popular subgenres had to be excluded because they were either stylistically indistinctive or incompatible with the chosen chordprogression-based (i.e. Roman numeral) mode of harmonic analysis: folk and death metal. Folk metal significantly overlapped stylistically with many of the other analysed subgenres, making this classification less useful, as it is not primarily the 'folk' characteristics that would have been captured but those of the 'host' subgenre, expanded by folkloristic elements and lyrical themes. In other words, 'folk' served as a prefix to the predominant metal genre. Death metal, although highly influential on various extreme metal genres, did not have clear harmonic patterns due to its largely atonal character and lack of chord progressions, as already noted by Berger (1999). Eric Smialek (2015: 165) similarly points out that death metal bands like Cannibal Corpse and Demilich prefer to build songs around riffs based on transpositionally similar pitch collections rather than creating songs with traditional pan-triadic chord progressions. As this study focused on chord progressions rather than scalar patterns to be identified modally, death metal was less suitable than black metal because of its largely atonal harmonic structure. To not completely neglect death metal, the compromise was to include *melodic* death metal, which seemed to employ riffs based around chord progressions (see Kazdan 2017; Hillier 2018, 2020).

The subgenres finally selected after the exploratory analysis were power metal, black metal, metalcore, melodic death metal and progressive metal. They do not encompass all styles of modern metal but represent a considerable proportion, with the exception of contemporary extreme metal genres such as death metal, which generally do not employ triadic harmony and were thus incompatible with the chosen analytical approach. Twenty tracks from each subgenre were analysed through critical listening, resulting in a corpus of 100 samples. All analysed songs are listed in Appendix 1. The analysis was two-fold, comprising a qualitative analysis of the musical scores created for this purpose and a quantitative capture of the chords used. Before outlining the sampling procedure and the analytical process, we will briefly describe the chosen subgenres and outline their harmonic characteristics, as described in relevant literature.

Black metal has been characterized as having 'heady, intense harmonic progressions' (Steinken 2019: 23), 'predictable and extensively repeated progressions' (Coggins 2019: 406) and harmonies that are 'sad, dark and almost beautiful in their minor keys' (Pedersen 2000: 7). These quotes, along with black metal's lyrical themes and overall dark aesthetic (Wiederhorn and Turman 2013), made black metal an interesting subgenre for this study, with an expected distinct approach to harmonic structures and representing one of the subgenres that fall into the extreme metal classification (Smialek 2015: 22). Power metal's close relationship to western classical music (Walser 1993; Sharpe-Young 2007; Heritage 2016) shows in elements such as lighthearted lyrics and virtuosic vocal melodies (Christe 2003; Sharpe-Young 2007; Weinstein 2011; Herbst 2019), which beckoned examining how power metal bands complement these aspects in their harmonic material. Metalcore's popularity, commercial success and deliberate simplicity (Wiederhorn and Turman 2013) indicated that it might starkly contrast with the other, more harmonically complex subgenres. Furthermore, the influence of hardcore punk on metalcore (Weinstein 2011; Kennedy 2018) would likely play a part in its

harmonic material, as it eschews emotive chord structures in favour of breakdowns and riffs (Easley 2015). Finally, progressive metal was found suitable as a boundary-pushing, inventive and technical genre (Pieslak 2007; Hannan 2018; Lucas 2018), notwithstanding the difficulty of defining it because it encompasses stylistically varied bands and compositions blending elements of different metal subgenres.

From a methodological perspective, it is important to recognize that there is a discrepancy between what the analyst imagines and what the musicians may have intended. Glen Pillsbury (2006: 21) has expressed reservations against the analysis of musical form, arguing that structure is more likely to become clear through systematic analysis and notational methods than by merely listening to the music. Consequently, we can assume that musicians do not necessarily have structure and harmony in mind when composing but instead follow their ear and tacit knowledge obtained from playing the music. Furthermore, given the way many metal musicians learn, i.e. in an informal manner, we cannot expect that high-level skills in music theory are applied in songwriting. In other words, the harmonic techniques and commonalities found are quantitatively valid for the analysed sample but do not allow direct conclusions to be drawn about the artists' intentions.

In order to reduce personal bias in selecting the songs for analysis, a sampling technique was applied similar to David Temperley and Trevor de Clerq's (2011) study, which analysed a database of chord progressions from 100 rock songs spanning five decades to determine the genre's harmonic choices and how rock music's harmonic palette developed over half a century. Our sampling strategy drew on the websites Loudwire, RateYourMusic and Metalstorm to take tracks from albums found in top lists. This approach ensured that each band was sorted into its subgenre with some consensus of the fanbase and that the chosen tracks accurately represented the artists considered representative of their field. Of the selected songs, either the first single or the first track of each record was chosen. This methodological decision might have led to a bias towards more mainstream-sounding songs that likely have simpler harmonic content than other tracks if a band had saved their more experimental material for the end of an album.

Data were gathered by recording chord progressions through critical listening (with perfect pitch), aided by replaying sections on piano, isolating instruments in a digital audio workstation and transcribing relevant guitar, bass, keyboard and vocal parts in notation software *Guitar Pro*. The analysis captured which chords were used in homophonic/pan-triadic sections, recorded as Roman numerals so that each chord was recorded relative to the key. In the interest of simplicity, and because the tonality of metal music is predominantly Aeolian (Lilja 2009; Kazdan 2017), all tracks were treated as being in a minor key throughout their entirety. Hence each Roman numeral refers to a degree of the Aeolian mode unless modified by accidentals (b and #).

For the statistical evaluation, the number of repetitions of a chord was determined based on the harmonic rhythm of the track, meaning that a song consisting of a sequence of a bar of C minor, a bar of Ab major and two bars of Bb major repeating sixteen times counted as 16 each of i and VI, and 32 of VII. Converted into percentages, it would be 25 per cent each of i and VI, and 50 per cent of VII. This approach prevented the underrepresentation of chords held longer than others within a given sequence. Using percentages rather than absolute values helped not overshadow shorter tracks by longer ones.

The following presentation focuses on scores of representative riffs to explain the typical use of harmonic techniques in the five selected subgenres. This qualitative analysis is underpinned by the quantitative dataset. In addition to descriptive statistics in the form of percentages, all subgenres were compared using statistical analysis of variance (ANOVA) with post hoc test Tukey HSD to determine whether and to what extent they differed.

POWER METAL

The twenty analysed power metal tracks contained eighteen out of 24 possible triads (Figure 1), showing a wide range of diatonic and non-diatonic chord patterns, with some notable omissions.

Interestingly, both the major and minor versions of #III/#iii and #VI/#vi were neglected entirely, as were bii and #iv. The absence of these non-diatonic chords indicates that power metal bands desire to keep their chord progressions 'pretty'. Non-diatonic triads were used, but they had a function in the chord progression as a whole. For example, secondary dominants and diminished sevenths were frequently used to add colour to progressions as well as provide common chords in modulations.

Secondary dominants and diminished seventh chords were utilized to keep in line with power metal being closest to baroque and classical harmony. Heavenly (2004) employ a sequence of secondary dominants at 00:00:52 in the last bars of the instrumental introduction of 'Keepers of the Earth' to transition smoothly from A minor to E minor (Figure 2), which is a 'circle of fifths' relation.

The part begins with an A Aeolian run in the lead guitar, followed by three successive secondary dominants that rise by a tone each time. At first, there is 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. With the now destabilized tonality, the modulation begins with B major as the next secondary dominant, resolving to E minor in bar 10. At this point, the new tonic in this sequence is established, but it is unclear whether the song is still in A minor or has moved to E minor, especially with the next chord, Bb diminished seventh, as a secondary leading tone chord that resolves to B







Figure 2: Introduction to Heavenly's 'Keepers of the Earth', showing secondary dominants (bar 9) and diminished seventh chords (bar 12) used as modulation devices (00:00:49).

major, which later turns into B seventh through the A natural in the guitar arpeggio, creating a long-drawn-out perfect cadence into the verse (bar 17) that begins firmly in E minor.

Another example is Galneryus's (2010) use of secondary dominants to add colour and movement to a progression in the instrumental introduction of 'Destiny' (Figure 3). Here, the non-diatonic Eb dominant seventh chord in bars 3 and 4 creates gravity towards the Ab major, followed by another quasiperfect cadence of G major to C major, neither of which is diatonic to Bb minor. These examples demonstrate how secondary dominants can be used in power metal to add colour to a progression whilst maintaining order. The cadences add a sense of drive to the passage and help it flow naturally, with the non-diatonic chords sounding justified, whether they are paired with a diatonic chord or with each other. Since power metal is a subgenre sonically close to 'classic' heavy metal (Sharpe-Young 2007), it is fitting that this type of chord progression is very much inspired by baroque and classical composers such as Bach or Mozart (Walser 1993; Heritage 2016).



Figure 3: Reduction of the intro to Galneryus's 'Destiny', using secondary dominants (bars 3 and 6) (00:00:00).

Power metal bands employed the III chord, the tonic of the relative major, much more frequently than other subgenres, making up 11.4 per cent of all the chords used (Figure 1). This chord choice fits power metal's lyrical themes, often ones of fantasy, with frequent uplifting passages about freedom, power, glory and victory in battle (Sharpe-Young 2007; Weinstein 2011). The III chord is the obvious choice to portray a more light-hearted, jovial atmosphere. The abundance of this chord is primarily due to its use as the first chord of the chorus, which helps achieve a clearer contrast between the verse and chorus sections of a song.

BLACK METAL

Owen Coggins states that in black metal, '[c]hord 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' (2019: 406). This description was true in most of the twenty analysed examples, but the chord progressions were still not as predictable and straightforward as Coggins suggests. Black metal bands deviated from simple Aeolian harmonic ostinati more frequently than other metal artists, often using non-diatonic chord progressions to create the ethereal, otherworldly sound that is so characteristic of the genre.

Black metal was the genre besides progressive metal featuring all 24 possible triads (Figure 4). In direct contrast to power metal, #iii appeared in 25 per cent and vi in 15 per cent of tracks, with their major counterparts also being used at some point, albeit less so, appearing only once each. This choice of chords 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 (Christe 2003; Kahn-Harris 2007), while power metal is commonly the opposite (Sharpe-Young 2007; Weinstein 2011).

For the analysis of black metal chord progressions, Weitzmann regions proved useful. Weitzmann regions are a collection of six consonant triads, each a single unit of work away from the same augmented triad (Figure 5). As Felix Salzer and Carl Schachter state, a 'temporary lack of a diatonic frame of reference creates, as it were, a suspension of tonal gravity' (1969: 215). One such example is Leviathan's 'Fucking Your Ghost in Chains of Ice' (2003).



Triad

Figure 4: Triads used in black metal.



Figure 5: Weitzmann region.

At 00:00:42, a harmonic ostinato appears in the way Coggins (2019: 406) describes: one chord per two bars of Ebm, Cbm, Gm and Bb (Figure 6). These four chords, all belonging to the same Weitzmann region, are constructed so that the three non-diatonically related chords sound in succession in descending major thirds, with the final chord also acting as the dominant of the antecedent Eb minor, providing a smooth transition back to the beginning of the harmonic ostinato with a perfect cadence.

This chord progression is a representative example of how black metal artists create a dark contrast to the brighter chord progressions in the other analysed metal subgenres, which generally use Aeolian or diatonic-based progressions. The second chord of this progression, Cb minor, is a triad whose root is a major third below the previous chord's tonic. Metal music is no stranger to this relation; however, in most cases outside of black metal, this triad would be major and provide the familiar VI chord around which much of metal harmony is built (Walser 1993; Lilja 2009). The analysed data show that this triad was more than five times more common in black metal than in any other subgenre. The third chord of this progression, G minor, again follows the same transformation, taking the listener further from the 'home' (i.e. the tonic) of Eb minor to a #iii chord. This transition was also more frequent in black metal than in other subgenres, the only contender being progressive



Figure 6: Weitzmann region-based progression in Leviathan's 'Fucking Your Ghost in Chains of Ice' (00:00:42).



Figure 7: Smooth voice leading in the intro of Shining's 'Yttligare Ett Steg Narmare Total Javla Utfrysning' (00:00:21).



Figure 8: Acoustic passage in Shining's 'Yttligare Ett Steg Narmare Total Javla Utfrysning', transitioning a minor chord into its closest-by-voice leading augmented chord (00:01:18).

metal. Another track with an extensive use of this chord transition is Shining's (2007) 'Yttligare Ett Steg Narmare Total Javla Utfrysning'. The track begins by alternating between B minor and G minor in the guitars in every other bar, connecting the chords with smooth voice leading in that the initial B minor is played as an inverted chord with the F# in the bass that moves the B down and the F# up to reach the G minor (Figure 7).

Later in the track, Shining use the same progression in a different key during the guitar solo, underpinning its relevance for black metal's characteristic dark aesthetic. During the acoustic passage beginning at 00:01:15 (Figure 8), Shining do not transition from one consonant triad to another but instead alternate between F# minor and the augmented chord from which its Weitzmann region derives: F A C#.

This passage returns to the smooth movement between the triadic first and final three notes of each bar. F# moves down to F natural while the extra chromatic notes D natural and G# rise on top, providing extra dissonance and giving the passage a feeling similar to that of a suspended chord that refuses to resolve. The sequence repeats for more than two minutes, leaving the listener almost begging for some return to normality by the end. This technique in itself is a reflection on the track's lyrics about suicide, as is often the case in black metal: 'All night and day, I pray for the decline of life'.

Aside from Weitzmann regions and sequences based around minor triads a major third apart, black metal artists frequently employed minor triads a minor third away from the tonic, another example of consonant chords that, according to traditional western music theory, are not related to each other. Aquilus's (2011) 'Nihil' is an example with a sequence of triads - Em, C#m, Em, Bbm, Em, Gm – whose roots form a complete E diminished seventh chord (Figure 9). The way the progression returns to E minor between each new chord helps to establish it as the 'base', but none of the other chords is diatonically related to E minor, 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# minor and G minor, are both equally close to E minor because they both share a common tone with E minor, the E and G naturals, respectively. The Bb minor, on the other hand, does not share a common tone. The sequence gradually moves further away from its 'home' of E minor to the furthest unrelated chord and back to its starting point, maintaining a certain degree of consistency by building this 'diminished seventh of minor chords'.

Dødsengel (2010) use a similar progression in 'Azonei Wyrdwalker', beginning on Eb minor, then moving through A minor and Gb minor before returning to Eb minor and repeating (Figure 10). Although there is not much to be said about how these chords are constructed, the triads themselves and the way they are ornamented are representative examples of black metal chord progressions. They are played as full triads rather than power chords with



Figure 9: Broken chords in Aquilus's 'Nihil', the roots of which make a diminished seventh chord (00:05:40).



Figure 10: Chord progression in Dødsengel's 'Azonei Wyrdwalker', the roots of which make a diminished seventh chord (00:01:43).

the third played by an additional guitar (see also Hagen 2011; Herbst 2018). Regardless of the guitar arrangement, the top line creates a subtle overarching melody, producing extra dissonance.

The previous interpretations for these common chord progressions are based on voice leading and shared tones between chords. These are advanced harmonic techniques that black metal artists could either employ based on theoretical knowledge, which is probably unlikely, or they could simply draw on tacit knowledge acquired through learning and playing the style. Regardless of their theoretical understanding, it is likely that these artists are fond of the sound of the characteristic chord progressions relying on minor chords. Therefore, another explanation than the one previously presented is quite possible, i.e. that black metal is similar to death metal – and many other forms of extreme metal – in that the harmonic relationship is not that deliberate and/ or important. Instead, black metal may concentrate on particular intervals - in this case, minor thirds – and their direct, non-diatonic transpositions that determine the approach to pitch. That is demonstrated in Aquilus's 'Nihil' (Figure 9), where all chords are minor triads whose roots form a diminished chord, which is made up entirely of minor thirds. This view would mean that black metal bands may not connect chords according to how many notes they share with the 'tonic' triad. Rather, injecting minor thirds (and tritones) at every possible instance may be more important than voice leading or any kind of tonal relationship. In this case, a functional, numeral-based form of analysis would not be particularly insightful. The present analysis cannot give a clear answer as to which of the two explanations is more likely, necessitating a focused follow-up study on black metal harmony. Nevertheless, the importance of minor third intervals for black metal's harmonic approach and aesthetic is obvious and distinguishes it from several of the other analysed metal subgenres.

METALCORE

Metalcore was one of the least harmonically diverse subgenres. In the twenty tracks studied, only thirteen out of the possible 24 triads were used (Figure 11), the second-lowest number, only undercut by melodic death metal with sixteen. Dissonant triads only occurred in three tracks. Metalcore adhered relatively strictly to Aeolian chord progressions, with 95 per cent of all chords being from this scale. This limited harmonic spectrum reflects metalcore's





fusion of heavy metal and hardcore punk (Kennedy 2018), with hardcore punk's harmonic nature being more heavily focused on riffs than emotive chord structures (Easley 2015).

While the major chord on the sixth degree of the minor scale (VI) is ubiquitous in most metal subgenres as the most common chord alongside the minor tonic, it was particularly prevalent in the analysed metalcore songs, accounting for over 22 per cent of the chords used. As per Lilja (2019), this chord is chosen for its strong subdominant function and because it is a smooth choice for a consequent chord to 'I' since sharing two notes with the tonic (the first and third degrees of the scale). The strong subdominant function this chord possesses makes it a good candidate for the first chord of a contrasting chorus section, as is the case in 'Reincarnate' (Figure 12) by Motionless in White (2014) and 'Beautiful Tragedy' (Figure 13) by In This Moment (2007).



Figure 12: Chorus of Motionless in White's 'Reincarnate', using VI as the first chord of the chorus (00:00:42).



Figure 13: Chorus of In This Moment's 'Beautiful Tragedy', using VI as the first chord of the chorus (00:01:05).

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The chorus sections of the two tracks begin on VI (C major and G major, respectively), and both use only i, VII and VI for the entire section. Taking 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 could come across as too 'cheesy' in the context of metalcore.

In 'Reincarnate', this first G major chord provides immediate contrast to the 'bouncy' B Phrygian riff that proceeds it, instantly recognizable as a new section since it moves from modal to diatonic. The vocal melody singing the F#, effectively turning the chord into a G major seventh, creates that melancholic feel that a band with an image like Motionless in White, with their characteristic makeup reminiscent of corpse paint, like to convey.

Whilst there are fewer differences between the harmonic content of the verse and chorus in 'Beautiful Tragedy' because the verses are diatonic in E minor, the beginning of the chorus in C major has the same effect of marking a new section. In This Moment also enjoy the fifth degree of the scale becoming the seventh in what is effectively a C major seventh chord in the fifth bar of this section.

MELODIC DEATH METAL

Using seventeen out of 24 possible triads (Figure 14), melodic death metal was midway between the sophisticated power and black metal and the more mainstream, basic progressions of metalcore in terms of harmonic complexity. Melodic death metal is a marriage between the sounds of Swedish death metal and the NWOBHM (Hillier 2020). These influences on the harmonic content were confirmed by the twenty analysed tracks. The classic Aeolian chord progressions that underscore the lead guitar work of the NWOBHM are combined with riffs made of darker modes, including Phrygian and Locrian, common in death metal (Berger 1999; Smialek 2015).

The chord progressions used in melodic death metal make it one of the genres with more conventional harmonic progressions. Most chords came from the Aeolian mode, with relatively limited use of non-diatonic triads, diminished and augmented chords. Benjamin Hillier (2020) discusses how early melodic death metal bands such as In Flames and Dark Tranquillity were influenced by the harmonic material of NWOBHM bands like Iron Maiden and Judas Priest





due to their use of Aeolian progressions with lead guitars harmonized in thirds and the 'Aeolian Cadence' described by Lilja (2009: 85–87). This cadence is exemplified in the outro of In Flames's (2000) 'Pinball Map' (Figure 15).

'Pinball Map' is a typical guitar duet influenced by NWOBHM. 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 and repeats the III and VII chords before finally ending with an Aeolian VI–VII–I cadence in Bb minor, leading back to the main riff that finishes the song.

Children of Bodom's (2000) 'Hate Me' is another example of this style, even though the lead guitar and keyboard share the melody and play in unison (Figure 16). The song alternates between perhaps the two most typical 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 in 'Burning Angel' (2002) for a modern, death metal-tinged atmosphere, forgoing the typical Aeolian progressions and playing something darker instead (Figure 17), reflecting the track's lyrics about death, hell and sin.

The first two chords, I and VI, are typical, except the VI chord is played as a first inversion, leaving the bass note as a pedal C. This inversion, immediately less stable than the more typical root position power chords, sets the scene for the next, more colourful chord, the \flat II (or Neapolitan) chord D \flat major. The two lead guitar lines digress from the C minor scale to accommodate for this inversion. The rhythm guitar then returns to the tonic for one bar before the final chord V (G major) is heard, forming an authentic perfect cadence back into C minor when the progression repeats. Using 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



Figure 15: Outro of In Flames's 'Pinball Map', using NWOBHM-inspired progressions (00:03:37).



Figure 16: Lead ostinato in Children of Bodom's 'Hate Me', using NWOBHM-inspired progressions (00:00:10).



Figure 17: Guitar duet in Arch Enemy's 'Burning Angel', using diminished (bar 11) and inverted (bars 3 and 8) chords (00:00:37).

for a more NWOBHM-influenced Aeolian cadence. This final chord is also played as a first inversion chord, omitting the fifth in the rhythm guitars. These first inversion chords make for a less stable but more fluid sound due to the smooth voice leading in the rhythm guitars, with the sole exception of both notes moving down from Db to C. This move is made possible by the rhythm guitars playing only two notes at a time, omitting the third in the root position power chords and the fifth in the inverted ones. By playing the melody in parallel thirds, Arch Enemy ensure that the omitted tone is always present and that each bar's harmonic material is fully fleshed out.

PROGRESSIVE METAL

Progressive metal was the most harmonically diverse subgenre of the corpus, and it was the second to use all 24 available triads as well as the most dissonant triads (Figure 18). With a wide range of modes employed in riffs and frequent and varied modulations, progressive metal was the only subgenre that contained at least one modulation to every possible subsequent key.

Progressive metal is stylistically much broader than any other subgenre covered, spanning the power metal influenced melodies of Symphony X and Evergrey, the darker atmospheres of Opeth and Edge of Sanity and the rhythmic complexity of Meshuggah. Therefore, it is only logical that progressive metal requires a wide range of harmonic techniques. For a better insight into its harmonic techniques, the analysis focused more on tracks with a wide range of techniques than on harmonically different tracks whose structures have largely been adopted from another subgenre of metal.

During the analysis process, it became clear that standard tonal analysis could not explain all harmonic choices in progressive metal, as it did for all other genres except black metal. It therefore seemed valuable to extend the function-based analytical approach by neo-Riemannian theory, a school of thought advocated by music theorist Richard Cohn (2012). Cohn describes how the master composers of the Romantic era often chose chord progressions not based on key or modality but by how smoothly they can be moved through each other through voice leading. Instead of describing triads' relations to one another in terms of what key signatures they fall in, i.e. the harmonic development is not functional in the sense of traditional tonal harmony, neo-Riemannian theory views chord relations based on how many 'units of work' are required to transform one chord into another. A unit of work here means



Triad

Figure 18: Triads in progressive metal.

shifting one of the notes in a chord up or down by one semitone. For example, it takes one unit of work to transform C major (C-E-G) into C minor (C-E \flat -G) by moving the E natural down a semitone to an E flat. An equal amount of work is required to transform C major (C-E-G) into E minor (B-G-E)¹ by 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 is not the case with a traditional tonal approach, where C major (no accidentals) and E minor (one #) are one step in the circle of fifths apart while C major and C minor (three \flat) are distanced by three steps in the circle.² Cohn's (2012) text redefines how composers and theorists alike can navigate pan-triadic progressions. For the analysis of metal music, Guy Capuzzo (2004) discusses the usefulness of a neo-Riemannian perspective and briefly analyses a guitar sequence in Ozzy Osbourne's (1981) 'Flying High Again'. Capuzzo remarks that neo-Riemannian theory can'demonstrate coherence in music that resists Schenkerian, functional harmonic, or other "classical" tonal approaches' (2004: 196). Lilja (2019) concurs that neo-Riemannian analysis is a valuable framework for examining metal harmony.

Of all the twenty studied tracks, Opeth's (2001) 'The Drapery Falls' was the most interesting, which is why it is analysed in detail as a representative example of the progressive metal subgenre. This almost eleven-minute-long epic offers many examples of distinctive use of harmony to create progressive metal's idiosyncratic sound. After a brief introduction with some strummed chords on a nylon string guitar, Opeth play a simple melodic line accompanied by a tonally ambiguous chord progression delivered by the rhythm guitar and bass (Figure 19).

Opeth subvert the listener's expectations in much the same way as Leviathan's work discussed previously. Instead of taking a standard metal progression, Opeth turn the normally Aeolian-signed major triads into minor triads. This approach gives the first three chords of an otherwise unremarkable i–VII–VI in C minor a much more jarring, unsettling feeling. Additional colour is provided to the progression by the extensions on every chord; an added ninth over the C minor in the first two bars, played in both the rhythm and bass guitars, and a seventh (rhythm guitar) and ninth (lead guitar) over the second chord.

The third chord, Abm7/Cb, is interesting because it could equally well be analysed as B major with an added sixth, as both contain the same notes, and neither is diatonic to C minor. The choice to analyse it as Abm7/Cb was based on the rhythm guitar beginning on an inverted Ab minor triad and the lead guitar providing the added seventh as in the previous chord. For both options, it is worthwhile to analyse how the chord is approached. The Abm7/Cb is part of a standard metal progression turned upside down by transforming the triads to minor, and the Badd6 (#VII) is the 'slide transformation'³ chord of the tonic, which is a representative example of progressive metal's characteristic approach to non-diatonic chord choices.

The phrase's final two bars provide a brief link back to the C5 power chord, accelerating the harmonic rhythm to two chords per bar instead of the previous two bars per chord, moving quickly through the chords. Given the strong destabilization of tonality established by the first three chords, the Gb major seventh sounds less out of place than a passage remaining diatonically in C minor.

The way bar 7 plays out, with the bass falling from Bb to Gb and the low Gb simply being added to the chord in the rhythm guitars, makes the progression

- Note that E minor (E-G-B) is in second inversion in this case.
- However, even C minor is related to C major in traditional music theory since it has a parallel key relation and is thus an acceptable modulation.
- Cohn (2012) describes the transition between a minor chord and a major chord one semitone lower as a slide transformation, whereby the tonic and fifth 'slide' down one semitone each to create a major triad with the same third.



Figure 19: Tonally ambiguous sequence in the introduction to Opeth's 'The Drapery Falls' (00:00:08).

rather reminiscent of an Aeolian progression in the key of Bb minor beginning on the power chord Bb5. This section could be regarded as a key change in the second bar, with the third chord being a Neapolitan chord. The verse section of 'The Drapery Falls' comes after another similarly non-diatonic chord progression beginning on A minor (Figure 20), based around an acoustic guitar and the vocal voice.

In this section, the acoustic guitar alternates between A minor and D# diminished seventh, which shares enough notes with A minor that the only moving part is the root note, as the fifth is omitted from the A minor chord. The initial A minor is embellished by an added ninth, which transitions into an added sixth on the D# diminished seventh. These two chords are then repeated, with D# diminished seventh becoming a G# minor halfway through the fourth bar. This progression gives additional purpose to the suspended B note heard across the first four chords as it becomes the third of this new triad. In the three bars of rest in the vocal line, a short line of passing notes ends with the melody on C#, turning the A minor into an A major chord for only half a bar before the repeat. This non-diatonic progression with chords that share so many common tones suits the lyrics well. The tonal ambiguity and eerie aesthetic created by the diminished chords and non-diatonic chords G# minor and A major is effective word-painting for the lines'[p]lease remedy



Figure 20: Non-diatonic progression in Opeth's 'Drapery Falls' verse section (00:02:17).



Figure 21: Diatonic progression in Opeth's 'The Drapery Falls' chorus (00:02:48).

my confusion' and 'I'm counting nocturnal hours, drowned visions in haunted sleep'.

At 00:02:46, the track has its first 'normal' chord progression, aptly used for the chorus (Figure 21). This break from chromatic, ominous progressions is short-lived and lasts only three bars before the verse begins again.

After a repetition of the verse and chorus material, the second key change occurs, a sudden, direct shift upwards by four semitones to C# minor. The next sequence (Figure 22) functions similarly to the introduction, using a minor chord on the seventh degree of the scale.

The four chords that make up this progression are ambiguous in terms of key signature: the former two are i and VI in C# minor, and the latter are VI and i in B minor. From a neo-Riemannian perspective, both these pairs of chords are connected by an 'L' (leading tone) transformation, one from major to minor and the other vice versa. Such a dyadic interaction enables both the first bar and the following three bars to sound familiar and customary enough on their own, yet it gives the passage as a whole a somewhat dissociative feel. For tonal consistency in the melody, the passage is repeated for the duration of the guitar solo, which keeps notes from B Aeolian throughout.

After another similar progression based on the same idea of using chords from C# minor and B minor simultaneously, Opeth draw from their death metal roots and play several minutes of heavily discordant material that can neither be analysed functionally nor with neo-Riemannian theory, climaxing in this distinctly dissonant arpeggio duet (Figure 23).

This passage speaks to metal's ability to sound positively noisy (Kahn-Harris 2007; Smialek 2015; Hannan 2018). However, it was one of the few passages where there was uncertainty about how to record it. Two alternating melodic tritones are a semitone apart, and if that were not discordant enough, the same passage is played a semitone higher at the same time.

For the following instrumental section (Figure 24), Opeth choose a typical functional harmony for the first time in the track. Despite sticking entirely to chords i and V in A minor, this excerpt maintains progressive metal's engaging discourse with the off-kilter time signature changes (Hannan 2018; Lucas 2018) and how the chords are voiced. The chords contain no conventional



Figure 22: Chorus into bridge/solo section of Opeth's 'The Drapery Falls', borrowing harmonic material from the introduction (00:03:56).



Figure 23: Atonal passage of Opeth's 'The Drapery Falls', using melodic tritones in parallel minor seconds (00:05:50).



Figure 24: Instrumental passage of Opeth's 'The Drapery Falls', using functional i-V harmony (00:06:10).

power chords nor keyboard lines but are fully fleshed out between the two guitar lines in a way that both have smooth voice leading. The transition between A minor and E major occurs with the A and C in the rhythm guitar moving down a semitone each, landing 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 denser, more opaque sound than if it were arranged more traditionally with power chords in the rhythm guitar and a monophonic melody line in the lead guitar and keyboard part. The final bar of this phrase provides a perfect cadence that links back to the first. Initially starting with all three instruments in unison, they separate to create a full E seventh chord in second inversion.

These sections of 'The Drapery Falls' demonstrate Opeth's ability to keep a listener interested throughout a ten-plus minute track by varying the harmonic techniques used in a way that no single harmony style dominates for too long. The different harmonic techniques are also employed in ways that fit the lyrics and the track's structure from a songwriting perspective, exemplifying what progressive metal as a whole is trying to do.

There are some outliers in the progressive metal subset, tracks that were simpler than expected. Dream Theater's (2005) 'These Walls' and Periphery's (2012) 'Scarlet' fall into this category, both containing mostly diatonic progressions with little variation. Overall, the many harmonic styles could speak to progressive metal's broadness as a genre, especially considering that what these songs might lack in harmonic diversity is made up for in rhythmic complexity, as is often the case with progressive acts (Pieslak 2007; Smialek 2015; Hannan 2018; Lucas 2018). On the contrary, 'Scarlet' remains in 4/4 time, with limited syncopation, and 'These Walls' stays largely the same, apart from the middle-eight section. These outliers suggest that bands are likely to deliberately choose their more commercially palatable tracks as singles while keeping musically intricate material for the album release.

STATISTICAL SIGNIFICANCE TESTS

Testing the 24 available triads for subgenre differences revealed that seven significant chord choices were prevalent in power, black and progressive metal as the subgenres with the most characteristic harmonic palettes. Unsurprisingly, black metal differed from all other subgenres except melodic death metal in their use of the i, focusing on the (minor) tonic (p < 0.01; $\eta p^2 = 0.17$).⁴ Black metal largely consisted of four-chord harmonic ostinati that almost always

Delivered by Intellect to: Jan-Peter Herbst (33324715) IP: 176.248.138.139 On: Sat, 06 May 2023 09:05:40 4. p indicates the level of statistical significance. A p-value below 0.05 is statistically significant, and <0.01 and 0.001 means an even greater probability of a systematic, i.e. non-random, effect. The strength of the effect is provided by np². A np²-value below 0.01 indicates a small, below 0.06 a medium and above 0.14 a large effect

began on i. There was often a modulation between these progressions, with the first chord establishing the new tonal centre. The proportion of the iii chord was also significantly higher in black metal and progressive metal than in the other subgenres (p < 0.05; $\eta p^2 = 0.12$). In the case of black metal, this frequent use may be explained by the preference for Weitzmann region-based progressions. Since both major and minor variants of this chord were uncommon in most subgenres, its use in progressive metal may be explained by the subgenre's tendency to deviate from standard harmonic progressions. Two other chords employed more often by black metal bands were vi (p < 0.01; $\eta p^2 = 0.18$) and #vii (p < 0.01; $\eta p^2 = 0.17$). The frequent use of the vi chord may again be explained by black metal's preference for Weitzmann region-based progressions. Essentially, it is a darker version of the typical VI chord common in all other subgenres. As for the #vii chord, it is a non-diatonic minor triad unpopular in all analysed subgenres, except progressive metal, because of its dissonant and overly dark effect.

The second subgenre in this study with a strong harmonic signature was power metal. It strongly featured two major chords, IV (p < 0.001; $\eta p^2 = 0.23$) and VII (p < 0.001; $\eta p^2 = 0.20$), which differed significantly from all other subgenres. The popularity of the IV chord may be explained by the sound of the underlying Dorian mode, which is the brightest of all minor modes. The IV chord is crucial to power metal's characteristic bright aesthetic on a compositional level, supported by the lyrical themes and wider arrangement like brighter instrumental timbres and keyboards. As for the VII, this chord is integral to the chromatic mediant modulation and provides the dominant function in a minor key cadence without the 'spooky' effect of the V chord. Replacing V with VII thus helps maintain power metal's bright aesthetic, just like the characteristic IV chord.

DISCUSSION AND CONCLUSION

This research aimed to determine which harmonic structures are common in five carefully chosen metal subgenres in the twenty-first century and to investigate whether these subgenres employ different harmonic techniques to achieve their desired sonic aesthetics. The findings indicate that while metal bands still use techniques inherited from the 1970s and 1980s, especially Aeolian chord progressions (see Lilja 2009; Walser 1993), some subgenres have developed their own signature harmonic repertoire setting them apart.

Regarding metalcore and melodic death metal, the results confirm the works of Jon Wiederhorn and Katherine Turman (2013) and Benjamin Hillier (2018, 2020), respectively. Both subgenres deviated only slightly from the norm of Aeolian and Dorian-based progressions discussed in Lilja's (2009) work. The deliberate simplicity of metalcore was evident in the limited choice of chords and lack of modulations. Metalcore followed simple formulas to achieve its 'radio-friendly', sonically conformist sound (Wiederhorn and Turman 2013: 557–614), making little use of triads outside of the ones that fit within Aeolian or harmonic minor progressions. Melodic death metal remained fairly consistent with its NWOBHM influences (Hillier 2018, 2020) through its use of duet guitar melodies over Aeolian progressions, with only a few Neapolitan or otherwise colourful chords as exceptions. Still, melodic death metal bands mixed in darker, non-diatonic triads to achieve a more transgressive aesthetic than the NWOBHM bands of the 1980s.

Progressive metal was highly diverse in terms of chord progressions, caused by the fact that progressive metal is a broad term comprising many different styles under the same umbrella. More pronounced than with other bands, progressive metal bands had an affinity for the avant-garde and thus preferred diminished and augmented chords, along with noisome atonal passages. Progressive metal proved most challenging to define as a subgenre, and it was the least consistent in its use of non-diatonic harmony. Although a variety of chord choices and key changes put progressive metal at the top of the list, the findings show that there was little to grasp onto as a defining feature of the genre as a whole, as was the case with power metal and black metal. However, looking at modulations does 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 metal frequently shifted a tone up and down between sections.

The most notable findings concerned power metal and black metal. In power metal, baroque and classical-influenced secondary dominants and diminished sevenths were often employed to add colour to the progressions. Moreover, passages beginning with the relative major chord served to brighten up the sound. Whilst power metal's close relation to baroque and classical chord progressions was expected, being the subgenre closest to 'classic' heavy metal where the affinity for western orchestral music is well known (Walser 1993), the Aeolian chromatic mediant modulation was a technique used almost exclusively in power metal.

Black metal proved the most contrasting subgenre to power metal. It is also influenced by western orchestral music but may employ a different school of harmony – or no harmonic concept based on voice leading at all, favouring the sonic quality of minor chords and progressions not adhering to western tonal theory. If following the first view, black metal bands preferred a different take on harmony, one that bypasses traditional notions of tonality in favour of chords' relationships to one another in terms of voice leading (Weitzmann regions) to create their eerie, ethereal sound. This approach to harmony saw black metal bands use all 24 possible triads, which only progressive metal achieved. The data suggest that black metal has moved furthest away from heavy metal's origins regarding harmonic content, pursuing its own intervallic and harmonic concepts centred on minor triads and tritones, similar to other extreme metal genres such as death metal. The Aeolian and Dorian structures have been replaced by a darker palette, and it would be worthwhile to investigate in future studies how these may differ from those of death metal and related extreme metal genres. Coggins' (2019) claim that black metal's chord progressions are 'predictable' and 'straightforward' could not be confirmed. The data showed that black metal bands used a large number of non-diatonic chords. Sequences like the one in Leviathan's work and other chord progressions discussed indicate that while they might be repeated, as Coggins states, they are less predictable than he suggests, sharing the 'chaotic' nature of death metal (see Berger 1999; Wallmark 2018). Similarly, Bert Stabler's claim that black metal bands conform to a 'musical cage of flattened supertonics and parallel fifth chords' (2016: 111) was contradicted in the work of Leviathan, Shining and Dødsengel. These three examples all eschewed the common harmonically neutral power chord (dyad) in favour of minor chords (triad), which is consistent with Jan-Peter Herbst's (2018: 96) assertion that black metal bands tend to use minor and altered chords, whereas other subgenres

like power metal might use power chords or major triads. This finding also supports Ross Hagen's claim that black metal bands prefer'full chord voicings' (2011: 184).

Black metal and power metal were found to have the two most contrasting styles concerning their sonic aesthetic and paratextual features such as lyrical themes, visual elements and subcultures. The way these two subgenres deal with harmony speaks to their overarching ambiences. The virtuosic, eccentric build-ups towards climactic cadences in power metal (Christe 2003; Sharpe-Young 2007; Weinstein 2011; Herbst 2019) help to evoke the lyrical themes, for example, embarking on quests, marching into battle and other heroic themes, as they provide the music with a focus on this 'end goal', just as the end goal in the lyrics is often to slay the dragon or reach one's destiny. This approach contrasts with black metal's use of harmony, with the ambiguous tonality and eerie, repetitive chord progressions reflecting the darker lyrical themes of hell, depression and suicide (Coggins 2019). To summarize the difference between the two: power metal focuses on the destination, and everything builds inexorably towards a point, whereas black metal focuses on the journey, with each new chord change adding to its sinister aesthetic.

This study drew on the existing literature surrounding harmony within heavy metal music (e.g. Walser 1993; Berger 1999; Capuzzo 2004; Lilja 2009, 2019; Smialek 2015; Heritage 2016; Kazdan 2017; Swallow and Herbst 2022). Its findings suggest that some of the analysed subgenres have tropes that set them apart from the others. Given the small number of relevant studies to build on, this research should be understood as exploratory, despite the relatively large sample size and quantitative component. Future research is needed to analyse a larger and broader corpus with a different or more complex approach that would allow the inclusion of major contemporary extreme metal genres characterized by atonal structures not employing triadic and functional tonal harmony.

No.	Band	Song	Album
Power	metal		
1	Dragonland	'Supernova'	<i>Astronomy</i> (Century Media, 2006)
2	Avantasia	'Reach Out for the Light'	Avantasia (AFM, 2000)
3	Pagan's Mind	'The Celestine Prophecy'	<i>Enigmatic: Calling</i> (Limb, 2005)
4	Helloween	'Mr Torture'	<i>The Dark Ride</i> (Nuclear Blast, 2000)
5	Timeless Miracle	'Curse of the Werewolf'	Into the Enchanted Chamber (Massacre, 2005)
6	Morgana Lefay	'Grand Materia'	<i>Grant Materia</i> (Black Mark, 2005)
7	Galneryus	'Destiny'	Resurrection (VAP, 2010)

APPENDIX 1: ANALYSED SONGS PER (GENRE
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No.	Band	Song	Album
8	DragonForce	'Operation Ground and Pound'	<i>Inhuman Rampage</i> (Noise, 2005)
9	Heavenly	'Keepers of the Earth'	<i>Dust to Dust</i> (Noise, 2004)
10	Angra	'Spread Your Fire'	<i>Temple of Shadows</i> (Steamhammer, 2004)
11	Kamelot	'The Haunting'	<i>The Black Halo</i> (Steamhammer, 2005)
12	Edguy	'Tears of a Mandrake'	Mandrake (AFM, 2001)
13	Lost Horizon	'Pure'	A Flame to the Ground Beneath (MFN, 2003)
14	Sonata Arctica	'The Cage'	<i>Winterheart's Guild</i> (Spinefarm, 2003)
15	Masterplan	'Spirit Never Die'	Masterplan (AFM, 2003)
16	Tierra Santa	'DavidY El Gigante'	<i>Sangre De Reyes</i> (Locomotive Music, 2001)
17	Rhapsody	'Dawn of Victory'	<i>Rhapsody of Fire</i> (Limb, 2000)
18	White Skull	'Escape'	<i>Forever Fight</i> (Dragonheart, 2009)
19	Epidemia	'Chas Ispytaniya'	Elfiiskaya Rukopis (Moroz, 2004)
20	Falconer	'Upon the Grave of Guilt'	<i>Falconer</i> (Metal Blade, 2001)
Black n	netal		
1	Windir	'Todeswalzer'	1184 (Head Not Found, 2001)
2	Dimmu Borgir	'Blessing upon the Throne of Tyranny'	<i>Puritanical Euphoric</i> <i>Misanthropia</i> (Nuclear Blast, 2001)
3	Leviathan	'Fucking Your Ghost in Chains of Ice'	<i>The Tenth Sub Level of Suicide</i> (Moribund Cult, 2003)
4	Watain	'Devil's Blood'	<i>Casus Luciferi</i> (Drakkar, 2003)
5	Aquilus	'Nihil'	<i>Griseus</i> (Blood Music, 2011)
6	Agalloch	'Limbs'	<i>Ashes Against the Grain</i> (The End, 2006)
7	Summoning	'A New Power's Rising'	<i>Let Mortal Heroes Sing</i> <i>Your Fame</i> (Irond, 2001)

No.	Band	Song	Album
8	Immortal	'Sons of Northern Darkness'	Sons of Northern Darkness (Nuclear Blast, 2002)
9	Dødsengel	'Azonei Wyrdwalker'	<i>Mirium Occultum</i> (Terratur Possessions, 2010)
10	Deathspell Omega	'Sola Fide I'	Si Monvmentvm Reqvires, Circvmspice (NoEvDiA, 2004)
11	Shining	'Yttligare Ett Steg Narmare Total Javla Utfrysning'	<i>Halmstad</i> (Osmose Productions, 2007)
12	Elderwind	'In the Snow'	<i>The Magic of Nature</i> (Elderwind, 2018)
13	Enslaved	'As Fire Swept Clean the Earth'	<i>Below the Lights</i> (Osmose Productions, 2003)
14	The Elysian Fields	'Enshield My Hate Eternal'	<i>12 Ablaze</i> (Black Lotus, 2001)
15	Mork Gryning	'Maelstrom Chaos'	<i>Maelstrom Chaos</i> (MNW Music, 2001)
16	Furia	'Jeszcze I Jeszcze'	Grudzien Za Grudniem (Pagan, 2009)
17	Caladan Brood	'City of Azure'	<i>Echoes of Battle</i> (Iron Grip, 2013)
18	Mistur	'Slaget'	Attende (Mistur, 2009)
19	Rotting Christ	'The Signs of Prime Creation'	<i>Theogonia</i> (Season of Mist, 2007)
20	Primordial	'Empire Falls'	<i>To the Nameless Dead</i> (Metal Blade, 2007)
Metalo	core		
1	Heaven Shall Burn	'Godiva'	<i>Veto</i> (Century Media, 2013)
2	Motionless in White	'Reincarnate'	<i>Reincarnate</i> (Fearless, 2014)
3	August Burns Red	'Thirty and Seven'	<i>Constellations</i> (Solid State, 2009)
4	All That Remains	'This Calling'	<i>The Fall of Ideals</i> (Prosthetic, 2006)
5	Anterior	'To Live or Not Remain'	<i>Echoes of the Fallen</i> (Metal Blade, 2011)
6	Killswitch Engage	'My Last Serenade'	<i>Alive or Just Breathing</i> (Roadrunner, 2002)
7	Underoath	'Writing on the Walls'	<i>Define the Great Line</i> (Tooth and Nail, 2006)

No.	Band	Song	Album
8	Avenged Sevenfold	'Unholy Confessions'	<i>Waking the Fallen</i> (Hopeless, 2003)
9	Bring Me the Horizon	'Shadow Moses'	<i>Sempiternal</i> (Epitaph, 2012)
10	Trivium	'Like Light to the Flies'	<i>Ember to Inferno</i> (Lifeforce, 2003)
11	Bullet for My Valentine	'All These Things I Hate'	The Poison (Gun, 2005)
12	Parkway Drive	'Carrion'	Horizons (Epitaph, 2007)
13	Jinjer	'Pisces'	<i>King of Everything</i> (Napalm, 2016)
14	As I Lay Dying	'The Darkest Nights'	<i>Shadows Are Security</i> (Metal Blade, 2005)
15	In This Moment	'Beautiful Tragedy'	<i>Beautiful Tragedy</i> (Century Media, 2007)
16	Within The Ruins	'Solace'	<i>Elite</i> (Entertainment One, 2013)
17	From Autumn to Ashes	'Cherry Kiss'	<i>Too Bad You're Beautiful</i> (Ferret Music, 2001)
18	Whitechapel	'When a Demon Defiles a Witch'	<i>The Valley</i> (Metal Blade, 2019)
19	The Devil Wears Prada	'Dead Throne'	<i>Dead Throne</i> (Ferret, 2011)
20	Unearth	'Zombie Autopilot'	<i>The Oncoming Storm</i> (Metal Blade, 2004)
Melodi	ic death metal		
1	Be'lakor	'Venator'	<i>Stone's Reach</i> (Prime Cuts Music, 2009)
2	Nightrage	'The Tremor'	<i>Sweet Vengeance</i> (Century Media, 2003)
3	Dimension Zero	'Hell Is Within'	<i>He Who Shall Not Bleed</i> (Toy's Factory, 2007)
4	Septicflesh	'Anubis'	<i>Communion</i> (Season Of Mist, 2008)
5	Mercenary	'World Hate Center'	<i>11 Dreams</i> (Century Media, 2004)
6	Dark Tranquility	'Lost to Apathy'	<i>Lost to Apathy</i> (Century Media, 2004)
7	In Flames	'Pinball Map'	<i>Clayman</i> (Nuclear Blast, 2000)
8	Children of Bodom	'Hate Me'	<i>Follow the Reaper</i> (Spinefarm, 2000)

No.	Band	Song	Album
9	Amon Amarth	'Twilight of the Thunder God'	<i>Twilight of the Thunder</i> <i>God</i> (Metal Blade, 2008)
10	Arch Enemy	'Burning Angel'	<i>Wages of Sin</i> (Century Media, 2001)
11	The Black Dahlia Murder	'Moonlight Equilibrium'	<i>Ritual</i> (Metal Blade, 2011)
12	Wintersun	'Beyond the Dark Sun'	<i>Wintersun</i> (Nuclear Blast, 2004)
13	Insomnium	'Mortal Share'	Above the Weeping World (Spinefarm, 2006)
14	Soilwork	'The Chainheart Machine'	<i>The Chainheart Machine</i> (Century Media, 2000)
15	Suidakra	'Wartunes'	<i>The Arcanum</i> (Last Episode, 2000)
16	Swallow the Sun	'Deadly Nightshade'	<i>The Morning Never Came</i> (Firebox, 2003)
17	Into Eternity	'Buried in Oblivion'	<i>Buried in Oblivion</i> (Century Media, 2004)
18	Scar Symmetry	'Morphogenesis'	<i>Holographic Universe</i> (Nuclear Blast, 2008)
19	Kalmah	'Heroes to Us'	Swampsong (Spinefarm, 2003)
20	Mors Principium Est	'Pure'	<i>Inhumanity</i> (Listenable, 2003)
Progres	sive metal		
1	Ayreon	'Day 2: Isolation'	<i>The Human Equation</i> (InsideOut, 2004)
2	Opeth	'The Drapery Falls'	Blackwater Park (MFN, 2001)
3	Witherfall	'Moment of Silence'	A Prelude to Sorrow (Century Media, 2018)
4	Periphery	'Scarlet'	Periphery II (Sumerian, 2012)
5	Edge of Sanity	'The Forbidden Words'	Crimson II (Black Mark Production, 2003)
6	Pain of Salvation	'Ending Theme'	<i>Remedy Lane</i> (InsideOut, 2002)
7	Nevermore	'The Heart Collector'	<i>Dead Heart in a Dead World</i> (Century Media, 2000)
8	Symphony X	'Inferno'	<i>The Odyssey</i> (InsideOut, 2002)

No.	Band	Song	Album
9	Evergrey	'The Masterplan'	<i>In Search of Truth</i> (AFM, 2001)
10	Dream Theater	'These Walls'	<i>Octavarium</i> (Atlantic, 2005)
11	Circus Maximus	'Alive'	<i>The 1st Chapter</i> (Frontiers, 2005)
12	Riverside	'Rainbow Box'	<i>Rapid Eye Movement</i> (InsideOut, 2007)
13	Beyond Twilight	'The Path of Darkness'	<i>Section X</i> (Nightmare, 2005)
14	Witherscape	'Wake of Infinity'	<i>The Northern Sanctuary</i> (Century Media, 2016)
15	Seventh Wonder	'There and Back'	Mercy Falls (Lion, 2008)
16	Orphaned Land	'Birth of the Three'	<i>Mabool</i> (Century Media, 2004)
17	Porcupine Tree	'Blackest Eyes'	In Absentia (Lava, 2002)
18	Protest the Hero	'Bloodmeat'	Fortress (Universal, 2007)
19	Hollenthon	'Y Ddraig Goch'	With Vilest of Worms to Dwell (Napalm, 2001)
20	Mastodon	'Crack the Skye'	<i>Crack the Skye</i> (Reprise, 2009)

REFERENCES

Aquilus (2011), 'Nihil', Griseus, CD, Independent.

Arch Enemy (2001), 'Burning Angel', Wages of Sin, CD, Century Media.

- Berger, H. (1999), *Metal, Rock, and Jazz*, Middletown, CT: Wesleyan University Press.
- Björnberg, A. (2007), 'On aeolian harmony in contemporary popular music', in A. F. Moore (ed.), *Critical Essays in Popular Musicology*, Aldershot: Ashgate, pp. 275–82.
- Capuzzo, G. (2004), 'Neo-Riemannian theory and the analysis of pop-rock music', *Music Theory Spectrum*, 26:2, pp. 177–99.
- Children of Bodom (2000), 'Hate Me', Follow the Reaper, CD, Spinefarm.

Christe, I. (2003), Sound of the Beast, New York: HarperCollins.

Coggins, O. (2019), 'Distortion, restriction and instability: Violence against the self in depressive suicidal black metal', *Metal Music Studies*, 3:5, pp. 401–18.

Cohn, R. (2012), Audacious Euphony, New York: Oxford University Press.

Dødsengel (2010), 'Azonei Wyrdwalker', Mirium Occultum, CD, Terratur Possessions.

Dream Theater (2005), 'These Walls', Octavarium, CD, Atlantic.

Easley, D. B. (2015), 'Riff schemes, form and the genre of early American hardcore punk', *Music Theory Online*, 21:1, pp. 1–21, https://mtosmt.org/ issues/mto.15.21.1/mto.15.21.1.easley.html. Accessed 10 March 2023.

Elflein, D. (2016), 'Iron and steel', in A. R. Brown, K. Spracklen, K. Kahn-Harris and N. W. R. Scott (eds), *Global Metal Music and Culture*, London: Routledge, pp. 35–49.

Galneryus (2010), 'Destiny', Resurrection, CD, VAP.

- Hagen, R. (2011), 'Musical style, ideology, and mythology in Norwegian black metal', in J. Wallach, H. M. Berger and P. D. Greene (eds), *Metal Rules the Globe*, Durham, NC: Duke University Press, pp. 180–99.
- Hannan, C. (2018), 'Difficulty as heaviness: Links between rhythmic difficulty and perceived heaviness in the music of Meshuggah and The Dillinger Escape Plan', *Metal Music Studies*, 4:3, pp. 433–58.
- Hannan, C. (2021), 'Ghostly longing: Tonality as grieving in Bell Witch's Mirror Reaper', Metal Music Studies, 7:2, pp. 277–97.
- Heavenly (2004), 'Keepers of the Earth', Dust to Dust, CD, Noise.
- Herbst, J.-P. (2018), 'Heaviness and the electric guitar: Considering the interaction between distortion and harmonic structures', *Metal Music Studies*, 4:1, pp. 95–113.
- Herbst, J.-P. (2019), 'The formation of the West German power metal scene and the question of a "Teutonic" sound', *Metal Music Studies*, 5:2, pp. 201–23.
- Heritage, G. (2016), 'It's like a Mach piece, really', in A. R. Brown, K. Spracklen, K. Kahn-Harris and N. W. R. Scott (eds), *Global Metal Music and Culture*, London: Routledge, pp. 35–49.
- Hillier, B. (2018), 'The aesthetic-sonic shift of melodic death metal', *Metal Music Studies*, 4:1, pp. 5–23.
- Hillier, B. (2020), 'Musical practices in early melodic death metal', Journal of Music Research Online, 11, pp. 1–28.
- In Flames (2000), 'Pinball Map', Clayman, CD, Nuclear Blast.
- In This Moment (2007), 'Beautiful Tragedy', *Beautiful Tragedy*, CD, Century Media.
- Kahn-Harris, K. (2007), Extreme Metal, London: Berg.
- Kazdan, A. (2017), 'Textural applications of power chords in Scandinavian death metal', *Metal Music Studies*, 3:2, pp. 269–321.
- Kennedy, L. (2018), 'Functions of genre in metal and hardcore music', Ph.D. thesis, Hull: University of Hull.
- Leviathan (2003), 'Fucking Your Ghost in Chains of Ice', *The Tenth Sub Level of Suicide*, CD, Moribund Cult.
- Lilja, E. (2009), *Theory and Analysis of Classic Heavy Metal Harmony*, Helsinki: IAML Finland.
- Lilja, E. (2019), 'Harmonic function and modality in classic heavy metal', *Metal Music Studies*, 5:3, pp. 355–78.
- Lucas, O. (2018), "So Complete in Beautiful Deformity": Unexpected beginnings and rotated riffs in Meshuggah's *obZen'*, *Music Theory Online*, 24:3, pp. 1–10, https://mtosmt.org/issues/mto.18.24.3/mto.18.24.3.lucas.html. Accessed 10 March 2023.
- Motionless in White (2014), 'Reincarnate', Reincarnate, CD, Fearless.
- Mynett, M. (2019), 'Defining contemporary metal music: Performance, sounds and practices', *Metal Music Studies*, 5:3, pp. 297–313.
- Opeth (2001), 'The Drapery Falls', Blackwater Park, CD, Music for Nations.
- Ozzy Osbourne (1981), 'Flying High Again', Diary of a Madman, CD, Jet.
- Pedersen, J. (2000), 'Look to hell! Look to Norway', Listen to Norway, 8:2, pp. 6–11.
- Periphery (2012), 'Scarlet', Periphery II, CD, Roadrunner.
- Pieslak, J. (2007), 'Re-casting metal: Rhythm and meter in the music of Meshuggah', Music Theory Spectrum, 29:2, pp. 219–45.
- Pillsbury, G. (2006), *Damage Incorporated: Metallica and the Production of Musical Identity*, New York: Routledge.

Salzer, F. and Schachter, C. (1969), *Counterpoint in Composition*, New York: McGraw Hill.

Sharpe-Young, G. (2007), Metal: The Definitive Guide, London: Jawbone Press.

Shining (2007), 'Yttligare Ett Steg Narmare Total Javla Utfrysning', *Halmstad*, CD, Osmose Productions.

- Smialek, E. (2015), 'Genre and expression in extreme metal music, ca. 1990–2015', Ph.D. thesis, Montreal: McGill University.
- Stabler, B. (2016), 'False atonality, true non-tonality', Helvete, 3, pp. 109-12.
- Steinken, W. (2019), 'Norwegian black metal, transgression and sonic abjection', *Metal Music Studies*, 5:1, pp. 23–33.
- Swallow, R. and Herbst, J.-P. (2022), 'Dissonance in metal music: Musical and sociocultural reasons for metal's appreciation of dissonance', *Metal Music Studies*, 8:3, pp. 351–79.
- Temperley, D. and Clerq, T. de (2011), 'A corpus analysis of rock harmony', *Popular Music*, 30:1, pp. 47–70.
- Wallmark, Z. (2018), 'The sound of evil: Timbre, body, and sacred violence in death metal', in R. Fink, M. Latour and Z. Wallmark (eds), *The Relentless Pursuit of Tone*, New York: Oxford University Press, pp. 65–87.
- Walser, R. (1993), *Running with the Devil*, Hanover: University Press of New England.
- Weinstein, D. (2011), 'The globalisation of metal', in J. Wallach, H. M. Berger and P. D. Greene (eds), *Metal Rules the Globe*, Durham, NC: Duke University Press, pp. 34–59.

Wiederhorn, J. and Turman, K. (2013), Louder than Hell, New York: It Books.

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