Discordant Systems:
Uses and Meanings of Rhythmic Difficulty in the Music of Meshuggah and Related Extreme and Progressive Metal Bands

A Distinguished Major Thesis presented by

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Abstract

In this thesis, I present a series of close readings of metal texts chosen for their rhythmic difficulty. In the first chapter, I address use of polymeter and hypermeter in the music of the metal bands Meshuggah and Intronaut. I draw conclusions about the many complicating factors involved in conceptualizing Meshuggah's core rhythmic style, the importance of the consistent use of this style in determining meaning, and compare the meanings expressed in Meshuggah's music to the very different ones expressed in Intronaut's music.

In the second chapter, I address several instances of tempo ambiguity and tempo change taken from the music of the bands Gojira, Meshuggah, The Contortionist, Animals As Leaders, TesseracT, and Car Bomb. I explore different types of tempo ambiguity and change and their implications for perceptions and conceptions of tempo, pulse, and meter, as well as specific meanings tied more closely to the details of each song.

In the third chapter, I address two more songs in which rhythmic difficulty is created by a lack of pattern and/or pulse. I comment on the ways that rhythm can express randomness, its potential for expressing chaos, and the very different ways in which these techniques are central to the images of the bands Meshuggah and The Dillinger Escape Plan.

I conclude by drawing attention to a theorized link between heaviness (as in "heavy" metal) and disorientation caused by rhythmic complexity, as well as examining the implications of my analysis and synthesizing with the work of others to draw conclusions about the social place of the type of metal I discuss in the broader musical world.

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Introduction

I've been a fan of metal since middle school, and while my tastes within the genre have changed significantly, my devotion to distorted guitars, aggressive drumming, and screamed or growled vocals has never wavered. I have always taken metal at least as seriously as it seems to take itself, and as I began to play guitar and develop a more nuanced and intimate understanding of the music, I was excited to talk about the things I found there, the things I learned and felt deep inside the metal recordings and inside the mosh pits.

However, when I started writing about metal at the end of high school and beginning of university in 2011-2013, I felt like I was doing something that required extensive justification, because I couldn't find many examples to follow. There were only a handful of scholarly works on heavy metal that took it seriously as an art form, and only one article that addressed my specific area of interest, musicological analysis of progressive metal.[1]

Things have changed. Metal studies is a fast-developing field that now has its own devoted journal (Metal Studies Journal, first issue published in 2015) and the number of scholars interested in the music has increased dramatically. Andy Brown has also remarked on the way that the type of scholarship has shifted "from that of social problem or indicator of psychological risk to a cultural aesthetic worthy of study in its own right."[2] Metal studies has largely moved on from the defensive tone of the pioneering works on the genre (Weinstein, Walser) to a discourse that doesn't feel like it needs to convince readers that metal is even worth studying in the first place - and so have I. This is a great thing for a metal scholar, because the discourse is

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[1] Pieslak's 2007 article on Meshuggah, which I reference often in this thesis

[2] Andy R. Brown, "Heavy Genealogy: Mapping the Currents, Counterflows and Conflicts of the Emergent Field of Metal Studies, 1978-2010," *Jounral for Cultural Research, 15* (3), 231.

increasingly focused on things that are interesting to a fan, rather than things that are of interest to an outsider. It feels to me that I have arrived at a point where "the investigation of [metal] music [can] proceed without an inferiority complex."[3]

However, my approach is still somewhat unusual. Following Walser and others, I advocate for the use of close readings (listenings) of metal recordings as an essential path to discussing the sounds and social forces of the scene. As a fan, performer, composer, and scholar of metal music, I am most interested in the details of specific songs, the styles of specific bands, and the ways these relate to the experience of the live show. While there has been much progress in the sense that looking at these aspects in popular music studies in general has become much more common, metal studies still shows a decided deficit of musical analysis. Michelle Philipov has written extensively about the tendency in metal studies to favor sociological research over close reading of popular songs,[4] for example, and Andy Brown has remarked that while musicological metal scholarship has been on the rise, it still accounts for less than a quarter of published works on the genre, behind disciplines such as sociology, philosophy, and psychology.[5] While this may seem like a sizable percentage, most of this scholarship is ethnographical and deals with the actual sounds of metal (as opposed to the people who listen to it) only tangentially.

By now, though, there have been several outstanding examples of sound-based study, especially in the last decade, and I no longer feel as obligated to justify my specific approach and area of study either. I will provide a survey of these later in the introduction and draw on the ones

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[3] Walser, R. (1993). *Running With the Devil: Power, Gender, and Madness in Heavy Metal Music.* (Middletown, CT: Wesleyan University Press) 38

[4] Phillipov, M. (2014). *Death Metal and Music Criticism: Analysis at the Limits.* New York: Lexington Books.

[5] Brown, "Heavy Genealogy" 232

that are relevant to my subject extensively in my analysis chapters and conclusions section. First, though, I want to highlight the two main reasons that I am so interested in close technical analysis as a way of understanding the metal that I write about: because, from all evidence, it is closely in line with what fans enjoy about the music, and it is closely in line with what the band members (who play the roles of composers and performers) feel about their music. Michelle Philipov has argued the former extensively in her book on death metal - in it, she shows how examining immanent[6] features such as fragmentation, technicality (the fact that the music is fast and difficult to play), and lyrics of songs by Carcass and Cannibal Corpse lead to insights about the pleasures of fans that "may exist independently of, or disengaged from, political and structural concerns."[7]

The latter argument, that the creators of this music care a great deal about technical details, is evident to anyone who has listened carefully to the music, especially anyone who has tried to play it. If the technical details weren't important, why would bands spend so much energy writing and rehearsing such complicated music? Technical details are not an end in themselves, of course, but they are inseparable from the entire musical fact and are relevant to any discussion of meaning in the music and observations about the people who are involved with the music.

Approach: Specificity, Technicality, Flexibility

Technical treatment of the musical details will often but not always be rooted in traditional music theory, for two reasons. For one, existing music theory provides a powerfully

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[6] In the sense of Nattiez' use of the word, pertaining to the musical entity itself, not its creation or reception. Nattiez, J.-J. (1990). *Music and Discourse: Toward a Semiology of Music.* (C. Abbate, Trans.) Princeton: Princeton University Press. 13

[7] Philipov, *Death Metal and Music Criticism* xii

precise and shared literature for treatment of many types of musical details. For another, there is often overlap between the types of things that classical notation and theory are well-suited for (metered rhythm and equal-tempered harmony) and central genre characteristics of progressive metal music of the type that I study. This is an important point that I will return to, and not one to be taken for granted - it is much easier to precisely describe metal music with Western classical music theory than it is to describe gamelan music, for example. As Walser points out, "In the Javanese gamelon music… cyclicity and coincidence establish the coherence that organizes meaning, in contrast to the way that tonality organizes the production of meaning in Western classical music." While it is not harmony but rhythm that I examine in these examples, traditional western metered notation often provides precise and accurate representations of recordings. However, the treatment must also be flexible. As Walser continues, "This suggests that heavy metal, too, should have its own mechanisms and metaphors, its own terms of discourse."[8]

I therefore make much less use of traditional music notation in my analysis than I could, because it is often more appropriate to analyze rhythm in the examples I look at using other notational means - with numbers, words, and graphs that highlight the salient rhythmic features in a way that seems natural to the music, rather than always imposing standard notation. A technical treatment must not reduce a piece to the things that can be easily shown using standard notation or described with existing music theory ideas. While metal has much in common with other musical traditions, it is by now a distinct, self-sustaining tradition of its own, and as such cannot be explained solely as an extension of other musical styles.

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[8] Walser *Running With The Devil* 37

The approach, then, is a specific, technical but flexible one. Again, while technical, music theory analysis is not a priori more important than any other mode of talking about metal music, there are two reasons why it is is important in the specific case of technical progressive metal. As I've touched on above, it is an underrepresented method of study in the blossoming field of metal studies, and it represents a mode of listening that is especially in line with the way that fans and musicians think about the music.

Despite the overall dearth of close reading of metal music, there have been some excellent examples, especially in the last decade. I seek to emulate two types of achievements from these examples. First, there is the more strictly music theoretical type: as Philipov puts it, "Because it seeks to find a vocabulary to describe the elusive, textual analysis can provide important and ongoing contributions to the study of popular music."[9] Along these lines, Gregory McCandless coins the term "ABAC Additive Metric Process" to describe a way of building riffs that is ubiquitous in the music of Dream Theater and progressive metal at large (including some Meshuggah riffs).[10] Similarly, Brad Osborn coins the term "pivot pulse" to describe the degree of angularity (and thus difficulty) between successive sections (notably in The Dillinger Escape Plan's "43% Burnt" - I address other examples of their music in my analysis).[11] Terms like these provide analytical traction and allow for the beginning of the creation of an analytical language uniquely suited to the specific interests of metal. I seek to do this also - to continue to develop

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9 Phillipov, M. (2013). "In Defense of Textual Analysis: Resisting Methodological Hegemony in Media and Cultural Studies." *Critical Studies in Media Communication , 30* (3), 221.

10 McCandless, G. R. (2013). Metal as a Gradual Process: Additive Rhythmic Structures in the Music of Dream Theater. *Music Theory Online , 19* (2).

11 Osborn, B. (2010). Beats That Commute: Algebraic and Kinesthetic Models for Math-Rock Grooves. *Gamut , 3* (1), 43-67.

and build a vocabulary that is specifically suited to the discussion of rhythm in extreme and progressive metal.

The other type of close reading that inspires my analysis is the musicological one, defined both by its ends and means. Its means are varied and often somewhat pragmatic, and its ends are larger social or hermeneutical claims. One example is Pieslak's combined use of attack point analysis, a variety of types of diagrams, the concept of hypermeter, and standard notation to examine form on several levels in Meshuggah's *I* and (briefly) relate them to claims about Meshuggah's fanbase.[12] Another is Lucas' combined use of spectographs and notation to look at the ways that Meshuggah's riffs can seem to start "in the middle" based on how the ear groups them.[13] The dense spectographs have the added benefit of preserving a reminder of the overwhelming sonic quality of the recordings, something that standard notation makes it easy to forget. Smialek looks at form in *Catch-33* with the help of guitar tabs of certain sections,[14] a genius move that reveals key patterns and is in line with Cusick's call for a music theory that deals with performer experience,[15] as well as with an important way that many fans interact with the music, by learning to play it. Capuzzo examines the concept of deviance in the music of Meshuggah with an elegant use of circular diagrams and overlaid shapes to visualize large scale cycles and polymeters, and uses a highly theoretical understanding of the music to flesh out

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[12] Pieslak, J. (2007). Re-casting Metal: Rhythm and Meter in the Music of Meshuggah. *Music Theory Spectrum , 29* (2), 219-245.

[13] Lucas, Olivia. "Loudness, Rhythm, and Environment: Analytical Issues in Extreme Metal Music." Phd diss., Harvard University 2016.

[14] Smialek, Eric. "Rethinking Metal Aesthetics: Complexity, Authenticity, and Audience in Meshuggah's I and Catch Thirtythr33." Masters thesis, McGill University 2008. 60-71

[15] Cusick, Suzanne G. "Feminist Theory, Music Theory, and the Mind/Body Problem." *Perspectives of New Music* 32.1 (1994) 8-27.

claims made by the band about their deviance. All of these examples use flexible analytical and representational means to address the intricacies of rhythm and form in Meshuggah's music as well as to draw conclusions about a variety of larger ideas.

My analysis seeks to achieve both of these goals - to use and extend existing music theory to "describe the elusive" and to use flexible approaches to get at larger meanings.

Hermeneutics, Perception, Layers of Meaning

Meaning is a tricky thing in music, and I need to establish a few basics of how I will be using it. First is the question of where meaning "exists." Is it something the composers or performers encode into the recordings? Is it something that arises out of musical structures? Is it something that arises out of social structures? Is it something that comes from lyrics? Is it something that listeners create while listening to the recordings or attending a live performance?

The answer is yes to all, though I will be dealing primarily with the ways that meanings exist in musical structures, specifically in rhythm. But this is a syntactical necessity rather than a metaphysical accuracy. Rhythm can hardly be isolated from melody, timbre, texture, and harmony in these recordings, for one - though I talk about rhythm creating meaning, the musical structures will always include these other aspects, as well as texts (lyrics, titles) and images (live shows, album covers). And there is also a chicken and egg conundrum: do composers intend specific meanings and encode them through use of rhythm, or do the meanings arise out of rhythms that are chosen for other reasons? Again, it is hard to separate these two possibilities, and as a composer I can attest to the ways in which they coexist. Writing a piece of music involves a continuous dance of explicit intention, subconscious intention in the form of improvisation, and musical structure, all of which grow together and influence each other.

I am also operating under the hypothesis that meaning need not be consciously and literally encoded by performers to exist and matter. In other words, it is not necessary to my discussion of meaning that composers or performers be able (or willing) to describe meanings in their work in the same terms that I do - either because they do not have the same vocabulary to discuss the musical details on which my arguments hinge, or because they do not feel that it is important to put these details into words, perhaps because they feel pressure as "rock" musicians to not discuss their music from a technical perspective.[16]

Meaning also doesn't need to be consciously read by listeners. While many fans of extreme metal are in fact trained in music theory, most listeners probably don't think in the terms that I use in my analysis. However, my use of vocabulary is meant to get at reactions that are relatively independent of a listener's ability to precisely describe them. One can feel the rhythmic disorientation that Meshuggah's music causes, for example, without knowing to call it polymeter contained within rigid hypermeter. Love's article on hypermeter contains a description of the archetypal listener he has in mind that applies equally well to assumptions I make about the average listener to Meshuggah's music:

> [1.2] As a regular guest at these gatherings [substitute metal concerts and listening to recordings], and an amateur musician herself, Elise is well acquainted with the local style. But she has not studied the latest compositional treatises, nor does she pay any special attention to meter [in so many words]… Instead, her hearing unconsciously draws on her past musical experiences: these govern what she expects and how she reacts to the unexpected. She is not necessarily able to articulate the substance of these expectations

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[16] Smialek, "Rethinking Metal Aesthetics" 72-80

and reactions, but they determine how easily she follows a piece and which of its moments stand out.[17]

There are different levels of meaning related to levels of perception and familiarity with the music, and these can be visually represented as a pyramid (FIG 1): at the base are meanings that are widely applicable in metal and can be accessed by most listeners, while moving up layers requires more specific knowledge of the genre, of artists, of albums, and of specific songs. Cone expresses a similar idea: "if a musical composition expresses anything at all, the importance of the expression must reside in the uniqueness of the composition, not in what that composition shares with a dozen others of the same genre."[18] I wish to add some nuance to this idea - while the idiosyncrasies of a given song are important, features of genre can encode meaning in important ways as well.

Some examples of layers of meaning: while it is hard if not impossible to articulate a universal set of criteria for what is metal and what isn't, it is fairly easy to differentiate it from most other popular music genres by the use of distorted guitars and loudness.[19] Philip Tagg, though he is not a metal scholar, has an insightful basic meaning to go with this level of specificity, that metal is about "beat[ing] the fascinating but overbearing [modern industrial]

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[17] Love, Stefan C. "Historical Hypermetrical Hearing: Cycles and Schemas in the String-Quartet Minuet." *Music Theory Online* 21.3 (September 2015). Accessed 2016-17. http://www.mtosmt.org/issues/mto.15.21.3/mto.15.21.3.love.html

[18] Cone, Edward T. "Schubert's Promissory Note: An Exercise in Musical Hermeneutics." *19th Century Music* 5.3 (Spring 1982), 234.

[19] In fact, it seems that even sharks can do this - researchers have found that sharks can effectively be attracted by death metal because it sounds like struggling prey when played underwater (though they can also be attracted by AC/DC, presumably would be by punk as well). Bolton, Doug. "Death metal music attracts sharks, documentary crew finds out." *The Independent*. 10 July 2015. Accessed 2017. http://www.independent.co.uk/news/science/death-metal-music-attracts-sharks-documentary-crew-finds-out-10381295.html

system by screaming louder than it."[20] Walser has a complimentary one that applies to this level of meaning: "Thus, distortion functions as a sign of extreme power and intense expression by overflowing its channels and materializing the exceptional effort that produces it."[21] Both probably resonate with anyone who has even a hazy conception of what metal sounds like.

Looking more specifically at extreme metal, Keith Kahn-Harris reads transgression as a primary meaning of the more aggressive subgenre of the larger metal genre.[22] This does not mean that Tagg's interpretation does not still apply, but while he bases his interpretation on what differentiates heavy metal from popular music at large (specifically rave music), Kahn-Harris bases his interpretation on the aspects that differentiate extreme metal from heavy metal - he subtracts away the commonalities and bases his interpretation on what is left. Fans and scholars continue to perform this type of specialization of meaning (again, consciously and unconsciously, verbally and non-verbally) all the way up the chain to the level of specific songs - see Pieslak's discussion of Meshuggah's music within the field of extreme metal,[23] Smialek's discussion of the album *Catch ThirtyThr33* among Meshuggah's other albums,[24] and Lucas' discussion of specific Meshuggah songs and passages.[25] And while any broader meaning (lower on the pyramid) will apply to all levels above it, it does lose salience as listeners become more attuned to specific characteristics.

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[20] Tagg, Philip. "From refrain to rave: the decline of figure and the rise of ground." *Popular Music* 13.2 (May 1994). 218

[21] Walser *Running With The Devil* 42

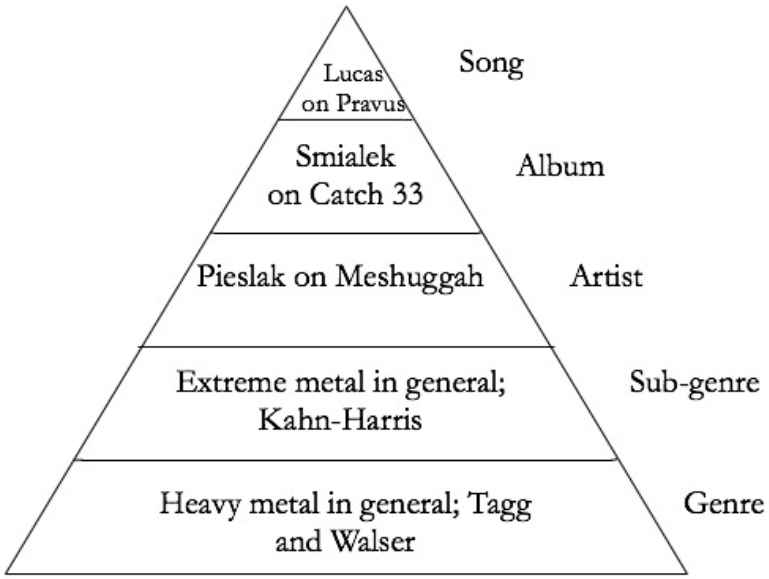
[22] Kahn-Harris, K. (2007). *Extreme Metal: Music and Culture on the Edge.* Oxford: Berg. 29

[23] Pieslak "Re-casting metal"

[24] Smialek, "Rethinking Metal Aesthetics" 98-109

[25] Lucas, O. "Loudness, Rhythm, and Environment" 65-123

Fig 1: Structure of meaning from genre to specific song



Thus screaming vocals, for example, which are often the only aspect that non-metal fans can focus on in extreme metal, become a genre convention and are largely taken for granted by experienced fans. Instead of just hearing "screaming" and the meanings that this has (power, aggression), listeners look for more specific meanings - differences between types of screaming, lyrics, rhythms, and such. Meaning becomes embedded in genre characteristics which become the raw materials out of which meaning is further created.

This point is important to establish as a background for all of my discussion of meaning. Many of the meanings that I discuss will apply to many of the other examples, but the more widely applicable an interpretation is, the less salient it is to experienced fans. If the only meaning of Meshuggah's music that was important to fans was the sense of power created by distorted guitars played at high volume, it wouldn't much matter to them if they listened to Meshuggah or AC/DC - they might as well be sharks.[26] More realistically, if it were only

[26] Bolton, D. "Death Metal Music Attracts Sharks"

rhythmic complexity and polymeter that mattered to fans of progressive metal, Meshuggah, Animals As Leaders, TesseracT, or The Dillinger Escape Plan might as well be the same band. This analysis deals with differences between types of rhythmic complexity that along with other musical details lead to important differences in meaning between bands and between songs from the same band.

Rhythmic Difficulty

Another term I use extensively is rhythmic difficulty, a term which requires some background generic knowledge, because what appears rhythmically difficult when viewed through the lens of other music genres is not necessarily notably difficult in metal music. Rhythmic difficulty refers broadly to how difficult it is to learn to recreate a given rhythmic passage, though I do not attempt to quantify this - I simply look at a broad collection of examples that are especially rhythmically difficult without explicitly comparing their levels of difficulty to each other.

By “especially rhythmically difficult” I mean that these examples stand out among progressive metal music, which already has a certain standard for rhythmic and metric complexity. Unusual time signatures and heavily syncopated accents in their own right are common enough in extreme and progressive metal that they do not generally stand out. Thus the music of Opeth or Mastodon (two progressive metal/rock bands), for example, does not figure into my analysis, even though there are plenty of instances of extended sections in 5/4 or 7/8 and many songs go through a few meter changes or have extended breakdowns that use heavily syncopated rhythms. While this type of rhythmic (specifically metric) complexity is extremely

unusual in hip hop,[27] for example, it is fairly ordinary in progressive and extreme metal. In my analysis I go beyond this generic (conventional for the genre) rhythmic difficulty and look at three types of less common and more challenging rhythmic phenomena:

1) polymetrical complexity, in which two or more meters of different cardinalities are simultaneously implied, including the ways in which these metric dissonances are complicated and/or resolved;

2) pulse rate complexity, in which different pulse streams (tempi) with a non-simple relation are present in a single song, either sequentially or implied simultaneously;

3) extended non-repeating and/or non-pulsed sections, in which it is notably difficult to discover a pattern or even a pulse.

I present several examples of each of these three types of "especially rhythmically difficult" phenomena, with each phenomenon being represented in its own chapter of this thesis. My examples are taken mostly from the music of Meshuggah, but also from The Dillinger Escape Plan and bands influenced by both of these pioneering bands.

Method

My main method of investigation has been close reading. Specifically, this means working extensively with specific commercially released progressive metal recordings in order to understand their rhythmic workings. I've primarily done this through transcription, which often involves learning to feel or conduct the rhythm, then learning to count it, then learning to play the passages on guitar. In some cases, my workflow was the opposite - I started with a published transcription of a piece, and used that to learn to play it in order to understand it better.

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[27] Which is of course not to say that there is no rhythmic complexity in hip hop, just that it is not generally of this type

In my analysis, I try to mimic this gradual method of acquiring rhythmic understanding. I often start with minimal durational representations of attacks in passages, and gradually flesh them out by adding more layers, pitches, and other information. I do this in order to make it as easy as possible to listen along with my examples - I echo Lucas' exhortation that "this style of analysis relies on rhythmic intuition that is emergent in listening; the importance of close listening for understanding these analyses cannot be overstated."[28]

While all of the analysis and diagrams and most of the transcriptions are my own, my arguments do benefit greatly from the work of others. In a few cases I've used tablature transcriptions published by **ultimate-guitar.com** contributors, and I note when this is the case. More significantly, almost all of my ethnographic data, when not taken from personal experience and speculation, comes from the work of others, especially Smialek's masters' thesis and Lucas' PhD dissertation.

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[28] Lucas, O. "Loudness, Rhythm, and Environment" 83

Chapter One - Polymeter, Hypermeter, Metric Dissonance

This first chapter addresses the rhythmic difficulty of simultaneous overlaid patterns of different lengths. Meshuggah is the band that has done this most visibly and most consistently across their career - they were the first to really dig into this type of rhythmic difficulty, and have become immensely influential, especially in the last decade.[29] I will look at three of Meshuggah's songs that use this technique and that express three different meanings, and types of meaning, that this type of rhythmic difficulty can have. Then I will turn to an example from the band Intronaut that uses a similar technique but with subtle differences and still other meanings.

As I mentioned in my introduction, the field of metal studies, including studies of Meshuggah, has seen exponential growth in the last decade. In 2007, Pieslak's pioneering article on rhythm in Meshuggah's music was something of an anomaly. Since then, there has been much more close technical work on the band's music, including scholarly work done by Smialek, Lucas, and Capuzzo and more popular-oriented but still accurate and perceptive analysis such as that found on the Metal In Theory blog by Stephen Hudson.[30] I will present my analysis as a conversation with these writers where applicable.

My focus is different from that of these works in several ways, though. I look at several examples from Meshuggah's oeuvre that have not yet been examined in scholarly publications. More significantly, I look at the use of rhythm of several bands related to and influenced by Meshuggah, which has not been done very much if at all in scholarly writing - Meshuggah is so

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[29] See the 'djent' sub-genre, the incorporation of techniques that are undeniably theirs in the work of metal bands across many sub-genres, as well as their influence on fusion artists such as Tigran Hamasyan and Dan Weiss.

[30] http://metalintheory.com/author/stephen-hudson/

important to the genre that their music can often rightly stand as an archetypal, fully realized version of many musical phenomena that are present in the work of other bands. However, there is much valuable insight to be gained in looking at how rhythmic techniques can be different and mean different things not only in different Meshuggah songs but also between the works of different bands. Specifically, while I look mostly at Meshuggah's music in this chapter, they play less of a role in the second and third chapters - their rhythmic difficulty almost never branches into the type of tempo play and arbitrary-feeling rhythms that many other bands use extensively.

My music theory in this section makes use of a few key terms from existing music theory, which I will define here, and develops extensions of these that are more specific to rhythmic practice in Meshuggah's music. The two overarching terms I use to describe the structure of Meshuggah's rhythmic style are polymeter (more than one meter at a time) and hypermeter (large groups of smaller metric units). In Meshuggah's case, the hypermeter is almost always 4/4, and I often speak of hypermeasures (in this case, a group of four measures of 4/4, or 16 quarter notes).

I also make special use of Krebs' concepts of metric dissonance to begin to get at some of the difficulty involved in these rhythms. In his and Yeston's terms, rhythm is made up of a pulse stream (the fastest moving stream of pulses) which is grouped into interpretive levels - in many pieces, sixteenth notes (pulse streams) are grouped into interpretive layers such as beat (four pulses), measures of 4/4 (16 pulses), and hypermeasures (64 pulses) by different types of musical events such as duration, dynamics, pattern recognition, harmonic motion, and textural changes. He identifies rhythmic dissonance as arising when interpretive layers of different and non-simply related cardinalities are present in a piece, where cardinality is the length in pulses of an

interpretive layer and non-simple means that one interpretive layer is not a multiple of the other. Thus, in the above example, the quarter note level (4 pulses) is not dissonant with the measure level (16 pulses) or the hypermeasure level (64 pulses), but it would be dissonant with the dotted quarter note level (6 pulses) or the quarter note triplet level (which would require a new choice of pulse stream). This is what he calls type A metrical dissonance.[31]

He also designates type B dissonance as a difference not of cardinality but of alignment - interpretive layers that may have the same cardinality but start staggered from each other are dissonant in this definition, such as for example the interpretive layers of the ride cymbal and of harmonic motion are often staggered from each other in jazz (ride on beats two and four, harmonic motion on one and sometimes three).

Thus Krebs codifies the meaning of dissonance (as sounding apart) for rhythm. His terms are useful in my analysis of Meshuggah's music, because identifying high degrees of rhythmic dissonance is a way of analyzing Meshuggah's rhythmic style. I also follow Krebs' path of exploring the potential parallels between harmonic theory (which is well-established) and rhythmic theory (which is less well-established).

Meshuggah's "I Am Colossus"

I look first at the song "I Am Colossus", the opening track from Meshuggah's 2012 *Koloss* album. I start by building a conception of the first section (:02-:18, repeated :18 -:33). My approach is meant to follow the transcription process that I go through with Meshuggah's music, which typically involves discovering the foreground guitar patterns, adding precision to my understanding of them, and then comparing them to the background drum patterns. While there

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[31] Krebs, H. (1987). Some Extensions of the Concepts of Metrical Consonance and Dissonance. *Journal of Music Theory , 31* (1), 101.

are many ways to listen to this selection, I think that this is a natural way to approach it from an analytical perspective and probably one that represents how many fans listen in order to try to learn the rhythms.

First, I map the guitar riff. These are the low, palm-muted attacks, which follow this pattern:

|: Looooong - long - long - long - long - short -
Long - long - long - long - long - short -
Long - long - long - long - long - short -
Long - long - long - long - long - short -
Long - medium :|

I make these descriptions of length more precise by assigning numerical lengths to them. The numbers below correspond to the length of each attack in eighth notes, giving a more precise version of the above representation. For reference on the tempo, the intro section (:00-:02) moves in eighth notes.

|: 5 - 4 - 4 - 4 - 4 -2 -
4 - 4 - 4 - 4 - 4 - 2 -
4 - 4 - 4 - 4 - 4 - 2 -
4 - 4 - 4 - 4 - 4 - 2 -
4 - 3 :|

In standard music notation, with meter dictated by the groupings above,[32] and harmony simplified and represented two octaves above sounding pitch the guitar part is transcribed in FIG 2.

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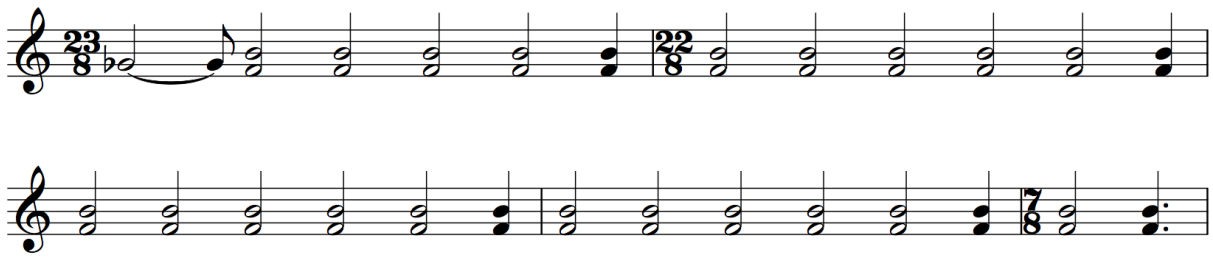
[32] This is another example of a riff seeming to start in the middle, to add to those Lucas identifies from *ObZen.* Besides starting with an insertion that is not part of the riff proper (the first 5/8 measure), the first iteration of the pattern is shorter by one attack (one half note - the measure of 18/8) than the subsequent ones - in other words, it sounds like it starts partway through.

Fig 2: Guitar pattern in opening riff of “I Am Colossus” by Meshuggah, :02-:33



This guitar part is not the whole story. The drums also outline a strong and much simpler pattern, which can be heard by listening to the hi hat and snare (ignoring the other cymbals, toms and bass drum for now)

|: Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat
Hi hat - hi hat - snare - hi hat :|

In terms of eighth notes, these are all the same length, a dotted quarter note, or three eighth notes:

3 - 3 - 3 - 3 -
etc.

This pattern outlines an interpretive layer that I call the background meter; I explain this choice of terminology below. It is 8 measures of dotted quarter notes in 12/8 time, with snare hits on the third beat of each measure.

The rhythmic interest of the song can only be understood when one looks at the two levels together. By notating in 12/8 instead of the 23/8, 22/8, and 7/8 of the guitar part I give priority to the drum pattern. I make it the notated meter for a few reasons: it is simpler, it is easier to feel, there is much evidence that this is how the band feels and thinks about the rhythms, and most importantly because lengths of 4 (or 8 or 16) measures of a quadruple meter overwhelmingly govern form in Meshuggah's music. These hypermeasures or groups of hypermeasures are the building blocks of form - different sections and riffs are introduced almost exclusively after whole hypermeasures: notice how the guitar pattern is truncated (the measure of 7/8) to coincide with the beginning of the next hypermeasure (at :18).

The simultaneous interplay of these two layers is diagrammed in FIG 3, where "foreground" refers to the guitar patterns (top line), "background" refers to the drum pattern (lower line), and the circles in the "background" line represent snare hits. Read left to right, top to bottom. Notice how apparent the lack of alignment (Krebs' dissonance, sounding apart) between the two is.

Next I render this opening section in traditional musical notation. In the drums, the X note head represents a hi hat hit, the pitch that would be C in treble clef represents the snare hit, and other notes represent toms (FIG 4).

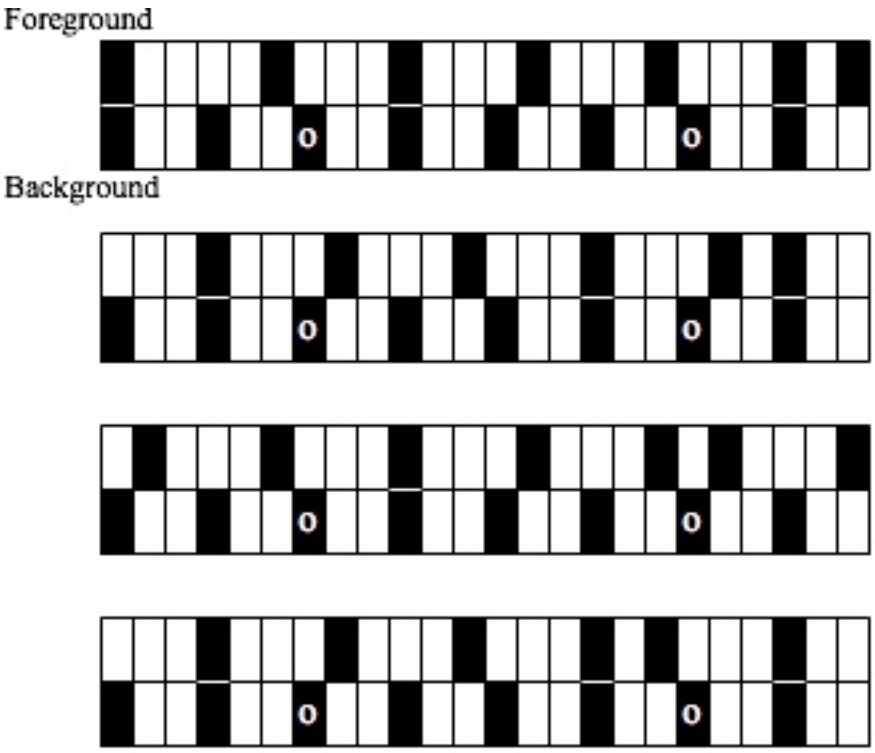
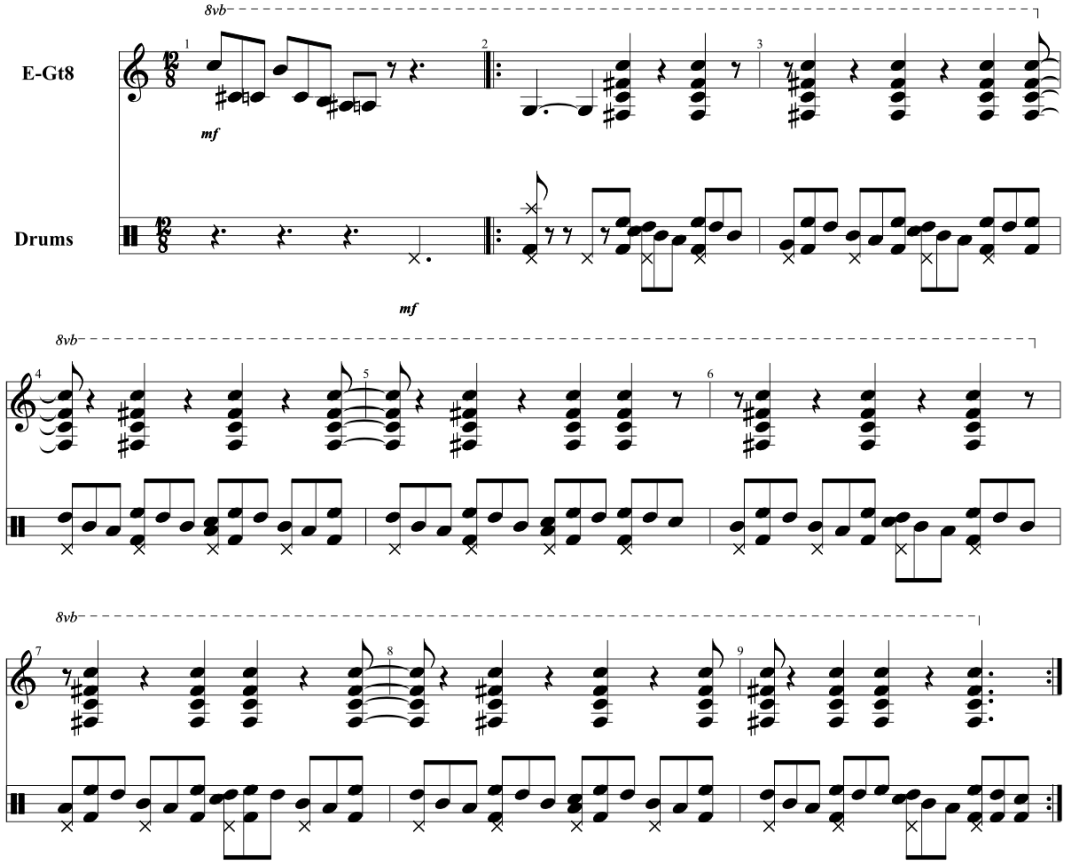


Fig 3 (left): Opening riff of "I Am Colossus" by Meshuggah, interplay of foreground and background riff diagrammed

Fig 4 (below): Standard notation of opening section of "I Am Colossus"



Features of Meshuggah's Core Style

This framework is so typical of Meshuggah's style that it is instantly identifiable and has practically spawned its own sub-genre. The most borrowed aspect is timbre. The distinctive low, palm-muted, heavily syncopated attacks against the steady four count of the drum kit has become ubiquitous in progressive metal of the last decade.

However, the core of Meshuggah's style is actually much more specific than this. One feature to notice is the 4/4 hypermetric organization. There are few passages of Meshuggah's music that cannot be broken up formally in groups of 4, 8, 16, 32, or 64 measures of 4/4. This is at the heart of why the band insists that their music is all about "…how things groove toward a simple straight 4/4 beat… there's nothing intricate about it as far as where the bars go… it's about how it grooves when it doesn't come in the same place when it comes over each time."[33]

While Smialek has pointed out that the band may feel pressure to insist on the 4/4 interpretation in interviews because of fan expectations,[34] I do not doubt that this is also how the band hears their music - in fact they probably have no choice but to hear it like this, in order to stay tight and perform it live. But as someone listening to their recordings and performances from the outside, this isn't the most intuitive way to approach the music. Not only does hearing it in 4/4 (or 12/8) actually require a lot of skill and practice (drummer Tomas Haake reminisced in

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[33] "Meshuggah Metal Riff Lesson" Youtube video https://www.youtube.com/watch?v=rR7qSHp2-lo

[34] Smialek, "Rethinking Metal Aesthetics" 72-77

an interview about rehearsing "10 to 14 hours a day without eating" in the band's early days[35]), it also limits some of the potential enjoyable aspects of the music; namely, the disorientation that comes before a song is well known, because of course the band will never experience their own music from the "outside," unaware of the rhythmic patterns underpinning everything. Lucas also points out that "the tendency to transcribe Meshuggah in 4/4 reveals biases in favor of regularity and symmetry – the large-scale regularity of their music is favored over local polymeter."[36] I will continue to use the background quadruple meter to notate examples, but also continue to point out other possible ways of hearing.[37]

Hearing in 4/4 has a lot to do with dynamic accents, and accents are hard to hear in the band's recordings, because everything is so compressed and distorted, a typical feature of metal recordings - everything is almost equally loud (live, it is easier to hear these accents performed). Hearing in multiple meters is arguably more accessible as a way to begin analyzing, because it involves listening to patterns of attacks and durations, as demonstrated in the process above.

In any case, this ambiguity is a key feature of Meshuggah's music. While there is a huge amount of variety among types of foreground (irregular guitar) meters, the background meter is almost always a quadruple meter - normally simple, sometimes compound. The guitars always

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35 "Interview With Meshuggah: On the New Album We Used Real Amps for the First Time in Many Years." Published on ultimate-guitar.com 26 Aug 2016, accessed 2017. https://www.ultimate-guitar.com/news/interviews/interview_with_meshuggah_on_the_new_album_we_used_real_amps_for_the_first_time_in_many_years.html

36 Lucas, O. "Loudness, Rhythm, and Environment" 79

37 And there is something at stake here, because at least some studies suggest that it is unlikely that it is possible to hear in both ways at once, though with practice it is possible to shift back and forth freely. Poudrier, È., & Repp, B. H. (2013369-390). Can Musicians Track Two Different Beats Simultaneously? *Music Perception: An Interdisciplinary Journal , 30* (4).

articulate the foreground meter, the drums almost always articulate both the foreground and the background meter, and both layers will almost always coincide and regroup after a number of measures divisible by four.

Polymetrical Cadence

This regrouping at the end of a group of 4/4 hypermeasures normally involves a truncation of the foreground pattern - this can be seen above in the example from "I Am Colossus" and I will point it out in later examples. Lucas describes these moments as the ones that "create the lurching sensation familiar to Meshuggah's listeners, as 'middle' [of a repeated riff pattern] unexpectedly collides with a new 'beginning.'"[38] I call this habitual truncation a "polymetrical cadence," because as a cadence resolves harmonic dissonance in tonal music, Meshuggah's polymetrical cadences resolve metric dissonance. Krebs supports this possibility: "a state of coincidence of attacks following one of non-coincidence certainly gives the aural impression of resolution."[39]

Thus the type A metric dissonance (patterns of different cardinalities) of the middle and end of a song segment gives way, through the mechanism of polymetric cadence (truncation), to a moment of metric consonance (however fleeting) as the restarting of the riff pattern coincides with the hypermetric downbeat. Further, Krebs posits that "a conflict between levels is resolved in favor of one of the conflicting levels."[40] In Meshuggah's music, this conflict is always eventually resolved in favor of the background meter. I will argue that polymetrical cadences are

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[38] Lucas, O. "Loudness, Rhythm, and Environment" 98

[39] Krebs, "Extensions of Metrical Dissonance" 114

[40] ibid

essential to the character of Meshuggah's music, and expand on the arguments of Lucas and Capuzzo about the meaning of the fact that the cadences always resolve in favor of the background meter. However, there are a few more general meanings that can be read from this example first.

Meanings - Heaviness of Disorientation

Heaviness is one of the defining characteristics of metal, especially the metal of Meshuggah. While it is hard to develop a good definition of heaviness and doing so would be a substantial ethnographic and musicological project outside of the scope of this paper, it is unmistakable to fans and a highly coveted quality when done right. Unless otherwise stated, the following claims about its definition come from my personal experience as a metal fan. Heaviness has both expressive and sonic qualities, which are mutually reinforcing. Expressively, heavy music will normally be serious and profound, uncompromising and often aggressive. Sonically, heavy music will often focus on lower pitches, normally palm muted power chords low in the guitar's range, and almost always involve screamed or growled vocals. It will often be slow, but not always. It is also often used as a more multi-purpose term to signify great performances and compositions, something like the way the word "swinging" is used in jazz.

Mark Mynett, in his book on production of metal music, also calls heaviness essential to the genre and describes it as "the music's perceived size, weight, and density."[41] While he focuses on how this perception comes about as a result of technical music production (timbral) details, the same principles apply when looking at compositional choices.

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[41] Mynett, Mark. *Metal Music Manual: Producing, Engineering, Mixing, and Mastering Contemporary Heavy Metal*. New York: Routledge. 2017. 9

One example of heaviness in action is the way that the band play some of their songs slower live than they did on their recordings.[42] Lucas notes this practice and offers an explanation for it: "… live performances of the title song "obZen" are slower than the recorded version by about 10 bpm. The role that Meshuggah have allowed music technology to play in their creative process has pushed them toward discovering their limits as human performers, as the sky is the limit in the early phases of songwriting."[43] Her interpretation is that the band needs to slow the song down in order to be able to play it live. While one certainly can't rule this out, I don't think that this is the case. The band has certainly played faster, more demanding songs live at recorded tempo (such as the notoriously difficult and exhausting "Bleed"), as Lucas acknowledges.

I think that what is gained from playing "obZen" and other songs slower live is heaviness. In general, slowness corresponds to Mynett's "perceived size, weight, and density." Heavy physical objects have more inertia and feel slower to move - "obZen" becomes heavier by being slower than expected.[44] "obZen" also focuses on percussive, more spacious attacks, and thus it makes sense to exaggerate its heaviness live. It would not make sense to play "Bleed" slower live, because a main focus of that song is its speed and technical demands.

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[42] As several similar bands have started to do over the last two years, from my experience at concerts and verifiable with live videos. Between the Buried and Me, Animals as Leaders, and Gojira have all played slightly slower versions of some of their songs live.

[43] Lucas, O. "Loudness, Rhythm, and Environment" 116

[44] And just recording "obZen" slower would not have had this effect - it is the disjunct between the performance tempo and the expected tempo, the one fans are used to listening to from the album, that draws attention to the slowness of the live version and makes the live version feel even heavier.

"I Am Colossus" undoubtedly claims a similar heavy aesthetic, especially in the first section. The guitar riff uses a single chord, a tritone played so low (on a downtuned 8 string guitar) that it sounds very muddy. Tomas Haake, the drummer, uses the bass drum and the toms on almost every eighth note, which are also pitched very low. The downtuned 5-string bass guitar is hardly audible in all of this overloaded bass frequency, but it is there as well, further emphasizing the low frequencies.

The song is also particularly disorienting. While Meshuggah's core rhythmic style is always rhythmically difficult, there are certain details about the opening riff of "I Am Colossus" that make it especially challenging. There is the lack of pitch content - because the riff has essentially no harmonic motion except from the first attack to the second, it is harder to distinguish between different parts, and harder still to identify the patterns because they are not reinforced by corresponding pitch patterns. There are also the offset and the irregular, shortened first iteration of the foreground pattern, which both also make it more difficult to understand the foreground pattern. And finally, there is the hemiola effect: the riff is essentially built on an extended, offset hemiola between the two layers of meter, where the guitars are accenting groups of 4 and 2 eighth notes (treating 12/8 like 3/2, triple simple instead of quadruple compound) and the drums are accenting groups of 3 (12/8, quadruple compound). There is thus an ambiguity about what the basic beat is in this section - is it the dotted quarter note or the quarter note? I save an in-depth discussion of tempo ambiguity of this kind for the examples in the second chapter. For this example, suffice it to say that the implied hemiola makes things even more rhythmically difficult and thus disorienting.

I argue that the rhythmic difficulty is part of this push toward a heavy aesthetic - that strong but disorienting grooves have come to reinforce, and to an extent mean, heaviness. Meshuggah's music requires quite a bit of time and energy to understand the grooves. In other words, it stays disorienting for much longer than less complex metal does, because of the irregularity and complexity of the patterns; I argue that because of this it is also unusually heavy.

The claim that disorientation is a push towards heaviness might be a hard one to support. It starts with personal experience - I certainly hear and feel music with a disorienting groove and the other sonic qualities described above to be very heavy (compared to the work of some other bands with comparable timbres and tempi but more straightforward rhythms, which sound relatively light, or inconsequential, or smaller). I suspect that this is a major attraction for many fans of Meshuggah and similar bands. One reviewer of the band Car Bomb, who are similar in many ways to Meshuggah and who I discuss at the end of the second chapter, concludes his review by stating that they "come across so much heavier than anyone else,"[45] and I would claim that this has to do with their especially disorienting rhythmic technique.

I have two hypotheses to explain the link between disorientation and heaviness. First, I think that because disorientation normally means rhythmic complexity, and because there is a link between perceived 'seriousness' (in the sense of skilled musicians) and complexity, there is therefore a link between complexity and heaviness by way of seriousness.

Second, there is also a link between heaviness and the musical representation of power, and I believe that power is enacted by a band's rhythmic tightness, especially through difficult grooves. As a listener on the "outside" of a rhythmic groove, i.e. a groove that the listener has not

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[45] Manning, Todd. "Car Bomb: Meta Review." Published on nocleansinging.com on 19 Sep 2016. http://www.nocleansinging.com/2016/09/19/car-bomb-meta/

learned and which is therefore still disorienting, the band seems all the more skilled. A band that can create a groove from something completely disorienting, and can make that groove be felt viscerally while the details are out of reach, sets up a situation of unequal power. The listener is compelled by the groove, made to feel its presence, but is not able to understand, much less recreate its shape. The band is therefore powerful in the eyes of the listener for mastering complex rhythms and making them forcefully felt, for conjuring power out of the apparent chaos of the surface level rhythms. This is one of the reasons that, as Lucas notes, Meshuggah have attained an almost mythological status in the extreme metal community,[46] and is also another avenue toward heaviness through disorientation, this time by way of power. Disorientation represents power, and power is heaviness.

This is one example of a meaning that exists relatively low on the meaning pyramid of this paper; in other words, it applies to most of the examples I present, because all of them are rhythmically disorienting in some way and most of them can safely be said to claim a heavy aesthetic.

"Dancers to a Discordant System"

Meshuggah's paradigm of regular quadruple meter hypermeter is the norm, but there are exceptions. One example of an exception highlights another deep meaning of Meshuggah's rhythmic style. The opening riff to "Dancers to a Discordant System" is built up layer by layer. First, there is only the simple descending guitar melody, which lasts for two measures of quadruple meter (quadruple compound meter, as it turns out), which is repeated four times. This guitar part plays the role of reinforcing background meter on an intermediate level - in this case,

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[46] Lucas, O. "Loudness, Rhythm, and Environment" 67

the pattern repeats every two measures. Then, the second guitar enters with the song's angular, extremely tricky first main riff. The difficulty here is compounded (pun intended) by the 12/8 feel, which was not hinted at in the first guitar part. Similar to "I Am Colossus," it is difficult not only to figure out the pattern, but even to feel the pulse through this section, because of the lack of clues to the compound subdivision of the beat beforehand.

The main riff pattern lasts for five measures of 12/8, and is repeated three times completely followed by one measure of the fourth repetition (truncation, polymetrical cadence). This fills out the normal 16 measure formal block for Meshuggah's music (3 x 5 + 1 = 16). However, the salient feature in this song is the single empty measure that follows before the next section - a repetition of the same guitar foreground riff but with the full band and heavier guitar timbres and no background guitar pattern - emphatically enters, clarifying the pulse and the 12/8 feel. A transcription of this first section (after the solo guitar intro, :15-:48) is in FIG 5,[47] where the red vertical lines show the ends of the 5-measure patterns and the horizontal blue line underlines the empty 17th measure tacked on at the end of the much more common 16-measure hypermeasure.

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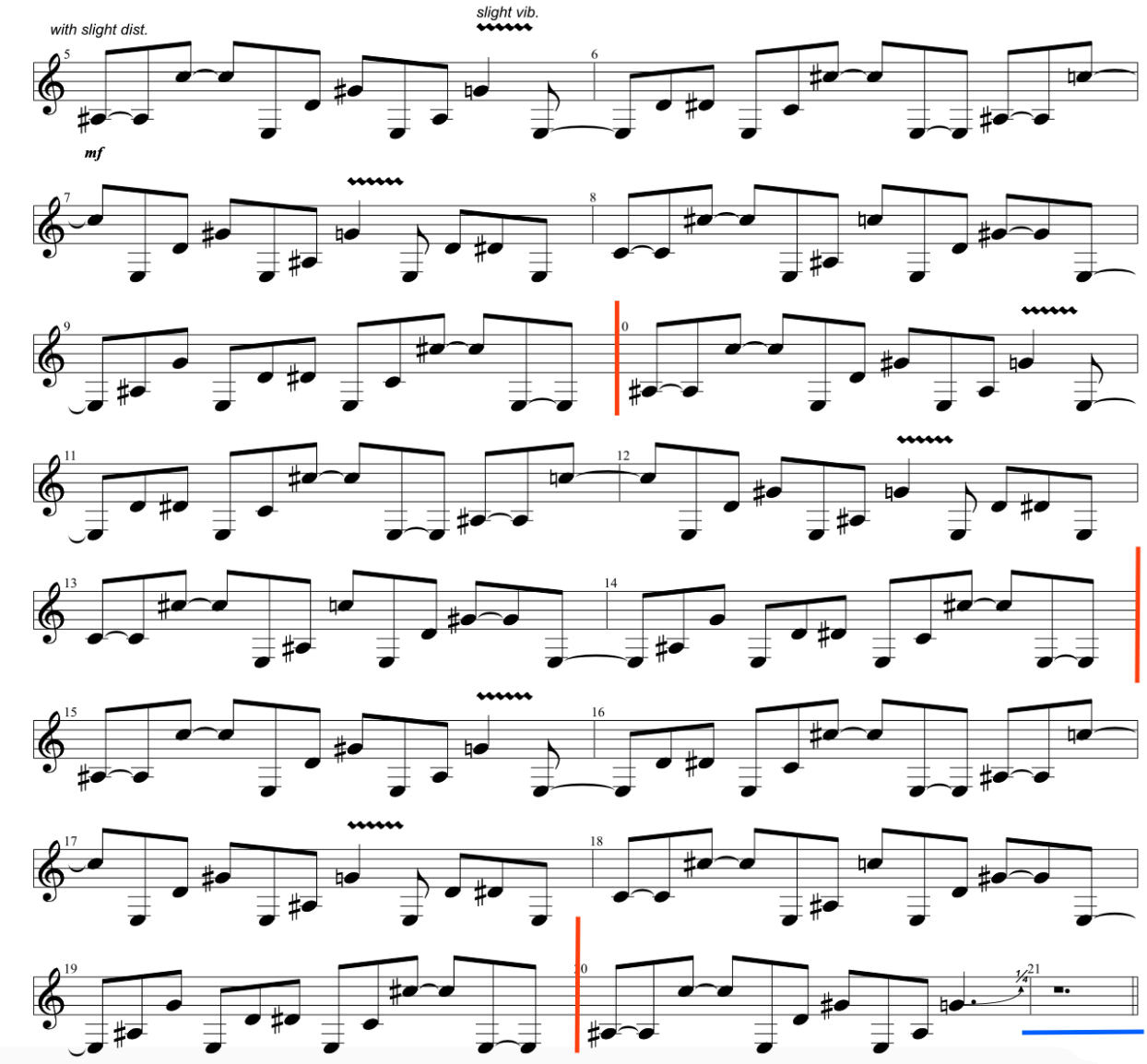
[47] Adapted from the Guitar Pro tab posted by ultimate-guitar.com user krangksh, published on October 30th 2008, accessed 2017. https://tabs.ultimate-guitar.com/m/meshuggah/dancers_to_a_discordant_system_guitar_pro.htm

Fig 5: “Dancers to a Discordant System” by Meshuggah, :15-:48 guitar



Meanings - Metric Dissonance and Polymetrical Cadence, Tension and Release

Why the extra measure? What is its meaning and purpose? I believe that the answers to these questions give deep insight into another facet of Meshuggah’s rhythmic style. While the empty measure might not be remarkable or even noticeable to a listener not acquainted with Meshuggah’s core rhythmic style, it stands out for someone who is. Love makes this point in his article on the perception of hypermeter in 18th century dance music forms. Though Meshuggah’s

music could not be more different from 18th century dance music in many superficial ways, both styles entail a strongly established set of hypermetric expectations, and Love's observation that "General pauses usually have the effect of deferral. The hypermeter may restart immediately after the pause…"[48] applies equally well to "Dancers to a Discordant System."

Love presents an example in which a "general pause suspends the hypermeter and builds tension, such that the restart… elicits relief."[49] I argue that this is also part of the best answer to the above questions about the purpose of the extra measure at the beginning of "Dancers." The extra measure serves as a silent count-in, simultaneously surprising (by thwarting the expectation of the immediate start of a new song segment), building suspense, and then ultimately providing resolution as a new hypermetric song section starts emphatically after the pause, at :48. The silence also helps to clarify the quadruple compound beat, because this silence becomes metered retrospectively.

It is still no easy feat for me to feel the quadruple compound beat through the opening version of the riff transcribed above. It is much easier in the next section, when the drums enter with their habitual crash-crash-snare-crash quadruple meter pattern. The measure of silence acts as a bridge between these song sections - the listener begins to hear the metered four-count in this silence, and it builds tension by prefacing the explosive entrance of the full band texture at :48.

There are some key takeaways in this. For one, it shows a common way in which Meshuggah's core style, built on quadruple meter hypermetric song segments, has its exceptions.

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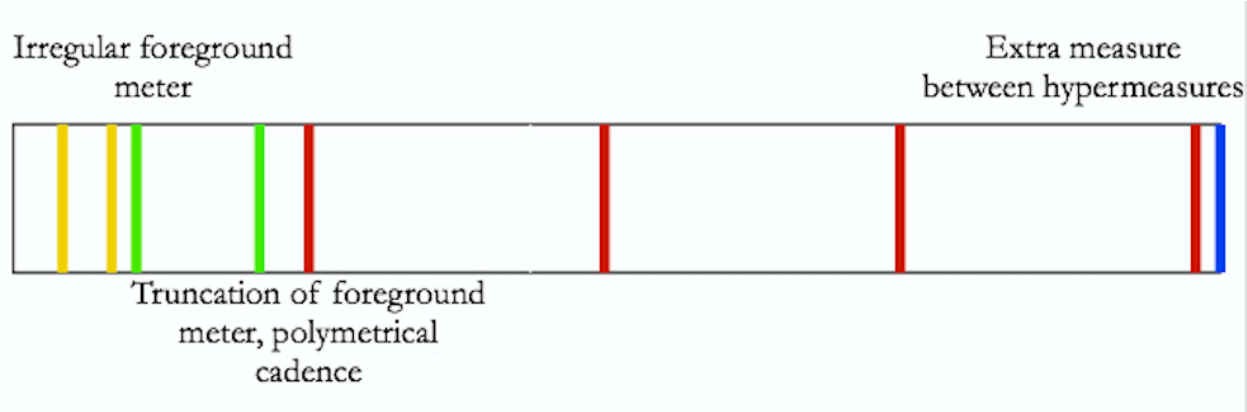
[48] Love, "Historical Hypermetric Hearing"

[49] ibid

One way to look at this is that it is yet another way of creating rhythmic dissonance, on a larger level than those examined already - breaks between hypermetric sections create a fractal, zoomed out version of the rhythmic lurching feeling from abruptly thwarted expectations that marks Meshuggah's music at all levels (FIG 6). In the illustration, yellow lines represent the durations of the individual components of the foreground meter, green lines represent full repetitions of these patterns, and red represents hypermetric groupings. All levels set up an expectation and then frustrate it, leading to rhythmic difficulty.

Fig 6: Fractal-like frustration of expectations in Meshuggah's music



However, Meshuggah's music relies not only on this nested metrical and hypermetrical dissonance, but also on resolution of this dissonance. Moments of misalignment lead to moments of strong alignment. The paths that are used to get to realignment are various. In most cases, the polymetrical cadence serves as a subtle count-in to the realignment of the foreground and background, for experienced ears. However, in "Dancers" the motion toward realignment is made even more obvious with the empty "count-in" measures (a feature that returns in later sections of the song). One way of looking at the silent count-in measure is that it telegraphs and

builds anticipation for the drop, the full band entrance at :48, which plays to a very physical reaction to Meshuggah's music.

This can be confirmed from firsthand or video experience at any show where Meshuggah plays "Dancers." During the clean section and especially during the silent count-in measure, the crowd becomes tangibly restless, shifting, shouting, or standing very still, before erupting into an energetic mosh pit as the downbeat at :48 hits. While moshing[50] is certainly not unique to Meshuggah's concerts, I read the silent count-in measure as a compositional means of amplifying the mosh potential of this and other moments in "Dancers." The moments of realignment, especially when emphasized in this way, thus form a significant cite of pleasure for Meshuggah's fans.

Meaning - Dancing to a Discordant System

While moments of metrical realignment are a source of pleasure for fans of the music, they can also have more specific metaphorical meanings. In this song, the title and lyrics are brought to life by the rhythms. If we equate discordance with dissonance, there are certainly discordant rhythmic systems. As diagrammed above, there is metrical dissonance within the individual lines, in the alignment of the lines with the hypermeter, and in the extra measures added in at the end of hypermeasures. However, these metrical dissonances are also physically moving - the riffs roll inexorably on, the quadruple compound beat is clearly stated after the intro section, and the dissonant layers build an infectious groove that is further emphasized by the count-in measures. While the lyrics describe a real world dystopia where regular people are nothing but puppets made to dance by the powerful and corrupt, listeners metaphorically act this

[50] A form of dancing to metal music that involves much physical contact between participants, who shove and bump into each other in addition to headbanging and jumping

out by dancing (headbanging, moshing) to a (harmonically and rhythmically) discordant (stylistic and metric) system.

Lucas and Capuzzo have also discussed the metaphoric meaning of Meshuggah's core style. While my above discussion is about a selection that does not strictly fit Meshuggah's core rhythmic style template, their observations are pertinent. For Lucas, the irregular foreground meter (in this example, the five measure guitar pattern that makes up the song's first riff) "struggles to deform the structure, and the structure normalizes the riff, forming boundaries for its excursions and bringing to mind the normative social forces applied to human bodies in everyday life."[51] Capuzzo gives a similar metaphorical interpretation, calling the riff patterns "deviant" because they are in unusual time signatures, and charting the ways that they work against the "standard" quadruple meter background level. While he notes ways in which the deviant foreground riffs sometimes exceed the boundaries of the standard background level, such as in the song "Do Not Look Down," he concludes that even in these cases the deviant riff is always made to conform to the standard riff eventually over the course of a song.[52]

I synthesize these arguments, Tagg's interpretation of the meaning of metal, lyrics from "Dancers," and my own analysis to extend these ideas. Lucas, Capuzzo, and I agree that Meshuggah's core style can be read as the struggle of the irregular foreground meter against the ultimately successful background meter. This seems to enact lyrics from "Dancers:" "Any attempt to leave the dance / invisibly suppressed." Any attempt by the foreground meter to transcend the background meter, at least in "Dancers," is immediately and subtly cut off. The

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[51] Lucas, O. "Loudness, Rhythm, and Environment" 119

[52] Capuzzo, G. "Rhythmic Deviance in the Music of Meshuggah."

lyrics also hint at the ways in which this stylistic feature reflects political and social realities: "Bloodied hands lead the waltz / we're trapped in the out of tune swirl" and "Unsuspecting, willing, blind, controllable herd / Pawns in a covert game conducted by hands we trust." Lucas, in the quote above, also notes similarities to "normative social forces applied to human bodies in everyday life."[53] While these forces are not precisely identified (capitalism? neo-liberalism? Swedish socialism?) in Meshuggah's lyrics and only slightly more concretely in interviews,[54] the general gist of their nature is clear enough.

There is an ambiguity, or an irony that seems to arise in this interpretation, though. What does it mean that fans of Meshuggah's music dance along to discordant (musical) systems in a way parallel to the way that of the "controllable herd?" I think it can safely be said that it is not because the fans take comfort in being part of a herd. Instead, I read this as a situation in line with the meaning that Tagg reads from metal in general. Meshuggah appropriates a version these overbearing, discordant systems and makes it their own - they use a musical metaphor for the very systems they decry as a means of resistance, which fans can in turn make their own.

Philipov claims that fans can experience some of death metal's gruesome, misogynist lyrics in the same way that people can watch horror movies, using them as an arena for thinking about things that are otherwise somewhat taboo.[55] With this reasoning, fans of Meshuggah might use the music to experience and think about controlling systems, and in a sense act them out.

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[53] Lucas, O. "Loudness, Rhythm, and Environment" 119

[54] Carlsson, Olle. "Interview: Meshuggah's Tomas Haake On Dark Meanings Behind The Songs On 'The Violent Sleep Of Reason.'" *Revolver Magazine*. 6 October 2016, accessed 2017. http://www.revolvermag.com/artist-artist-interview/interview-meshuggahs-tomas-haake-dark-meanings-behind-songs-violent-sleep

[55] Philipov, *Death Metal and Music Criticism* 127

In summary, “Dancers” contains empty measures that break from the band’s habitual use of hypermeter and that amplify the song’s physical dimension, its potential for moshing. In this song, the potential for Meshuggah’s core rhythmic style to represent oppressive systems is echoed in the title and lyrics, which meaning is in turn reinforced in the ways that the band breaks from their core style. This particular meaning, that the band appropriates a metaphorical version of the subtly controlling systems that they see in the world, can to an extent be present anywhere that the band’s core style is present (a relatively low level on the pyramid of meaning). However, the extent to which it matters in any given song will depend on other factors. It matters very much in “Dancers” because of the title, lyrics, and the effect of the measures that exist between hypermeasures.

“Clockworks”

The first track from Meshuggah’s most recent album, 2016’s *The Violent Sleep of Reason*, is a prime example of one more type of meaning in Meshuggah’s rhythmic style. In the first minute of the recording, the band repeats the same foreground guitar pattern with changes in texture and breaks that correspond to the edges of four quadruple hypermeasures - here, groups of 16 measures of 4/4, or 64 quarter notes.

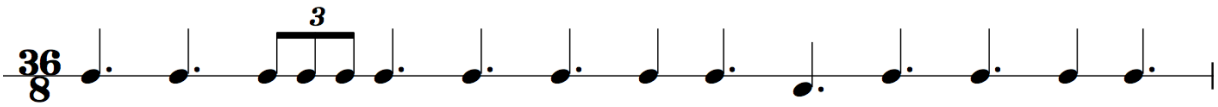
As with “I Am Colossus,” I start to build a conception of the riff with words. The guitar pattern durations in a given group of four hypermeasures can be represented descriptively as:

|: Long - long - burst - long - long - long - short - long - chord - long - long - short - long
Long - long - burst - long - long - long - short - long - chord - long - long - short - long
Long - long - burst - long - long - long - short - long - chord - long - long - short - long
Long - long - burst - long - long - long - long (break) :|

This sequence is repeated exactly four times, and lasts 15 seconds.[56] That is, this pattern starts at :00, and starts again at :15, :30, and :45.

In standard music notation, taking the tempo from the four beat count in on the high hat at the very beginning of the song (quarter note around 260bpm), this pattern becomes FIG 7, below:

Fig 7: Main guitar pattern in "Clockworks" by Meshuggah, :00-1:00 and elsewhere



Again, this is repeated three times completely and truncated on the fourth repeat.

As described in the discussion of "I Am Colossus" above, this is an example of Meshuggah's core rhythmic style. The choice of three and a fraction repetitions of this pattern is not random, but fits exactly the length of 4 hypermeasures with quarter note as indicated in the count-in at the start of the recording. In other words, the repeats last for exactly 128 eighth notes = 36 x 3 + 20 = 64 quarter notes = 16 measures of 4/4. The truncated and slightly altered fourth repetition of the guitar riff pattern each cycle is the polymetrical cadence, realigning the foreground pattern with the background hypermeter.

Again, this is standard for Meshuggah - an unusual foreground meter for the guitars that follows a large scale 4/4 background meter. What is unusual and extraordinary about this section is that there is no intermediate level of rhythm between the fast foreground guitar layer, which moves at the level of quarter notes at 260bpm (pulses are less than a quarter of a second long) and the slower groups of four hypermeasures, which last about 15 seconds.

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[56] Maybe a sort of meta word painting on the title?

As with many of Meshuggah's riffs, there is also something that makes it even more difficult in some way. Here, it is the difficulty in reconciling the dotted quarter notes with the eighth note triplets. These two rates of attacks live in different worlds: eighth note triplets don't fit evenly into dotted quarter notes, and while eighth notes provide a common ground between the two rates, these become almost prohibitively fast to hear in real time, especially in the opening minute when there is no audible rhythmic glue between the foreground and background layers. I return to the irreconcilability of two rhythmic layers in the second chapter.

Normally, there would be a cymbal pounding out quarter notes, or a snare drum hit every measure, or a sustained guitar note changing pitches every measure or two measures as there was in the opening section of "Dancers," but here there's nothing of the sort; just a very fast, busy barrage outlining the pattern with breaks in the action being the only clue to the background, 4/4 hypermetric organization. Most of the rest of the song returns to their more habitual texture, with the drums and other textural elements outlining layers of rhythmic motion on an intermediate scale.[57] However, the use of this texture at the opening of the new album is a strong statement and carries meaning for the specifics of the song and in the larger context of the band's music.

Meanings - Systems

The more general meaning of this section is the way that it highlights how standardized Meshuggah's core style is by abstracting from it. The absence of the intermediate layers makes the existence of the core structure more abstract, and therefore even stronger. As skilled jazz rhythm sections will often only obliquely make reference to the form and even the pulse, but never deviate from it because it is such a strong binding force in the music, in this song

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[57] Pieslak notes this habitual feature in "Re-casting Metal" 235

Meshuggah feel safe to depart from more literal statements of the 4/4 background meter because it is so firmly in place that it doesn't need to be spelled out.

I argue that as largely standardized patterns in the use of harmony govern Western Classical music, Meshuggah's largely standardized use of rhythm gives meaning to their oeuvre and the work of many related bands. It is an abstract meaning, to be sure, almost a meta-meaning. A harmonic analysis of a tonal classical piece only inherently has an abstract meaning, and has this meaning only in relation to other pieces and to archetypal "rules" of harmonic use.

However, harmonic theory provides an extremely useful framework for talking about the sounds of music (which are of course notoriously hard to talk about) by dealing with specific musical details of a given piece, by comparing the piece to other pieces and to archetypes, and by providing a path to other, more articulable (narrative, social, etc) meanings. While Meshuggah's music and the music of related bands that use many of the specifics of their core style is of course a minuscule sample compared to the amount of tonal music that relies on the same harmonic patterns, I argue that it is a revolutionary step in that direction - a move toward creating a musical system that can bestow the same types of meaning as the Western tonal harmonic system. It certainly provides support for Lucas' prediction that "it will only be a matter of time until there is a recognizable, if small, school of 'Meshuggah analysis,' like those devoted to other composers."[58] This depends in part on Meshuggah's creation over the years of a "musical discourse as [a] coherent system of signification."[59]

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[58] Lucas, O. "Loudness, Rhythm, and Environment" 120

[59] Walser *Running With The Devil* 33

As I have shown, Meshuggah's system allows the adoption of specific and accurate language (foreground and background meter, metric dissonance and polymetrical cadence, for example), which provides a powerful starting point in any analysis of the band's music and facilitates the tricky transition from recorded musical fact to words that can be manipulated and contemplated. It also gives a point of departure from which to examine the peculiarities and meanings of a specific piece. In the beginning of "Clockworks," the absence of the intermediate layers is the most salient feature in this respect. Recognizing this would be impossible without having internalized the details of the band's core style over the course of the rest of their career. With this knowledge, we can tease apart meanings that are common to almost all of the band's work, such as the heaviness of disorientation, and meanings that are more specific to a given album or song, as I do below.

Meaning for "Clockworks"

"Clockworks" is undoubtedly disorientating and heavy, and it has the same tensions and releases of tension as the band's core style will always have. However, the absence of the intermediate layers is an unusual factor and therefore the one that can lead to an understanding of meaning that is more specific to this particular song.

The first lyrics are "dismantling the clockwork that makes me the cynic," which hints at possibilities for rich interpretations in light of an analysis of the music. It is easy to hear the opening riff as the gears of a clock that keep slipping. "Dismantling the clockwork" could also be represented almost literally by removing the pulse-keeping, clock-like cymbal in the first section of the song. If the persistent quarter note pulse represents the "clockwork" to be dismantled, then the gradual shift away from this (and toward the dotted quarter note) in many sections of the

song could represent varying degrees of success. In the chorus section (2:30-2:59 and 6:11-6:41), as in the last new riff of the song (4:13-6:11), short dotted quarter note ostinatos are alternated with quarter note (straight sixteenth notes), which represents the persistent struggle between the old clockwork and the break from it. In the solo section following the first chorus, on the other hand, the dotted quarter note seems to take over - the guitar riff from 2:59-3:29 is simply low, palm muted dotted quarter notes, though they are still ultimately contained within the habitual background 4/4 hypermeter.[60]

Haake has mentioned in interviews that the song is about reconfiguring one's own thinking patterns to remove cynical, negative thinking.[61] I think that it would be a misuse (overuse) of analysis to try to read a narrative into the song's structure, to say that the lyrical protagonist struggles and momentarily breaks free and then is ultimately trapped in old ways of thinking. There is no need to account for every detail of the song's structure, as Cone would argue;[62] several writers have argued for a non-narrative, fragmented understanding of form in extreme metal.[63] However, the above analysis does at least show how meanings present in the lyrics are deeply embedded in the rhythmic structures of the song.

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[60] This use of the dotted quarter note as a sort of alternate tempo is fundamental to many of Meshuggah's riffs - see especially "Bleed" and "In Death - Is Death." I explore implications of this practice on perception of tempo in my second chapter.

[61] Prato, Greg. "Thomas Haake of Meshuggah." Published on songfacts.com on 23 Aug 2016, accessed 2017. http://www.songfacts.com/blog/interviews/tomas_haake_of_meshuggah/

[62] Cone, Edward. "Schubert's Promissory Note" 240

[63] Kahn-Harris, *Extreme Metal* 33

“Fast Worms”

While there are many, many bands[64] that have adopted Meshuggah’s core polymetric style or elements of it, the only example I will look at in depth is one that expresses a very different affect than Meshuggah’s music does, and I choose it because of this difference in meaning. The example is the polymetric breakdown in the middle of “Fast Worms” by Intronaut, from their 2015 album *The Direction of Last Things*. Intronaut is not an extreme metal band, so their use of clean guitar tones in this section (versus Meshuggah’s habitual use of heavily distorted tones) can be understood partly generically. However, their specific alterations to Meshuggah’s core style compliment and amplify many other meanings present in the song and in the band’s overall image.

The section, from 2:56 to 3:56, starts with two layers of different pattern and cardinality, one played by each guitar (and conveniently panned hard left and right). The guitar in the right channel loops a pattern of 3 + 2 + 3 eighth notes, which adds up to fast measures of 4/4, with quarter note around 180bpm. The other guitar, in the left channel, loops a pattern of 2 + 3 + 2 + 2 + 2 + 3 eighth notes, which adds up to two measures of 7/8. The two patterns are played until they line up again, after 7 measures of 4/4. A cymbal hit marks this moment, the first time they coincide again after the start of the section. The second time they coincide, the texture changes, and the drums and bass enter, with tricky grooves that do not conform exactly to either pattern but reinforce both and fit within the larger structure, giving strong downbeats on the moments when the two patterns realign. The guitar parts are notated in FIG 8.

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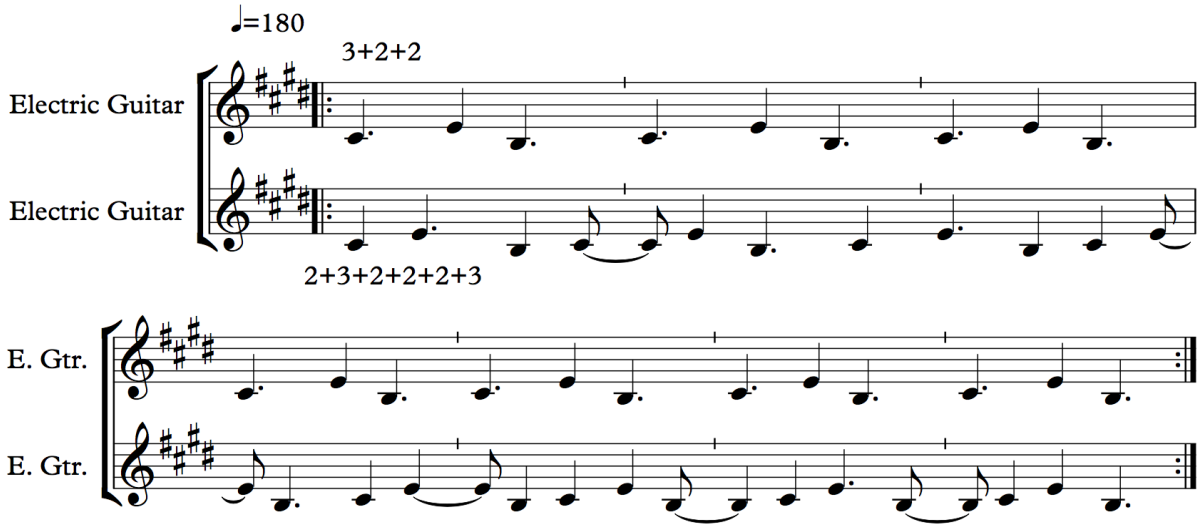
[64] See Periphery, Textures, Vildhjarta, Uneven Structure, in addition to all of the bands discussed in this paper

Fig 8: Polymetric breakdown of "Fast Worms" by Intronaut, 2:56-3:56, guitars



Rhythmic and textural differences

While there are many similarities between this passage (which is in many respects representative of much of Intronaut's music) and Meshuggah's core style, there are a few key differences. Most apparent is the textural character of this section as compared to that of most of Meshuggah's music. This section of Intronaut's song uses clean guitar tones, dynamic accents, delay and reverb, and has a sparse texture. When the drums and bass enter, it is a busier texture but still an organic-feeling one. Meshuggah's music is heavy, dynamically compressed, and often has a (very intentional) machine-like sound.

More specifically and rhythmically, there is no polymetric cadence. Instead of truncating an iteration of the foreground meter's pattern in order to align it with a background 4/4 hypermeter, the pattern is allowed to realign naturally at the lowest common multiple of the cardinalities of the two meters, in this case after seven measures of 4/4, which is equal to four measures of 7/4. There is still metric 'resolution' in that the two layers realign, and in that this

moment is marked each time by a textural accent, a marked shift in instrumentation (entrance of drums and bass).[65] However, it is less of a focal point because there are no changes to either pattern at any point.

There is also no hierarchy of layers. The two meters are both articulated on guitar, split equally across the stereo field, and because of the lack of polymetric cadence, neither is altered in a way that might hint at the importance of the other. This is also a big difference from Meshuggah's core style, in which the foreground and background meters have clear and very different roles and are articulated in different instruments.

These differences are summarized below (FIG 9):

Fig 9: Differences and similarities between Intronaut's "Fast Worms" and Meshuggah's "Clockworks"

"Fast Worms" Only (Intronaut)	**Both**	**"Clockworks" Only (Meshuggah)**
Clean guitar	Metal band instrumentation	Distorted guitar
Sparse texture	Textural changes (accents) mark formal divisions	Dense, heavy texture
Dynamic accents		Compressed dynamics
Organic feel	Rhythmically exact, very precise	Machine-like feel
No polymetric cadence, patterns allowed to continue	Realignment happens eventually	Polymetric cadence through truncation of foreground meter
No 4/4 hypermeter	Short and long term rhythmic stratification	Rigid 4/4 hypermeter
Metric layers same textural and functional footing	Multiple meters of different patterns and cardinalities	Clear foreground vs background meter

[65] Pieslak "Re-casting Metal" 225

Meaning in "Fast Worms"

From all of these differences from Meshuggah's style we can understand a very different meaning in Intronaut's music, one that is central to the difference in the affects of the two bands. Meshuggah's music is heavy and above all *serious* sounding. In light of all of the above, I read this passage of Intronaut's to be lighthearted and playful; the texture is lighter, and there are no jagged edges in the repetition of the patterns, no "forced" realignments. This is both a result of the textural differences and the rhythmic details.

Textural differences such as clean guitars instead of distorted guitars immediately point toward a less heavy aesthetic in this passage. Examining the rhythmic details is less obvious and more interesting, though. Instead of starting a process (overlaid patterns), setting one above the other, and truncating one of the patterns to fit a certain amount of repetitions of the other, in the passage from "Fast Worms" the band allows both patterns, which are given equal weight, to continually repeat and realign when they naturally do, giving priority to neither. I read this as a lower degree of compositional control, and by extension a more "go with the flow" attitude that is in line with other things Intronaut has made part of their public image. It certainly aligns with what guitarist Daniel Tinnick said about the section in an interview: that it came about as a sort of game, where "[we] had a call and response guitar part where we were playing the same notes but in different time signatures. And Danny [Walker] came in with the drums and Joe [Lester, bassist] found a way to halfway follow what I was playing and halfway follow what Sacha

[Dunable, other guitarist] was playing. It doesn't sound too chaotic because we were playing the same notes."[66]

The passage explores the way that highly skilled musicians can have fun with rhythm, and make it clear that they're having fun. This relaxed and playful attitude to composition and performance is the affect (meaning) that I read from this passage, especially when compared to Meshuggah's music, which any listener even vaguely familiar with the genre will do because of Meshuggah's enormous influence. The lighthearted, conversational, organic riff shares many of the rhythmic hallmarks of Meshuggah's music (polymeter), but because of a few differences, the overall meaning is not at all the same. This demonstrates one of the main claims of this thesis - even bands that share much of their rhythmic vocabulary and come from the same lineage express different, highly individual meanings using these techniques. Polymeter is just one of these specific techniques - in the next chapter I will examine another.

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[66] Rowe, Riley. "Interview: Intronaut Guitarist Talks Post-Metal, Upcoming Album." published on metalinsider.net on 19 Oct 2015. Accessed 2017. http://www.metalinsider.net/interviews/interview-intronaut-guitarist-talks-post-metal-upcoming-album

Chapter Two - Tempo Change, Tempo Ambiguity, Metric Modulation

Meshuggah's rhythmic style, based on polymeters, is well-established in their own music and aspects of it have become ubiquitous in technical and progressive metal. However, there are other ways that bands create rhythmic complexity. In Meshuggah's music, there are many variations in the details of the polymetric style, but one thing never changes: tempo. Nowhere in their oeuvre do they change the rate at which the pulses move within a single song.[67] They of course group the pulses in many different ways, and I will discuss an example in which they play with ambiguity of tempo, but for Meshuggah, once a song's pulse and beat rate are established, they continue until the song ends with no changes. This is an important observation, because it is not necessarily like this for other bands. This section is about bands who use various types of tempo change, another form of rhythmic complexity, to create and reinforce meanings.

My use of the word tempo is straightforward - I use it to mean the rate at which beats move. Because beats are regular accents every certain number of pulses, the tempo is thus also a function of pulse rate. These can both be expressed as a numerical rate in beats per minute (bpm).[68] I will also use "pulse per minute" (ppm) where applicable to avoid confusion. Following Yeston, the pulse rate is the fastest rhythmic level in a metered piece, the slowest

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[67] This is a big claim, and the big exception is their EP *I*, which is technically a single song - though its extended form and other outlier qualities do not contradict the substance of my claim. Some songs from the new album were recorded live without a click track, such as "Ivory Tower," and these speed up slightly from beginning to end - again, this does not for any perceptive purposes constitute a tempo change.

[68] Though getting these numbers is not as easy as it might seem. I do it manually using the tap tempo function on a metronome, which has some random error but gets close enough for my purposes. Using a spectograph to calculate tempo, or better yet having access to the tempo at which the click track was set in the studio, would be more precise.

isochronous series of pulses that accounts for all other rhythmic events.[69] FIG 10 illustrates this for a hypothetical example in 4/4 with a sixteenth note pulse:

Fig 10: Beat, meter, and hypermeter as interpretive levels of pulse

In the first chapter I discussed rhythmic difficulty at the level of meter and hypermeter, specifically the use of multiple meters at once and their relation to larger hypermetric organization. In this chapter, I discuss rhythmic difficulty at the level of changing beat and pulse rates, though subtle and gradual fluctuations in pulse rate, such as those that inevitably happen in live performance without a click track, do not figure into my discussion. This is because they are often almost imperceptible while they are happening and thus not a source of rhythmic difficulty, and in any case are uncommon in progressive metal.

There are many ways that tempo change can happen. Tempo (beat rate) can change without the pulse rate changing, or with pulse rate changing. In tempo changes without the pulse rate changing, I do not consider the simple case of double or half time, when the tempo and sometimes pulse are doubled or halved, because this does not often feel particularly rhythmically difficult. To understand this, consider FIG 10. When the pulse rate is doubled, another line is

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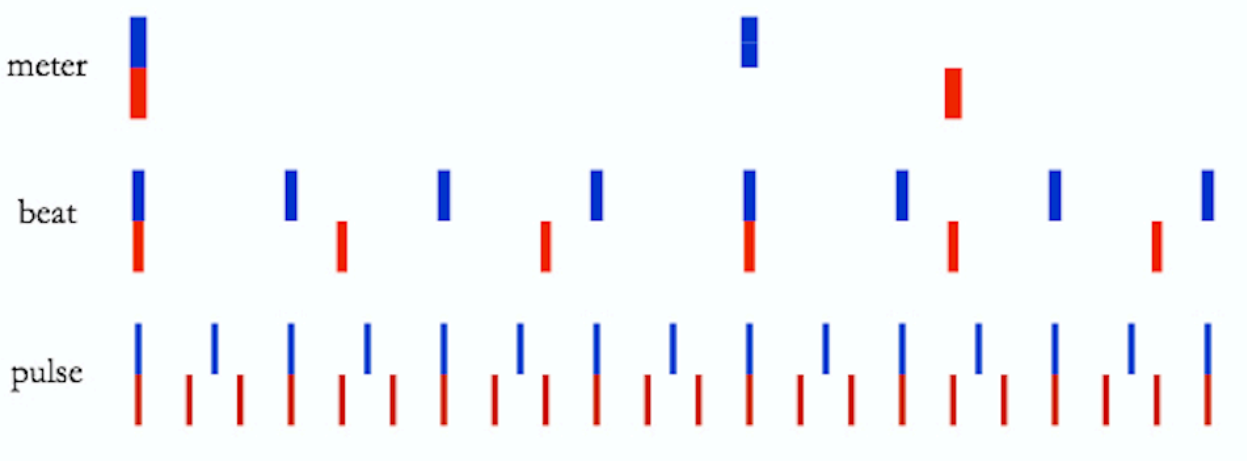
[69] Yeston, M. (1976). *The Stratification of Musical Rhythm.* New Haven: Yale University Press.

added between each pulse rate line, but the implied metric strong points do not change position. Similarly, when the pulse rate is halved, there is no value in the halved tempo that could not exist in the initial tempo, and therefore there is minimal difficulty involved.

However, tempo changes such as going from the quarter note having the beat to the dotted quarter note having the beat with no pulse rate change feel more disorienting and therefore do figure into my discussion. Tempo changes with a pulse rate change also figure into my discussion. These can be to related pulse rates, i.e. ones that can be expressed as a simple integer ratio, or to non-simply related pulse rates. In the case of simply related pulse rate changes, there is the possibility of various amounts of preparation and overlap for the pulse rate change. In all of these cases, the difficulty arises from a change in the durations that matter at every interpretive level.

This is diagrammed in FIG 11, where the blue pulse rate is in a ratio of 3:4 to the red pulse rate. If the pulse rates are eighth notes, this could represent the metric modulation, from blue to red, of dotted quarter note becoming half note. The key takeaway is that, while there are some common points on the quantized rhythmic grid between the two pulse rates (and associated tempi and meters), there are pulses (and therefore beats and meters) in the red pulse rate that simply do not exist in the blue pulse rate and vice versa; they belong to different rhythmic worlds. This provides an explanation for the rhythmic difficulty associated with tempo changes and cases of ambiguity that I examine - they involve hearing durations and attacks that do not make sense in the tempo framework that the listener had been using to understand rhythm.

Fig 11: Two non-trivially related pulse rates and the different rhythmic worlds they allow



While it is fairly abstract to look at types of tempo changes in this way, all of my examples are firmly rooted in perception and personal experience. I look at six concrete examples taken from six different bands in which it is easy to feel that something happens to the tempo, though it may be difficult to explain exactly what degree of change it underwent and how the new tempo is related to the old one, if at all. Beginning to categorize these types of tempo changes along the lines above as well as along a spectrum from tempo ambiguity to complete modulation is useful for the way that it adds precision to the theoretical discussion and sharpens perception. As in the first chapter, I use analogies to harmonic theory when useful and use the rhythmic details I discuss in conversation with other musical details to make various arguments about meaning. There is to my knowledge no academic work on this type of rhythmic difficulty in metal music, so I compare to the work of others less in this chapter than I did in the first chapter.

Gojira's "Pray" - Direct Tempo Change, Heaviness

First, I will look at a relatively straightforward example to show how things can be different from Meshuggah's paradigm. The passage of interest is the ending breakdown in Gojira's "Pray," from their 2016 album *Magma*, or rather the transition into this breakdown. Simply put, the breakdown is at a different tempo than the rest of the song and the two tempi have a non-simple and arbitrary-feeling relation to each other.

The whole of the song is at quarter note around 100bpm. The pulse is unambiguously and rigorously maintained; one of Gojira's stylistic trademarks is a machine-like precise playing style that is conspicuous even by metal standards, especially from drummer Mario Duplantier. At 4:28, the tempo shifts suddenly to around 72bpm. It is possible that the band thinks about this shift as related to the previous tempo, in which case it could be described[70] as the quarter note triplet of the old pulse becoming the quarter note of the new pulse. It is certainly possible that the band hears it in this way, and I will discuss several examples that more clearly make use of this type of smooth tempo transition.

However, in this case, I don't believe that the band particularly invites listeners to feel either tempo within the other. There are a few hints in the song, such as the faint foreshadowing of the breakdown during the first four seconds and the brief hemiola at the end of the last riff before the breakdown (4:16-4:18). However, the gap between this riff section and the start of the breakdown as well as the fact that the two tempi never exist simultaneously makes their possible common basis obscure, and the tempo transition feels abrupt and arbitrary. To use analogous

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[70] This is approximate - the tempi were attained using the tap tempo function of a metronome with the recording, so there is some uncertainty in these, which is why the bpm don't work as perfect multiples of each other. It is also possible that the band hears the tempi as unrelated and plays them in the studio and live with the help of a click track.

harmonic terminology, it is a direct tempo modulation, with no directly adjacent pivot pulses (durations that make sense in both tempi) or substantial preparation.

The feeling of arbitrariness is heightened live, where the band draws out the space immediately before the tempo change for a few minutes before dropping suddenly into the breakdown at a new tempo. The old tempo is sustained but very sparsely through this space, and there is silence immediately before the start of the breakdown, which makes it all the more disorienting when it hits.

This matters because like "I Am Colossus", this example can be read as another way of getting at heaviness through disorientation, which is created with the suddenness of the transition. The breakdown also feels heavier because it is slower than the preceding sections. While slowness is neither necessary nor sufficient for heaviness, given the same riff, a slower version will often feel heavier; thus perhaps "slower-ness" is a closer correlate of heaviness, as I discuss above in relation to Meshuggah's live performances of "ObZen." In the case of Gojira's "Pray," the breakdown is not actually a slower version of any earlier section, though it certainly feels similar, with low, palm muted bursts of attacks like those that make up most of the other riffs in the song. The "slower-ness" comes from the breakdown's tempo being slower than the tempo of the preceding portions of the song.

It is possible to link this feeling of heaviness because of a slower tempo to the embodied experience of moving underwater. The "Pray" breakdown feels like being suddenly submerged - everything moves slower as if there is more resistance, movement feels heavier and thicker. Thus the direct tempo change creates heaviness both through disorientation and through sonic metaphors for density that appeal to physical experiences.

Meshuggah's "Nebulous" - Tempo Ambiguity

As I mention in the introduction to this chapter, Meshuggah's music never uses actual tempo change as a compositional device. However, there are several examples where tempo becomes ambiguous along with the usual ambiguities of grouping and meter present in their music. The strongest example of this is in the song "Nebulous" from the album *Nothing (Remastered)*.[71] By tempo ambiguity I mean that the feeling of the background (quadruple meter) pulse is rivaled by a different, non-trivially derived pulse for an extended amount of time. In "Nebulous", this happens in the first breakdown section at 2:08. Diagramming this riff as I did for "I Am Colossus" and "Clockworks" in the first chapter, it can be represented as, with each word taking the same amount of time except for the 'short' at the end of the series of repetitions:

<u>Ambiguous Tempo Pattern 1 (2:08-2:29)</u>
low - rest - high - low - rest - low - low - rest - high - low - rest - low - low
low - rest - high - low - rest - low - low - rest - high - low - rest - low - low
low - rest - high - low - rest - low - low - rest - high - low - rest - low - low
low - rest - high - short

Then, for the rhythm guitar riff immediately after, the pattern is:

<u>Ambiguous Tempo Pattern 2 (2:29 - 2:50 and 3:55-4:37)</u>
|: low - high - low - low - high :| x8
low - high - low - short

There is a variation on this, which I call Pattern 2', where the "high" attacks are replaced by rests:

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[71] I use the 2006 re-recorded and remastered version of this song because it is slower and lower and in my opinion this plays to the song's strengths more than the original 2002 recording. Note that because of this, the timestamps I use don't match up with the 2002 recording.

Ambiguous Tempo Pattern 2' (2:50-3:55)
|: low - rest - low - low - rest :| x8
low - rest - low - short

The tricky thing about the pulse through these sections is a result of the construction of the patterns and the texture. The first thing to notice is that within the pattern, every attack or rest lasts for the same amount of time. This is a strong indicator of tempo - it would be completely reasonable, hearing the guitar riffs above with no drums or context from the rest of the song and without hearing the "edges" of the sections (the parts with "short" attacks), to hear the length of each of these attacks or rests as quarter notes.

However, coming from the preceding sections in the song, it becomes clear that these are in fact dotted quarter notes with relation to the initial tempo. It would then be reasonable to call the first riff above a straightforward metric modulation, where what was the dotted quarter note in the old tempo becomes the quarter note in the new tempo. While this is not the easiest thing in the world to feel, it is not terribly complicated. This interpretation would hold up especially well through most of the first riff (2:08-2:29), because the drums follow exactly the accents of the guitars. In other words, it feels most natural to adjust the tempo of the pulse at the 2:08 mark from quarter note = 90 (the tempo of the beginning of the song) to quarter note = 120 (dotted quarter note becomes quarter note). In fact, I would argue that it is not only easy but necessary for one type of understanding: a listener has to hear this second tempo (120bpm) in order to easily follow the patterns in both of the above riffs, to take the durations for granted because they are largely static and listen instead to the alternation of high and low attacks and rests.

But it is not as simple as this, because the first tempo is never truly left behind, and in fact remains the dominant, structuring tempo even through the sections when it is easiest to hear the new tempo. This is because of the way that the patterns are truncated and because of textural details in the other guitars and in the drums.

For the first riff of the breakdown (pattern 1), the truncation ("short" attack at the end of the section) is the only clue. This "short" attack, the length of an eighth note, does a lot of work. First, it breaks the illusion of a complete metric modulation - because it is 1/3 the length of the other attacks, it shows that the ostensibly new pulse at least cannot be a simple meter. It is also a polymetrical cadence,[72] and as such plays two more roles: second, it prepares listeners for a hypermetric downbeat (a textural accent), and third, it realigns the foreground meter with the background meter.

The "short" attacks in the next section play the same roles, but now the drums and other guitar parts reinforce the initial tempo. The drums very lightly keep the initial quarter note pulse on the ride cymbal (or with eighth notes on the hi-hat) through most of the repetitions of the second pattern, and the lead guitar in a later section plays sustained notes (with a guitar e-bow) that last for 8 quarter notes. The structure of this section of tempo ambiguity in "Nebulous" is summarized below (FIG 12):

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[72] In tonal music, a cadence in a new key is a strong piece of evidence for a modulation, as opposed to some less-strong instance of use of chords from another key. Analogously, in this example, the fact that the polymeters still "cadence" in the old tempo is a strong piece of evidence that there is in fact no metric modulation, only tempo ambiguity.

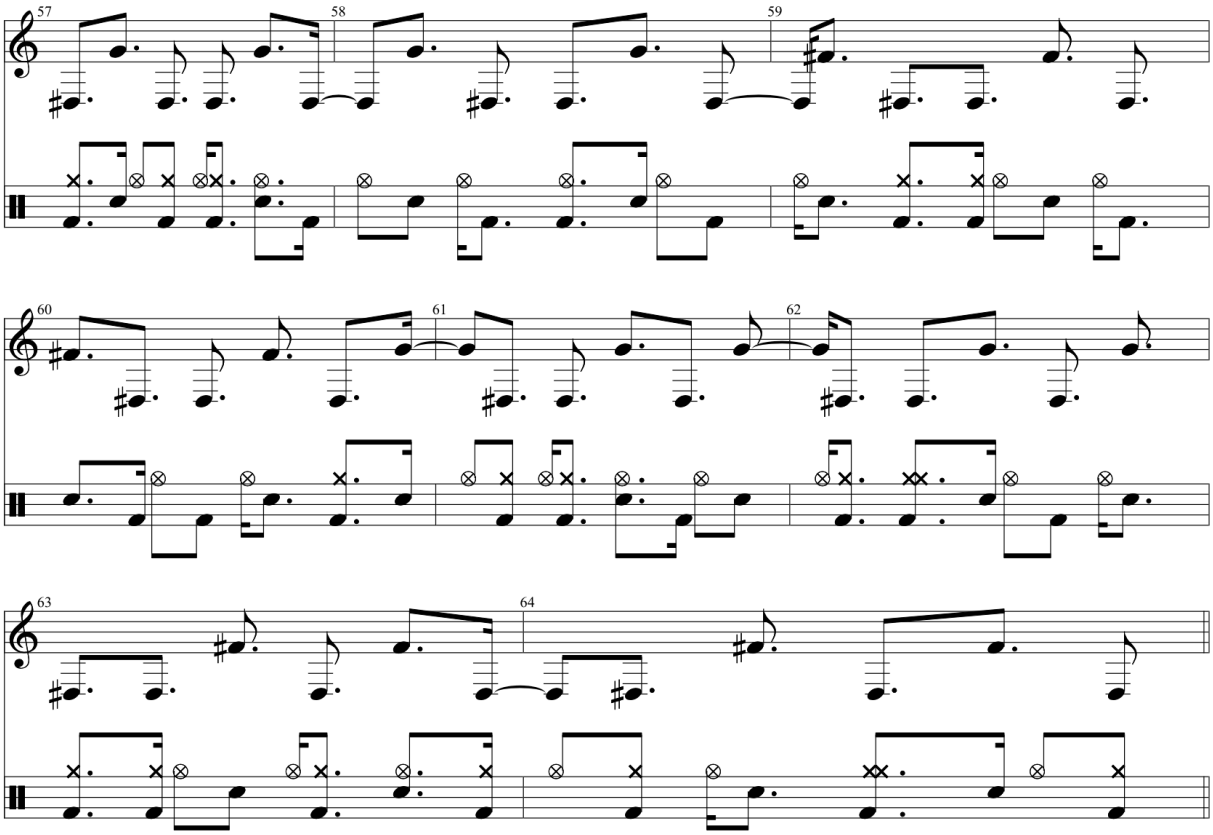
Fig 13: Tempo ambiguity summary in “Nebulous” by Meshuggah

Time	Pattern	Textural Accent	Support of 120bpm tempo	Support of 90bpm tempo
2:08	1	Almost homorhythmic, just guitar with drum accents	Whole band movement in what would be quarter notes at 120bpm (except very end of section)	Truncated ending realigns guitar pattern with background 4/4 hypermeter
2:29	2	Pattern change, drums change	Guitar movement at same rate, snare and bass drum follow	Truncated ending, drums lightly play quarter notes at 90bpm on ride cymbal
2:50	2’	Vocals enter	Guitar movement at same rate, snare and bass drum follow, vocals often reinforce pattern	Truncated ending, drums more noticeably play quarter notes on crash cymbal
3:12	2’	Guitar solo	Guitar movement at same rate, snare and bass drum follow	Truncated ending, drums play eighth notes on ride and hi-hat
3:55-4:37	2	Sustained notes, pattern change	Guitar movement at same rate, snare and bass drum follow	Truncated ending, drums very faintly play eighth notes on crash cymbal, sustained guitar line changes pitch every two measures of 4/4

The section from 2:29-2:50 is transcribed in (FIG 13);[73] Treble clef is guitar, sounding two octaves below written. Percussion line is drum kit, with circled cross = ride cymbal, cross = crash cymbal, higher notehead (C if it were treble clef) = snare, lower notehead (F if it were treble clef) = bass drum. Guitar part is beamed in dotted quarter notes to highlight the regularity of motion, drums are beamed in 4/4 to highlight the background meter. Notice that the section lasts for eight measures of 4/4, and as usual the guitar pattern is truncated to fit - the lone eighth note at the end of the two hypermeasures is the polymetrical cadence in this example.

[73] Transcription adapted from Guitar Pro tab posted on ultimate-guitar.com by user fisher, published 21 Feb 2009. https://tabs.ultimate-guitar.com/m/meshuggah/nebulous_guitar_pro.htm

Fig 13: “Nebulous” by Meshuggah, 2:29-2:50, guitar and drums



Analysis / Meaning - contrast to strengthen release of tension, role of cymbals

Again, this degree of tempo play is rare in Meshuggah’s music. Their whole style is built on ambiguity of grouping and changing metric cardinality in relation to a pulse, but there is almost never difficulty in finding this pulse, because the steady pulse plays such a vital role in their style (see first chapter). While the section of “Nebulous” outlined above is the strongest example in their oeuvre of ambiguous tempo, I argue that this is not only not a metrical modulation, but that ultimately the tempo ambiguity only serves to reinforce the metrical cadence and therefore the strong primary pulse. Meshuggah’s rhythmic style is, even in this case, about the play of the foreground guitar meter against the pulse and the strong reaffirmation of

this pulse and the 4/4 hypermetric groupings through the polymetric cadence. The fact that in this example the foreground meter and textures seem to change tempi only serves to make this contrast and realignment stronger, but does not in fact undermine the initial pulse. This dramatic reaffirmation of the pulse by way of disorienting abstraction from and emphatic return to it ultimately further supports my conclusions in the first chapter about the centrality of physicality and groove to Meshuggah's music.

The other takeaway from this example, which is implicit in the discussion of Meshuggah's core style in the first chapter but bears underlining here, is the role of the cymbals in keeping the pulse. This is an important genre convention. More often than not, the drummer will use the crash or ride cymbal to articulate quarter notes, which cuts through the texture and unambiguously keeps the pulse - sometimes a necessity for keeping the ensemble together and keeping the listener clued into the interplay of foreground and background meter. The cymbals will be an important marker of tempo in all of the following examples.

The Contortionist's "**Language" - tempo ambiguity and modulation**

The next example is one that also plays with tempo ambiguity, similar to "Nebulous". However, in this case, the tempo play runs the spectrum from slight ambiguity to actual modulation. The example is "Language I: Intuition" and "Language II: Conspire", from the band The Contortionist's 2014 album *Language*. Though they are separate tracks on the CD, I am treating them as a single piece because they flow seamlessly together and share much thematic material.

The most salient rhythmic feature of the piece is the tempo play between two different tempi, which are quarter note = 135bpm, which I will call the initial tempo, and dotted quarter

note = 160bpm, which I will call the conjugate tempo. These tempi are related: the dotted eighth note of the initial tempo becomes the dotted quarter note for the conjugate tempo. For most of the piece, hints at both tempi are present at the same time, often with only one tempo at a time being the organizing one, by which I mean the tempo that accounts most simply for the placement of textural accents, i.e. changes in section. The difference between this and the Meshuggah example is that in this case, the tempo does actually change - the initial tempo is not the organizing tempo throughout. While strictly speaking there is no pulse rate change except perhaps to double the pulse rate, the use of tempo, as well as the ways in which it interacts with meter in this piece is very nuanced and certainly disorienting.

The form of the piece is outlined below, with color shading to indicate the tempo at each point. Green is the initial tempo (quarter note at 135bpm), yellow/gold is the conjugate tempo (dotted quarter at 160bpm). The darker the color, the more firmly the tempo is established (FIG 14).

Fig 15 - Fluid tempo ambiguity in "Language" by The Contortionist

Time	Section	Rhythm/meter/tempo	Textural notes
:00	A	4/4 in initial tempo, guitars outline fast 3+3+2 in 16th notes	Saturated rhythmic background
:42	A	Shakers reinforce quarter note	Shakers, vocals, synth layers
1:10	A'	4/4 with syncopated accents in bass and drums	Verse starts "we will…"
1:45	B-A'-B-A'	4/4, cymbals further accent quarter note	Chorus, contrasts with static preceding sections
2:14	C	9/8 in initial tempo = 6/8 in conjugate tempo. Quarter note pulse maintained but no longer determines form.	Harmony changes each measure, new melody
2:33	C'	Same meter, quarter note on splash cymbal makes tempo more ambiguous	Lyrics "…finds its place"
2:46	D	Same meter, still ambiguous	Lyrics "ever flowing," snare hits every 16th note but without clear accents
3:04	D	More firmly in 6/8 of conjugate tempo, snare hits on 4th and 5th eighth notes of each measure	Same guitar chords, new accents in snare drum
3:48	D'	2/4 in initial tempo, 3+3+2 16th notes still hints at conjugate tempo (which moves at the rate of three 16th notes)	Lyrics "ebb and flow"
4:07	E	Stable 4/4 in initial tempo	More distorted guitar tone
4:40	E	Still 4/4	Lyrics "…inception, intuition speak to me." Melodic descent.
4:54	E'	2/4 in conjugate tempo, with cymbal hits every measure. Guitar continues with same 4/4 riff in initial tempo, metric dissonance from overlaying two tempi	Same guitar riff (aural illusion), feels different because of metric modulation
:00	F	Securely in conjugate tempo, faint snare hits on 16th notes of initial tempo link the two pulse rates	Start of "Language II," fast riff with lots of space
:12	G	6/8 in conjugate tempo (cymbals every measure), overlaid with 4/4 in initial tempo	Heavy downbeats and fast ascending guitar runs
:36	H	Cymbals in 6/4 of initial tempo, guitars continue with dotted eighth notes (hint at conjugate tempo)	Lyrics "primordial sound," breakdown riff
1:02	E"	Cymbals keep pulse in initial tempo, guitar grouping suggests 9/8 in initial tempo = 6/8 in conjugate tempo.	Reprise of section from "Language I"
1:58	H	Same 6/4 of initial tempo	Return to breakdown riff
2:31	C"	9/8 in initial tempo = 6/8 in conjugate tempo	Lyrics "seeks its place"
2:49	I	4/4 very clearly, bass riff using dotted eighth notes hinting at conjugate tempo	Shakers, synths, bass riff
3:14	D	9/8 in initial tempo = 6/8 in conjugate tempo	Same as before
3:28	D'	2/4 same as before	Lyrics "ebb and flow" again

Hearing Inside vs Outside

While I claim that there are actual tempo modulations, and it may be possible that the band hears them this way (the way to know this for sure would be to listen to how their click tracks are programmed live and in the studio), I think it is more likely that they hear the entire piece in the initial tempo. It is possible to do this, because while there are certainly sections that make it very hard to hear the initial tempo (especially the beginning of "Language II"), it is not impossible, because there are no durational values derived from the conjugate tempo that do not exist in some form in the initial tempo. This is because when interpreting sections at the conjugate tempo, they are always in a compound meter, meaning that the pulse, the fastest isochronous level (16th note in the initial tempo, 8th note in the conjugate tempo) is preserved.

However, like Meshuggah's insistence that their music is always in straightforward 4/4 time, this interpretation (that there is no metric modulation in "Language" - not that the band has claimed this, but it is a possible viewpoint) must be met with skepticism, for the simple reason that the vast majority of listeners do not hear the music the same way that the band does. In other words, the band cannot claim unambiguous ownership of perception of meter. It takes a fair amount of analysis and knowledge of music theory for a listener to come to the conclusion that it is possible to hear the entire piece in the initial tempo unless, like the members of the band, he or she performs it. It is much more natural to hear it as a series of subtle oscillations between two different tempi, both of which are fully in control at different times. In other words, calling parts of this piece metric modulations is not entirely incontestable, but I think it is appropriate as a way of describing the effect, because some of the departures from the initial tempo are

established firmly enough and last for long enough to completely disrupt the perception of the initial tempo.

Meaning - thematic, compositional

Tempo play in this example is not only of a different type from the Meshuggah example (metric modulation as well as ambiguity), it also has a different purpose and effect. Thematically, the gradual back and forth between the two tempo areas is reflected in the lyrics. A returning lyrical motif is that of "breathing" and "ebb and flow" - these ideas are effectively painted by the slow back and forth between the two tempi. In a two-part piece like "Language I" and "Language II," the two tempi also serve to establish the unique character of the two parts. "Language I: Intuition" is represented by the initial tempo, which is straightforward, felt viscerally when it is present (the persistent 4/4), and is the base on which the rhythms of the piece are built. "Language II: Conspire" begins firmly in the conjugate tempo - it feels faster and more energetic, less easy to lock onto, and is derived from the first. Bridging the gap between music and ideas, the piece represents two aspects of language - the way that it is absorbed easily and intuitively by children, and the way that it is eventually used to build new ideas and knowledge, to expand beyond what has already been said.

Animals As Leaders' "Weightless" - title painting and virtuosity

Another complex example of metric modulation can be found in the song "Weightless" from the 2012 album of the same name by Animals As Leaders, an instrumental metal band that is perhaps second only to Meshuggah in defining the "djent" sub-genre. While the band uses many of the same rhythmic techniques as Meshuggah, they also make much use of tonal, jazz-influenced melody and harmony, something that is not present in Meshuggah's music. Their

music also has a virtuosic focus that is not present in Meshuggah's music. Founder and lead guitarist Tosin Abasi is renowned for his abilities, and unlike the members of Meshuggah he is often willing to discuss technical aspects of his composition, at least with regard to harmony and form.

"Weightless" goes through several events that sound like tempo changes. In my analysis, I examine these points of interest and the ways in which they problematize distinctions between tempo and meter. First, though, I look at a relatively unambiguous example of metric modulation from the end of the song.

The point of interest is from 3:17 to 3:30, where the pulse rate unambiguously changes. The fast 5/8 ostinato that is the main theme of the piece fades out and this length of time is divided in half rather than into five. The metric modulation is thus five eighth notes = half note, and the new riff, which lasts for the rest of the song, moves in half notes at this new tempo, while the drums articulate fills often using 16th notes at this new tempo, creating an incompatible rhythmic world with the preceding fast 5/8. This is a fairly simple example. While the actual metric modulation is fairly uncommon (using five eighth notes as one of the values to be reinterpreted in a new tempo, a 5:2 ratio), the musical effect is not hard to hear and actually reasonably intuitive because of how fast the measures of 5/8 go by in the old tempo.

This example also seems to act as a metaphor for the title. I mentioned metaphors of changing weight or gravity in my analysis of the breakdown in Gojira's "Pray," and the effect is similar here. When the new tempo kicks in, it feels as if gravity changes and everything becomes lighter, probably because there is more space between attacks. The fact that Gojira's breakdown feels heavier while this feels lighter has to do with several other musical details, mostly to do

with range and timbre. For example, while both metric modulations go to a slower tempo, Gojira's breakdown emphasizes low, palm muted power chords, while in "Weightless" the overall texture focuses more on the high end of the spectrum.

There are other metric modulations in "Weightless" that are less simple to discuss, because they highlight the potential unity of conceptions of tempo and meter at certain pulse rates. There are two events at the beginning of the piece that feel like tempo changes and that split up the first minute and four seconds into three sections:

:00 - first section starts, solo guitar
:22 - second section starts, band enters
:43 - third section starts

The pulse rate stays the same throughout these sections, at about 380ppm. The fact that 380ppm is uncomfortably fast but not impossible to keep track of is important to my discussion. I present three possible ways of notating these first three sections that express different perceptual possibilities. The first highlights hearing the events in question as meter changes (FIG 15), the second highlights hearing the same events as tempo changes (FIG 16), and the third highlights hearing larger scale grouping (FIG 17).

In figure 15, the changes between the sections are represented as meter changes - the length of an eighth note never changes, and the cymbal hits in the second and third sections are interpreted as marking each new measure. There is a certain logic to this, because it is a very readable and playable way to think about the section. None of Animals As Leaders' music is easy to play (a point I will pick up momentarily), but this at least makes the relations between sections clear; it can act as a prescriptive representation of the music.

Figure 16 treats the changes between sections as tempo changes instead of meter changes. This has a resonance with the way that the music sounds, especially to a listener less familiar with the music and with playing it. While this version of notation would not be logical to try to play, it carries some important descriptive truths.

Figure 17 highlights larger-scale symmetry, i.e. that each section can be represented as exactly 16 measures of 5/8, getting rid of the awkward short measure at the end of the second section in the first two notation strategies. This represents a listening that values larger scale symmetry having to do with the length of sections, and has the added benefit of incorporating both guitar lines in the second and third sections. However, this notation feels awkward for the way that it goes against the crash cymbal in the second and third sections, which is conventionally an important marker of tempo for progressive metal, and in existing Meshuggah transcriptions, notation almost always gives priority to the cymbal in defining groupings.

Figure 15: "Weightless" by Animals As Leaders :00-1:04, meter changes, guitar

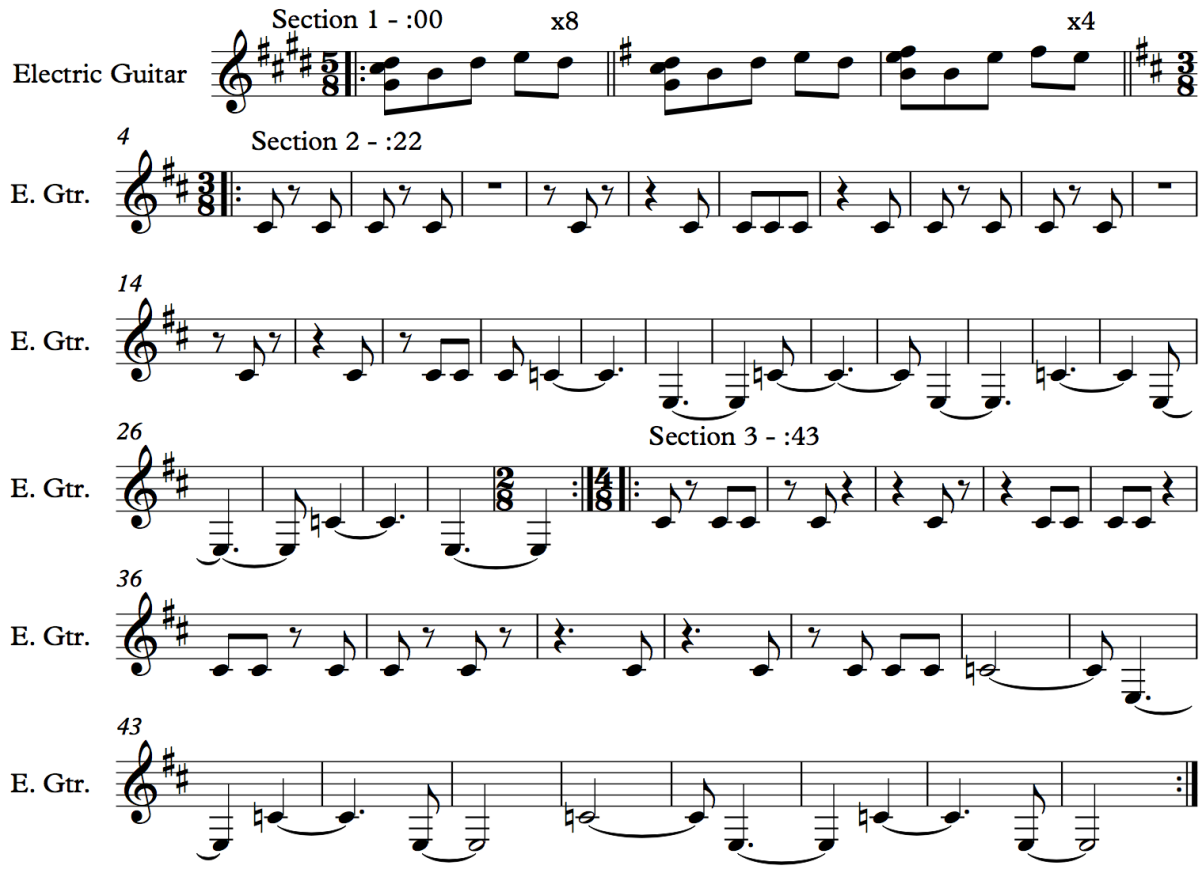


Figure 16: “Weightless” by Animals As Leaders :00-1:04, tempo changes, guitar

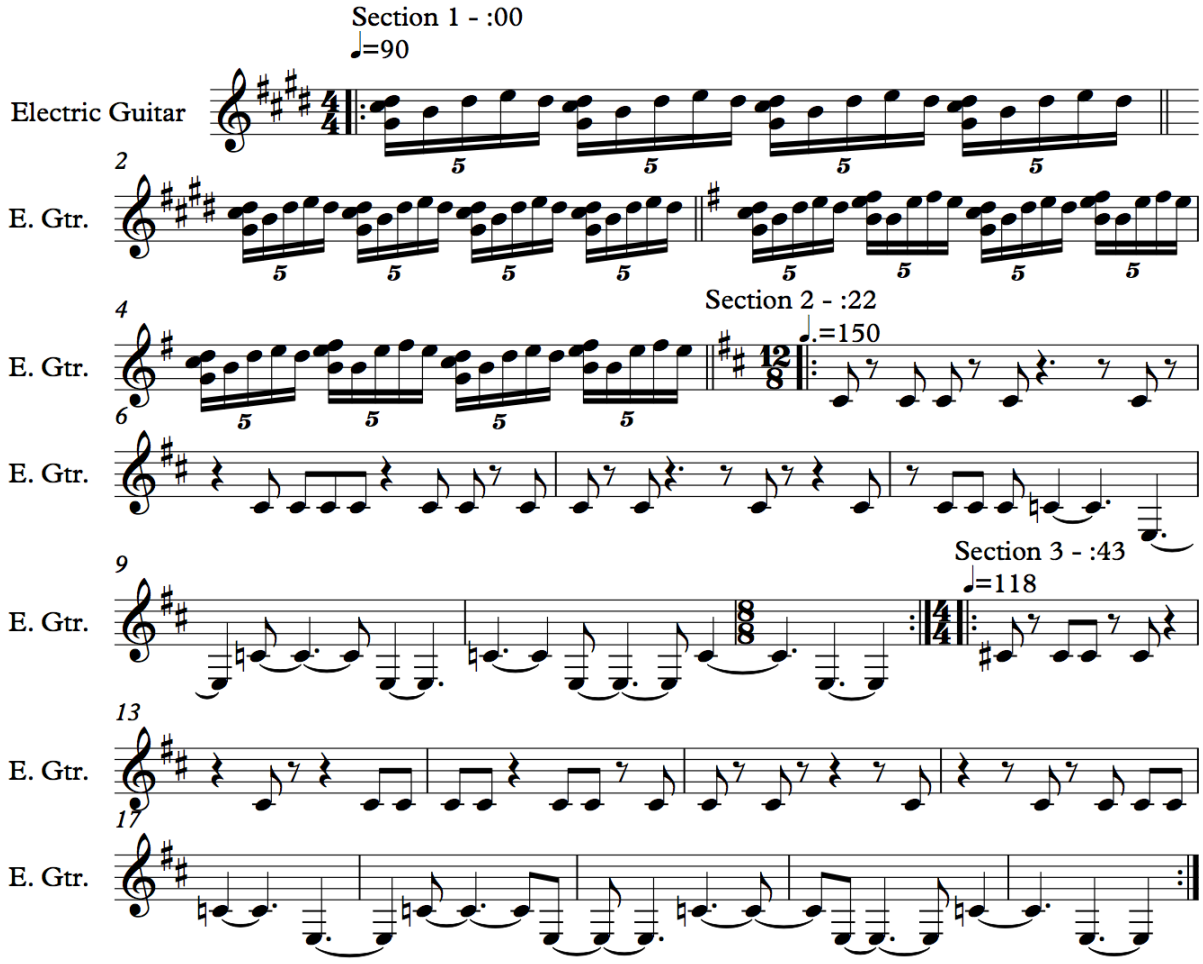
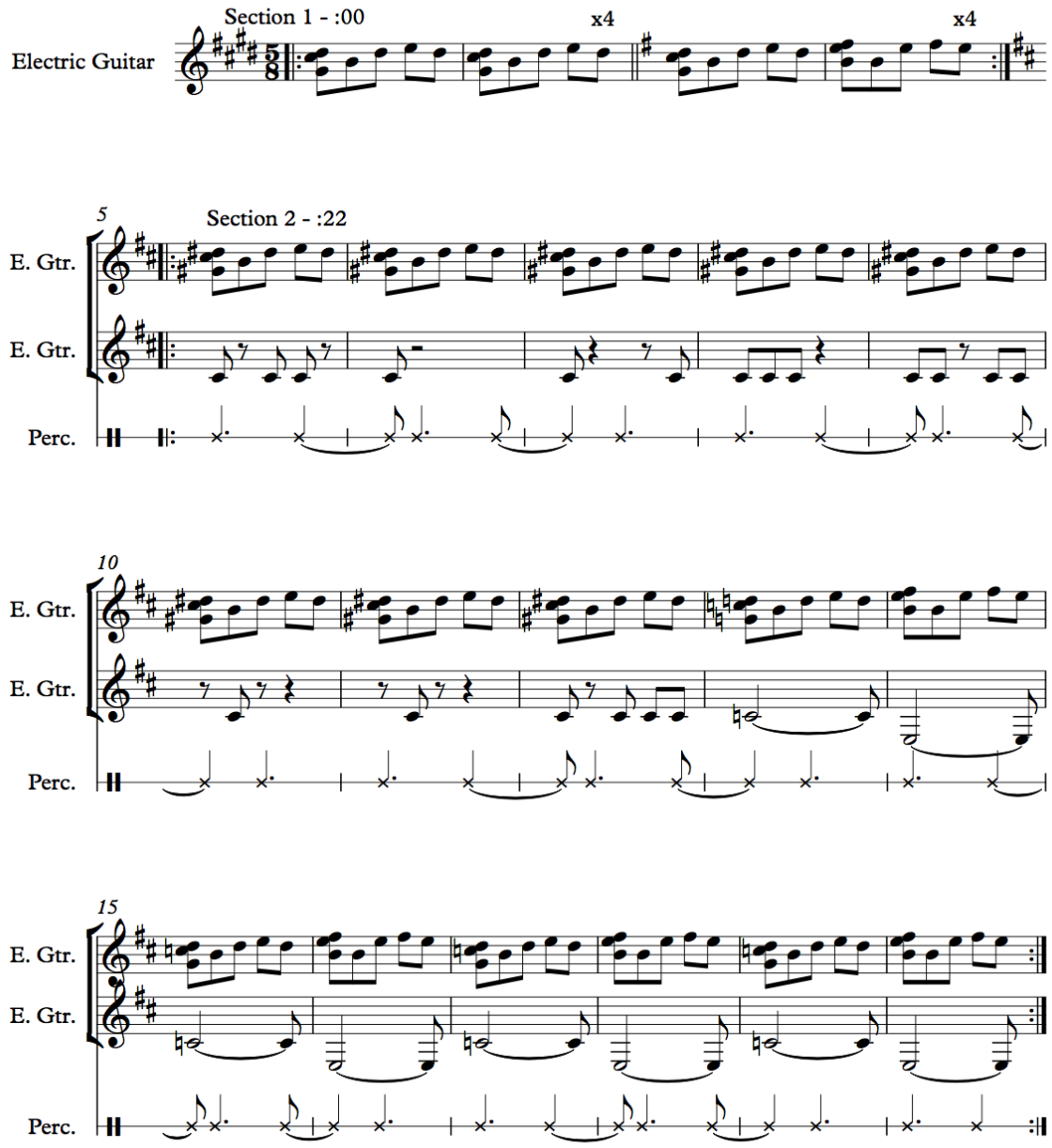
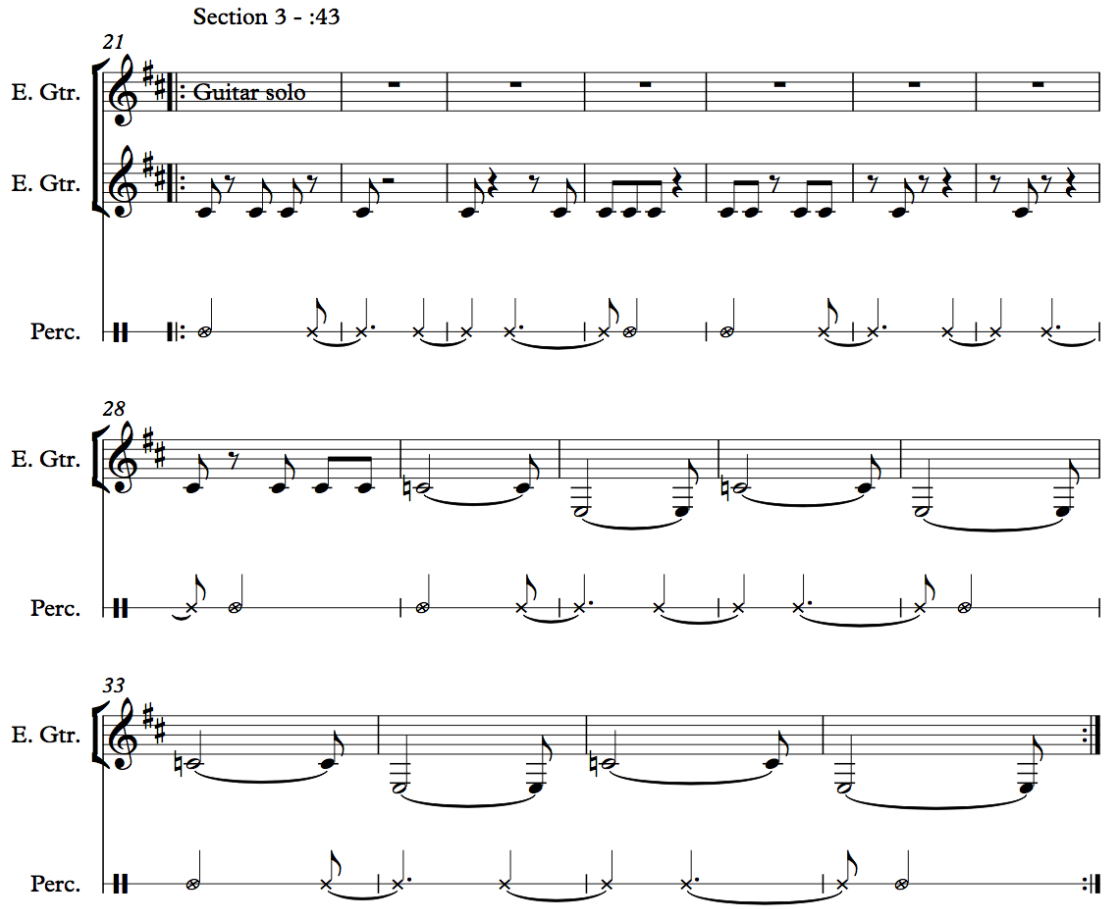


Figure 17: “Weightless” by Animals As Leaders :00-1:04, guitars and drums, symmetry highlighted





All three examples are directly derived from the recording - the sound content that they represent is identical. However, they lead to different rhythmic interpretations of this sound content, and as such all three leave out something important. While it is possible to consciously choose to hear in a certain way, the potential for this passage to evoke all three ways of perception cannot be reduced. In all three, there are two important shifts, the difference is in what is understood as shifting. This is exciting because of the way it shows the rhythmic fertility of the passage. It is also especially interesting because it shows how tempo and meter can somehow be equivalent. This is of course not always the case. While tempo and meter are both interpretive levels derived from the same basic pulse, they are normally on different scales, with meter being larger than tempo.

Because of the pulse rate of this example, though, it makes almost equal sense to hear the beats as either fast measures or moderately paced beats (figures 15 and 16). It is this particular pulse rate (the 380ppm at which the guitar ostinato moves) that makes this possible - if the whole example were faster, it would become hard to make the argument for meter changes, while if the whole example were slower, it would be much harder to justify the interpretation based on tempo changes. Thus the example, through its content and carefully chosen pulse rate, blurs the line between meter and tempo and reveals their common identity as interpretive levels of a basic pulse rate.

Another exciting aspect of this example is its quality as an aural illusion. The syncopated, palm-muted attacks are the "same" in the second and third sections, and the guitar ostinato is the "same" in all three sections. By "same" I mean that the durations are identical - but it is hard to hear this, because shifting perceptions of where the beat is make them feel very different from section to section. The use of the cymbal is essential in this - because it is such a strong generic marker for tempo, it is hard to ignore the way that it interacts differently with these patterns in the second and third sections. It feels like the syncopated attacks are dilated in some way moving from the second to the third section, when in fact they are not changed, it is only the drums that change.

What do these shifts mean? My interpretation of the last tempo change of the song fits here - the sudden complex shifts can be felt as metaphorical encodings of the title, as changes in gravity. There is the same disorienting quality of losing a grounding sense of pulse in these section as there would be in losing the grounding sense of gravity.

However, there is another meaning. I argue that the ability to create such a detailed aural illusion is an intentional marker of virtuosity, and to the extent that the difficulty of this passage can only be understood through a grasp on its rhythmic underpinnings, it is an invitation for listeners to hear in this detailed rhythmic way. Guitarist Tosin Abasi highlights his virtuosity in other ways, especially with his fast playing (see the notoriously fast sweeps at the beginning of the song "CAFO") and deft use of extended techniques such as a variation on the slapping and popping techniques found in funk bass playing to create intricate, percussive rhythmic patterns (see the breakdown in "The Woven Web").

I argue that the perceived tempo shifts in "Weightless" can be seen as an extension of this overtly displayed virtuosity - the moment stands out somewhat in the band's work and thus calls attention to itself, and the ability to execute these shifts seamlessly, to create an aural illusion through rhythm, can be read as another aspect of the band taking pride in their high level of ensemble instrumental proficiency, a proficiency that has much in common with the types of proficiency valued in classical performers.

Of course, none of the music I discuss in this thesis is particularly easy to play, even besides the fact that all of the examples have been chosen for the rhythmic difficulties they present. However, I take Animals As Leaders as an example to discuss this pride in virtuosity because their music and commercial presence stress it more than other bands. Besides extremely fast solos and extended techniques, all three band members give private masterclasses at stops on tours, give interviews that focus extensively on playing technique, experiment with unusual instruments such as acoustic 8-string guitars, and lend their talents to supergroups such as Abasi's fusion project T.R.A.M. The band even sold a shirt with the words "Odds are we're

better musicians than you" in all caps along with the band logo during a 2014 North American tour (FIG 18).[74] The band has certainly developed instrumental ability as a major part of their brand, and as such control over complex, disorienting and even somewhat illusory rhythmic structures can be read as calling attention to the band's skill, especially for Animals As Leaders but also to some extent for all of the bands I discuss here. It is also evidently something that fans of the bands value highly - it is fans who buy these shirts, after all. I explore some implications of this in my conclusion section.

Figure 18 - Animals As Leaders T-shirt sold at concerts and online

TesseracT - "Proxy" and "Retrospect", tempo areas like key areas

TesseracT is another band heavily influenced by Meshuggah, but one that plays much more with tempo ambiguity and metric modulation. In the first two songs of their 2013 album *Altered States*, there are several metric modulations, which exemplify another way of using rhythm (specifically tempo) in a way that is analogous to the use of harmony in Western tonal

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[74] http://www.animalsasleaders.org/products/50251-odds-on-black. This shirt was brought back due to popular demand and is now apparently semi-permanently available on the band's web merch store.

music and creates meaning in a similar way. The tempo areas of the two songs are outlined below (FIG 19):

Figure 19 - Tempo areas in Tesseract's "Of Matter: Proxy" and "Of Matter: Retrospect"

Time	Tempo (bpm)
Proxy :00	beat = 119
Metric modulation: dotted quarter note becomes quarter note	
Proxy 1:36	beat = 80
Metric modulation: quarter note triplet becomes quarter note	
Proxy 2:48	beat = 119
Metric modulation: quarter note triplet becomes quarter note	
Retrospect 2:09 to end	beat = 90

There are four tempo areas, three distinct tempi, and two types of metric modulation in these two (linked) songs. It is interesting to note the subtle difference between the second and fourth tempo areas (green and purple above) - they are close in terms of bpm, but not the same; they are derived from the same initial tempo (blue), but the metric modulations used to get to each are different. It is also interesting to note the way that the same metric modulation (quarter note triplet becomes quarter note) is used twice in a row, to go through two different tempi. This example stands out among the others I've chosen for the way that TesseracT shift fully into new tempi and stay there for significant amounts of time.

The use of these different tempo areas (each of which contains several different grooves in different meters), to my ear, is different than any of the above examples. Here, it is a compositional choice broadly in the same vein as the use of harmonic key areas in Western tonal

music.[75] In a broad sense, TesseracT visit different closely related tempo areas (relatively simple metric modulations) for rhythmic variety in the same way that a short Romantic composition might visit different harmonic areas. There are several important differences, of course, but the analogy holds and helps make sense of TesseracT's use of different tempo areas. It is the same principle of variation and development seen in Western classical tradition music, but applied to a different musical parameter.

Texture as always plays an important role in this interpretation. TesseracT's music is very smooth - the metric modulations happen almost imperceptibly, there are layers upon layers of ambient-sounding guitar and synth lines that keep a sense of continuity, there is little harmonic variety, the vocals are always clean in these examples (sung as opposed to growled), and there are as many clean guitar tones as distorted ones. All of this serves to heighten both the smoothness of the sound and therefore the sense of traveling between different tempo areas, as well as the direct similarities to the textures of Western classical music. There is disorientation, but it is hardly involved with heaviness[76] and it is not highlighted in the same way that it is in the above examples.

Car Bomb's "Lights Out" - playing with genre conventions, heaviness

The last example of tempo play that I examine is the most extreme. Car Bomb's rhythmic style, while seeming to share much with bands such as Meshuggah, Gojira, and The Dillinger Escape Plan, has developed into something largely unique in the genre. The crux of this uniqueness is the very busy compositional style (many different short sections in a song), very

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[75] Harmonically, TesseracT are also broadly speaking a part of tonal music

[76] At least not around the tempo changes - see the opening riff of "Retrospect" at 1:09 for an example of heaviness through metric disorientation

precise and heavily syncopated attacks, and a very busy, confusing, and somewhat illusory use of tempo changes. I will look at only a short sample, the opening riff from the song “Lights Out”, from the 2016 album *Meta*.

This section seems to cycle through several tempi in a short amount of time, as outlined in the table below (FIG 20):

Fig 20: Tempo play in Car Bomb’s “Lights Out” :00-:42

Time	Section	# of cymbal hits	approx. tempo of cymbal hits (bpm)	standard notation interpretation, number of 8th notes between cymbal hits	Notes
:00	sounds	n/a	n/a	n/a	deconstructed guitar sounds
:08	A1	5	72	6 (dotted half)	
:12	A2	6 (not exact)	86	5	
:16	A3	8	115	4 (half note)	
:21	A4	10	144	3 (dotted quarter)	
:25	A1	5	70	6 (dotted half)	guitar riffs now change, high notes added in
:30	A2	6 (not exact)	85	5	
:34	A3	8	110	4 (half note)	
:38	A4’	(10)	n/a		cymbal hits not stated, but length is the same

Similar to “Weightless,” it is possible to hear the whole section at the same tempo, because the basic pulse rate is unchanging. There is also the same quality of an aural illusion - each subsection lasts for the same amount of time, which is equivalent to ten dotted quarter notes, but this is far from obvious to hear, partly due to pitch changes in the guitar riff. All of the “tempo changes” are derived from the same basic pulse. In other words, it is possible to count a

single tempo through the whole A section, and this tempo is continued in the section immediately after.

However, this is by no means an easy conclusion to reach. Because the cymbals are normally such an important marker of tempo in the genre, in this section they create the strong perception of a rapidly shifting (in a non-trivial way) pulse, even if this is something of an illusion in the sense that it is not how the band must feel it in order to play it. This is one of the main meanings of this section - it is a sort of arithmetic game (the cymbals hit after one less eighth note in each subsection). While it is not easy to hear that this exactly is happening, it is clear that the beat seems to be speeding up, which perhaps paints the lyrical motif of being "straight on course," of inevitability - the riff, which is presented in condensed form in several other instances in the song, seems to collapse inexorably toward the faster beat.

There is more to the rapid, dense tempo changes, though. This example is progressive not only because the band's music is in the technical/progressive metal subgenre, but also because the band is taking a genre convention (using the crash cymbal to pound out the beat) and twisting it, using it to create the illusion of almost constant metric modulation. This is one of a multitude of examples of the meaning of the album's title, *Meta*: the use of cymbals in a non-conventional way comments on and exploits genre conventions to create a very disorienting experience for listeners already familiar with the genre.

This is the first instance in this paper of what I would call an anti-groove. In all of the other examples here, groove is very important, if complicated. In Meshuggah's music and polymetric paradigm, there is one privileged pulse that is reinforced with polymetrical cadences. In the metric modulation and tempo ambiguity examples above, there is either one dominant

pulse that is different than the one before it or two pulses that can be felt in the same section, but in both cases there is a strong feeling of groove. Not so in this example - the changes are so rapid that it is hard (though not impossible) to adjust to each groove.

This is also yet another example of heaviness through disorientation. The guitar riffs are low and palm muted, and the disorientation is even more extreme than in any previous examples. While the argument could be made that there are not actual tempo changes in this section of the song,[77] this point does not rather than illusory ones keep the disorientation going. It was this band that the quote about "for some reason being so much heavier" referenced earlier[78] was originally about - and it is easy to see why. With extreme disorientation as a result of playing with genre conventions of tempo marking comes extreme heaviness.

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[77] See :53, 1:52, 3:24. Notice that these are not metric modulations but seemingly arbitrary direct tempo changes, and all are made much more difficult to follow because of very angular meter changes as well as pulse changes.

[78] Manning, "Meta Review" on nocleansinging.com

Chapter Three - Non-Patterned and Non-Pulsed Rhythmic Difficulty

This final chapter deals with two final types of rhythmical difficulty that metal bands use to create meaning, one in which there is a lack of patterns and one in which there is a lack of discernible pulse. While these two techniques are very different in terms of what they involve at a rhythmic level, I group them together in this chapter for several reasons. For one, both can be understood as fundamental destabilizations of the concept of metered rhythm. While the first two chapters deal with examples in which the use of metered rhythm is taken to complex heights, this last chapters deals with examples that in some ways leave behind metered rhythm all together. For another, the two compositional techniques can be grouped together under the name of "arbitrariness." Non-repeating rhythms are arbitrary in that they defy attempts to understand a simplifying internal logic. Non-pulsed rhythms are arbitrary in that attacks are placed anywhere, without relying on the traditional rhythmic grid. Finally, it makes sense to talk about the two techniques together because they happen together and reinforce each other in my second example, taken from "Prancer" by The Dillinger Escape Plan. This example is representative of much of the band's idiosyncratic rhythmic technique, which presents a difficulty not quite like those I have discussed thus far.

Non-patterned rhythms in *I*

I look first at non-repeating durations on their own. The way in which these contribute to rhythmic difficulty is straightforward. Put simply, it is hard (for performers and audiences) to learn a long line of music that does not repeat. A lack of patterns can also be understood as creating a continuous string of "melodic" (as opposed to "harmonic," in the sense that it is

sequential rather than simultaneous) metric dissonance (again, in line with Krebs' definition of metric dissonance); expectations are continually set up and frustrated.

There is also a sense of freshness that persists through many listenings, because of the way that non-patterned rhythms resist memorization. If one doesn't spend the considerable time and effort it would take to study and memorize a linear passage, it will always have little moments of surprise when one revisits it.

The example of non-repeating rhythms that I present is from Meshuggah's 2004 *I* EP, a single 21-minute piece, which is also the focus of the first scholarly work on Meshuggah's music, Pieslak's 2007 article. The form of the piece is diagrammed below (FIG 21):

Fig 21: form in Meshuggah's *I*
:00 - A section, long non-patterned section
1:33 - B section, chaos / noise
1:55 - C section, "I, this fractal illusion" with solos and textural variations
3:35 - D section tremolos, has several subsections
4:53 - E section, though it sounds similar to A section it isn't the same timbre or pattern
5:40 - F section, solo and two overlaid tempi, goes through subsections
7:47 - G section, clean microtonal bends
8:40 - H section, similar to A and B but again different
10:33 - I section 4/4 breakdown
12:01 - J section, "I, the nihilist" shifting rhythms
14:07 - K section, sound effects and space, into clean patterns
16:58 - L section, more typical groove, though still long with no pattern repetition/polymeter
20:28 - feedback and fade out

The piece is through composed, comprised of 12 distinct sections. Though some sound similar to each other (for example the A section :00-1:33 and the E section 4:53-5:40), no material from earlier sections is ever brought back once the section is done. What is fascinating about the piece, though, is the way in which the form within many of the sections is also largely

through composed, i.e. non-patterned. The first section, for example, can be represented as follows, with 'S' standing for short and 'L' standing for long attacks. This representation is accurate without giving numerical values to the length of the attacks, and shows well the frustrating lack of pattern (FIG 22):

Fig 22: Duration mapping of guitar attacks in Meshuggah's *I*, :00-1:33

SSL SSL SSL SSL SSL SSL SSL SSL
SSL L L SSL SL SSL SL SSSL L L L L
SSL SSL SL SSL SL L L L L L
SL SSL SL SSL SSL SSL SSL SSL SSL SSL L L L
SSL SSL- SSL SSL SL SSSL SL SSL SSL SSL L L L L L L
SSL SSSL SL SSSL SSSSL SSL SL L L L SSSSSSSSL
SSL SSL SSSL L L L SSL L SSSL L
SSL SSL SSL SSL SSL SSL SSL SSL
SSL L L SSL SSL SSL SSL L SSL L SSL SL SSL L L L SSL SX

The "L-" in the 5th line is a unique half note attack (all of the other L's are dotted quarter notes, while the S's are quarter notes). The X at the end is the abrupt snare hit and rest. The grouping into lines in the above representation is somewhat arbitrary, based on points that are relatively easy to distinguish when possible, such as long strings of the same duration attack.

The salient point in this passage, though, is how opaque it is. There are tantalizing hints at patterns, such as the same string of 8 SSL's in the first and penultimate line,[79] and the close similarities between the second and last lines. However, trying to find patterns, either by looking at a visual representation or by listening, gives one the feeling of looking for pictures in the

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[79] Pieslak perceptively points out that this is a quote of the opening riff of Anthrax's "Time", the significance of which is several layers deep (Pieslak "Re-casting Metal" 241). The similarities between "I" and "Time" seem to go even further: compare 1:11-1:14 of "Time" and the B section of "I", 1:33-1:55.

random static on a TV screen - a feeling that is justified, because the band claims that much of the piece was made in a random, improvisatory manner. When asked about playing *I* live, which the band has never done, drummer Tomas Haake responded:

> Yeah, the very beginning of that track [*I*], that whole drum fill, if you will, between the kicks and the toms, I don't know if I could ever learn that one in the exact same way. I think a lot people don't really know that it is random, and we never learned it ourselves. I just recorded drums and as I said, we just recorded guitars and bass on a bar by bar basis. We never really learned it as big chunks of music. It is written and recorded in a weird way.[80]

If there is a conscious meaning to be found in the patterns,[81] and I'm certainly prepared to believe Haake that there is not, the band are not public about it.

While the section adheres to a few very rigidly defined rules, such as homorhythmic attacks at the same pitch in guitar and bass, that are almost always either a quarter note or a dotted quarter note long (with one attack lasting a half note in the whole section), a constant double bass drum and tom roll that also accents the guitar attacks, and a resultant clearly perceptible pulse the whole way through, the section is ultimately extremely disorienting. Patterns seem to emerge and are immediately broken. No consistent metric grouping presents itself for any significant amount of time. Because the building blocks of the rhythm are all the same and pitch doesn't change, there are no signposts to give a sense of where in the section one is (all of this became even more frustratingly apparent to me when transcribing the section).

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[80] Slevin, Patrick. "Interview with Meshuggah: Challenges Collapse." Published on theaquarian.com 12 Mar 2008, accessed 2017. http://www.theaquarian.com/2008/03/12/meshuggah-challenges-collapse/

[81] It's tempting to look for something like the use of the Fibonacci Sequence in Tool's "Lateralus"

This is the case for much of the piece. While Pieslak teases out some details of construction in the C and D sections,[82] his analysis still points out among the similarities between sections certain arbitrary-seeming insertions or deletions in the flow of attacks. Several sections of the piece are easy to explain rhythmically, such as the I and K sections, and a few such as the last section L contain blocks that are repeated enough, short enough, and contain enough harmonic motion that they do not feel bewilderingly arbitrary like other sections such as A, E, and H. My focus, though, is on these sections, the ones that contain long strings of seemingly arbitrary patternless attacks. If the anti-patterns themselves don't necessarily mean anything, what might this arbitrariness mean?

Meaning in the A section of *I*

I can read two main meanings from the use of arbitrary, linear rhythms in *I.* The first is biographical and social: these techniques as they appear on *I* are a complete departure for the band from previous compositions that had relied on shorter repeating fragments overlaid over regular 4/4 meter.[83] This positions the EP as an artistic and technical experiment and risk, which is essential to the band's image. In other words, in light of the band's existing work, the arbitrariness on *I* can be read as saying "We are an artistic, experimental band that is still creating music that challenges ourselves and will challenge listeners." Pieslak points out the way that the Anthrax quote in the first few seconds also means this - by quoting a thrash band that was one of

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[82] Pieslak "Re-casting Metal" 229

[83] As Smialek explores in detail, there is a similar use of almost-patterns that don't ultimately pan out for pitch choice in *Catch-33* but never with respect to rhythm. Smialek, "Rethinking Metal Aesthetics" 66-70

their influences and then quickly moving on from this quote, Meshuggah position themselves as an innovative next step in the thrash metal lineage.[84]

This message is equally important for fans. While I don't mean to belittle fans' specific attraction to the pleasures centered around these rhythmic techniques and have elaborated on them in detail, there is undoubtedly for many fans a feeling of justification that comes from listening to challenging music: perhaps a way to feel good about the music that one already enjoys, sort of like feeling reassured that tasty food is also healthy. Smialek explores this attitude and its implications in his thesis on Meshuggah's *Catch-33*, and I will pick these ideas up in my conclusion section.

Second, and more specifically to this song, we can look at the ways in which these rhythmic techniques complement the other musical details of the piece. I read the A section as an effective musical evocation of mortality, and the chaos and disorder of life. I take my cue from certain of the lyrics (from later in the piece, taken from different sections):

> Blind - these mortal men of clay, divine and dying in their harassed form /…/
> I crave my nothingness /…/
> The cogs turn, grinding away at ceaselessness, willing it to dust /…/
> Shifting through worlds from chaos, to chaos, to chaos /…/

Chaos is portrayed in the A section through the use of rigid parameters centered around binaries. In the guitars, there is only either a single pitch (the same throughout the section) or silence. The duration of each of these attacks, with one exception, is either short (quarter note) or long (dotted quarter note). Within these parameters, there are no patterns, as discussed above. The parameters allow the band to portray randomness and chaos by representing it as the digital

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[84] Pieslak "Re-casting Metal" 241

randomness of alternation of short and long attacks. This is one of many examples of the band's oeuvre, starting with *Future Breed Machine*, of conflating human and machine characteristics. However, this is a different take - here, the focus is on the possible meaninglessness and narrow, binary chaos of human life, as reflected in the binary chaos of the section.

"Prancer" - no pattern, no pulse

Another example of the use of rhythmic difficulty created through non-patterns can be found in the work of the band The Dillinger Escape Plan. I look specifically at the song "Prancer" from the 2013 album *One Of Us Is The Killer*, though much of what I discuss applies to the majority of the band's output.

There has already been an academic article that treats some of the rhythmic difficulty presented in the band's music, Brad Osborn's 2009 article that discusses the song "43% Burnt". He proposes a model for comparing difficulty of melodic (sequential) rhythmic dissonance that depends on the length of a shared 'pivot pulse' between sequential metric cardinalities. In other words, he points out that it is less jarring (challenging, in my words) to move from a slow 6/4 to 4/4, where a half note pulse can be maintained uninterrupted, than it is to move from 4/4 to 9/16, where the quarter note pulse and even the 8th note interpretive levels cannot be carried through.[85] This is another source of difficulty, or rather a way in which the difficulties of the band's non-patterned sections are sometimes compounded.

Osborn's model certainly holds up and applies to much of the band's music, but I argue that in The Dillinger Escape Plan's music, they often take melodic rhythmic dissonance even further by removing not only pattern but pulse. There are many sections of their songs that feel

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[85] Osborn "Beats That Commute"

rhythmically off the grid (imagining the regular grid of pulses and even subdivisions), as well as sections where there is not even a discernible grid to use as a reference point.

The band does not make public the specifics of how it approaches playing music like this. It is always, of course, possible to fit any series of rhythmic attacks to some sort of grid if one subdivides small enough, but after a certain point this becomes a task that gradually slips out of the perceptive range of human musicians and listeners, as will be demonstrated in the examples below. Perhaps the band thinks in terms of subdivisions of some type, but there is strong evidence to the contrary, hinting at a way of thinking about rhythm that is not always dependent on meter and pulse.

I look specifically at the first three sections in "Prancer:" the homorhythmic opening section (:00-:06), the non-patterned but pulsed second section (:06-:32), and the following section in which sense of pulse is largely obscured (:32-:50).

I will examine the second section first, because it has the most similarities to the ideas discussed in my analysis of *I*. It is very similar in construction - a very rigid harmonic and textural structure is used in order to foreground rhythmic irregularity, and this rhythmic irregularity does not follow a pattern within the section (though in "Prancer," this whole section repeats). While there are repetitions of certain chunks, as there was in Meshuggah's *I*, these do not help much to develop an aural framework. The guitar part can be represented in a sort of attack point analysis, which highlights the patternlessness of the section. Read from left to right on both lines, where the numbers represent the number of eighth notes spent on either the low open E string or the high dissonant chord (FIG 23):

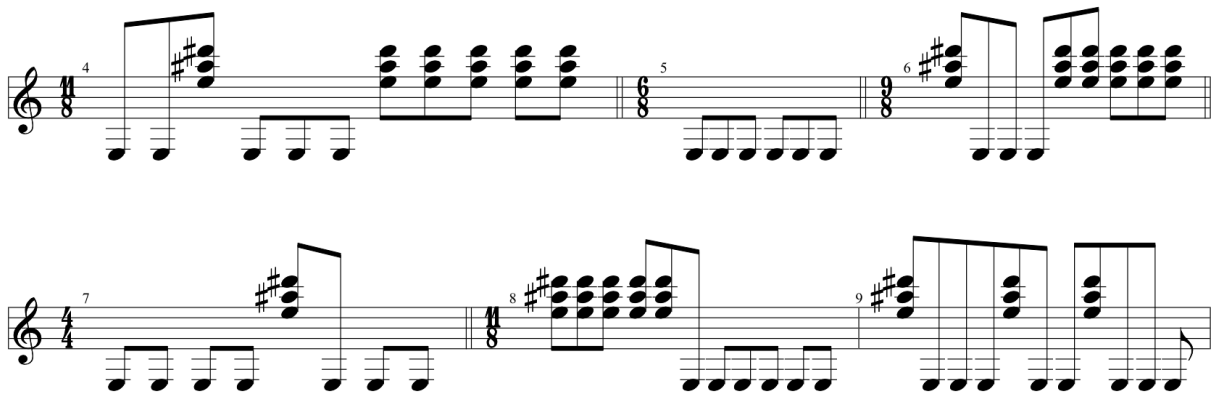
Fig 23: attack point lengths in The Dillinger Escape Plan's "Prancer" :06-:32

High: 1 5 1 5 1 5 1 1 1

Low: |: 2 3 6 3 4 3 6 3 2 3 :|

A full transcription is in FIG 24, with bar lines determined by the vocal phrasing (not notated).

Fig 24: "Prancer" by The Dillinger Escape Plan, :06-:32, guitar



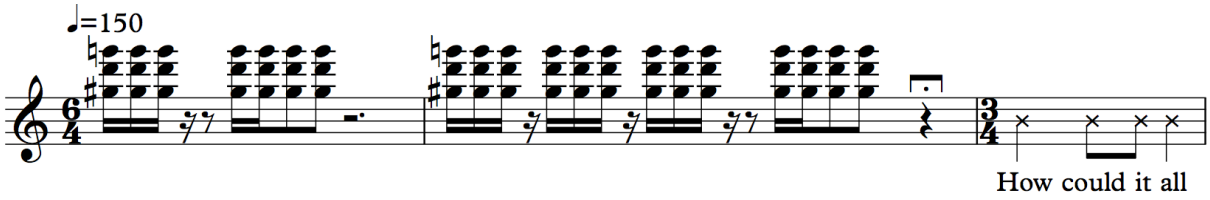
There is only the alternation of the low E string and the dissonant chord in the upper register, and the drums follow the guitar riff closely. The highlight is the irregular and constantly changing groupings of each. Like *I*, there is a binary. In *I*, it was the alternation of short and long attacks that was varied without repeating any pattern in any predictable way. In "Prancer", it is high and low that are alternated with no pattern to the groupings. When listening, just as in *I*, there is a constant feeling of being dropped, of having expectations proven wrong, of losing one's place, even though the string of non-repetition is relatively short and it is much more possible to memorize it than it is to memorize the beginning of *I*.

The first and third sections go further in creating melodic rhythmic dissonance, though, because in addition to containing no easy pattern, they obscure the sense of pulse. In the above section and in *I*, while it is hard to predict any specific attack because that requires memorizing a

long and seemingly arbitrary string of binary states (short and long, or high and low), it is easy to feel the pulse, which never changes. Not so in the first section of "Prancer."

The opening section has a non-pulsed quality, a result of the homorhythmic texture and the long, unmetered pause after the opening attacks (think of the opening of Beethoven's 5th). I've transcribed it as follows (FIG 25):

Fig 25: "Prancer" by The Dillinger Escape Plan, :00-:06, guitar and voice

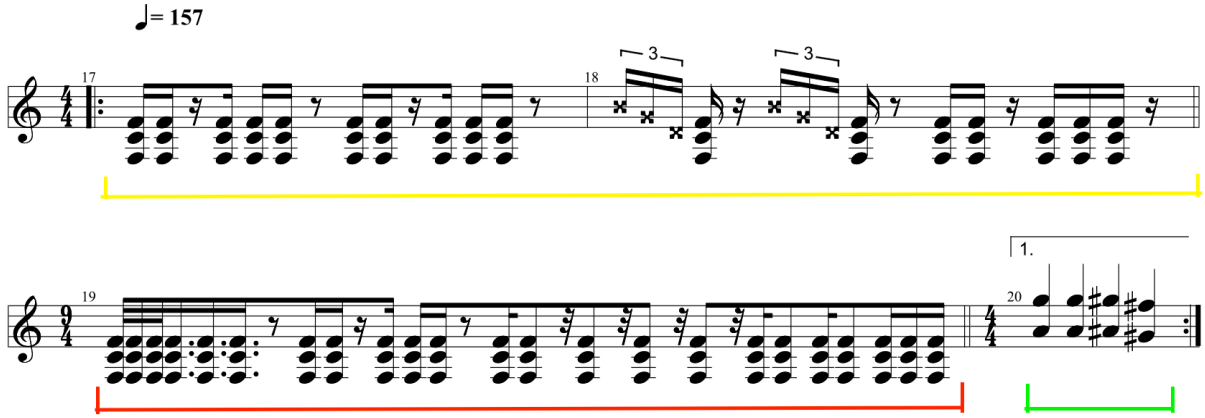


While it takes some careful listening to discern the constant pulse and therefore the 6/4 measures in the opening barrage, it is certainly there. However, the long dramatic fermata rest before the screamed vocals and the start of the second section disrupts rhythm. In the album recording, this pause is brief (a couple seconds) but enough to disrupt the pulsed flow. Live, though, the band will pause for much longer (10-20 seconds), building suspense, before singer Greg Puciato brings the rest of the band in. This non-pulsed silence disrupts a pulse that was only weakly felt in the first place, leaving a state of uncertainty before the start of the second section.

The third section takes this even further. The second section ends with a rallentando (:28-:32) that leaves the pulse entering the third section unclear. The length of the pause is also ambiguous and feels unmetered, it has a similar dramatic fermata pause feel as the end of the first section. One therefore does not enter the section with a clear idea of pulse, and its entrance at :32 is jarring. From here, the pulse is even harder to follow, though at the end of this subsection, which is repeated twice, there are moments of clarity. I diagram this in the

(approximate) transcription[86] of FIG 26. Green represents moments when the pulse is clearly audible, yellow where it is less audible, and red where it is hardly audible at all or only audible as a carryover from the other sections.

Fig 26: "Prancer" by The Dillinger Escape Plan :32-:50, guitar, pulse visibility diagram



While the above transcription gets some things right and is certainly serviceable as an aide to learning to play the section along with the recording, it is fundamentally flawed in the sense that the rhythms don't actually line up. When a MIDI representation of the above is played at the same time as the recording, it becomes obvious that the two do not agree. Feeling the pulse of the sections marked yellow above as notated gives a tempo of about 125bpm, while the green sections are at about 160bpm, and it is still very hard to feel any pulse at all in the red section.

My conclusion, then, is that this section is the result of extreme ensemble tightness and a long history of writing music like this, and *not from relation to a fixed pulse*. This seems to be backed up by a remark from bassist Liam Wilson:

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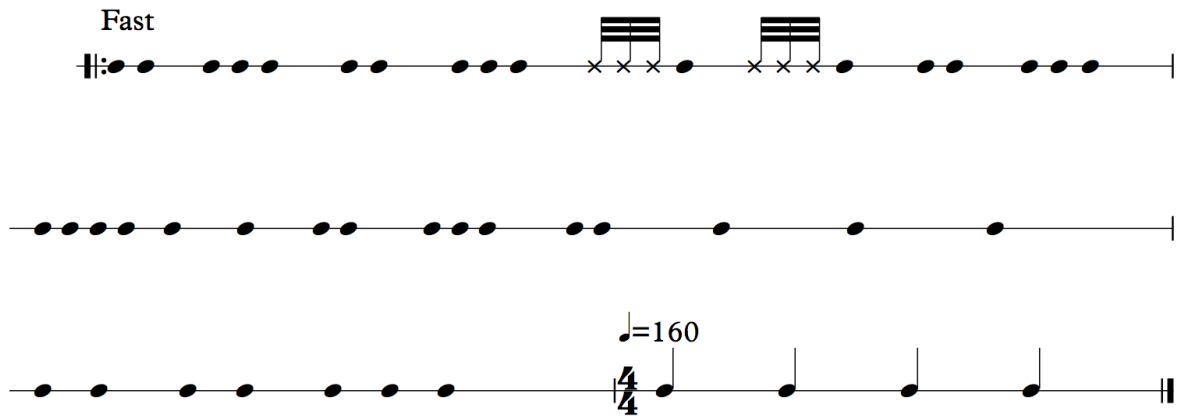
[86] by ultimate-guitar.com contributor Lersch646, underlines are mine. https://tabs.ultimate-guitar.com/t/the_dillinger_escape_plan/prancer_guitar_pro.htm

> Some songs have a tempo-map, some don't. We're not big fans of "quantizing" per se, but some songs do start with a click track for reference and we end up turning it off; others help make more sense of the madness of certain sections with it. There were times where we'd turn off the click just to see how close Billy [drummer] was, and his internal metronome was so on-point it was downright freakish. In my opinion, we don't need it, and most of us agree things sound better without one.[87]

I would wager that this is one of many song sections in the band's oeuvre where a click track would make things harder rather than clarifying them. Rather than grooving to a well established pulse, the section is another example of a sort of anti-groove in which there seems to be no invitation to listen with a regular pulse. It seems that some sort of proportional rather than metered notation would be more appropriate as a transcription of this section (FIG 27).

Fig 27: "Prancer" by The Dillinger Escape Plan :32-:50, proportional notation



Meaning - artistic idiosyncrasy and iconoclasm

Like in *I*, sections like these seem to be at least partially about chaos, which is vividly brought to life in their live shows, at which strobe lights are pointed into the mosh pit, which has a (well-earned) reputation for being one of the most active in metal. However, there is a more

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87 Cohen, Joshua T. "The Dillinger Escape Plan Interview with Liam Wilson." Published on blowthescene.com, 30 Sep 2013, accessed 2017. https://blowthescene.com/interviews/dillinger-escape-plan-interview-liam-wilson.html

specific meaning in passages like the ones from “Prancer” examined above, one that resonates with many other aspects of the band’s music and performance life: the idea of the powerful manifestation of the idiosyncratic artistic will. In other words, the idea that the band will defy traditional barriers of various types and *be wherever they want*.

We can see this in their relation with genre. One of the original math metal bands, they’ve had no problem incorporating influences from grindcore, hardcore punk, metal, pop/rock, as well as glitch and IDM (Intelligent Dance Music). On earlier albums, they shocked with deconstructed, extremely fast and abrasive math metal oddities (*Calculating Infinity*), and on later albums they again shocked with pop song structures (“Milk Lizard”) and computer programmed interludes (“Fugue”).

We can see this in their lyrics - to take just one representative line from “Prancer:” “For the record there is never anyone controlling / Our trajectory is ours.”

We can see this in the band’s live performance. They are notorious for doing things they aren’t supposed to onstage and being where performers aren’t supposed to be. Guitarist Ben Weinman jumps off of speakers, wades into the crowd stepping on shoulders and faces, hangs upside down from the rafters and from lighting fixtures, and knocks over equipment, all while playing, and has the history of injuries to show for it. Singer Greg Puciato is known for an iconic performance at the 2013 Revolver Magazine Golden Gods Awards during which he hit his head while headbanging and continued the performance for several songs with blood streaming down his face. Puciato is notorious for breathing fire during performances of “43% Burnt”, including at

the (evidently aptly named) Furnace Fest in Alabama in 2002, where he set speaker cabinets on fire.[88]

We can see this in the band's use of harmony, which is full of harmonic minor seconds, tritones, and major sevenths (see examples in the transcriptions above). Ben Weinman mentioned this in an interview:

> It ultimately comes down to the band remaining an insular unit and having faith in their convictions by not taking on any external input in so far as the "correct" way to do things… Everything about Dillinger was incorrect, certainly in terms of theory, we went against everything. *Calculating Infinity* was us effectively ripping up the music theory book; if someone said "don't harmonize with a second, it just sounds out of tune," then every single lead we did, we'd harmonize with a second. It sounded disgusting, but we did it.[89]

While these remarks seem to be a reaction against a certain fairly basic conception of tonality, perhaps that which appears in many pop music genres, rather than any notion of tonality as exists in art music of the last century, the attitude is striking and fits their rhythmic style as well.

Finally, we can see this in the band's decision to disband after the release of their final album *Dissociation* in 2016, a decision they've discussed at length in various interviews, but is best summed up by Greg: "this was our artistic statement, and now that's it!"[90] By artistic statement he refers presumably to the band's whole career and output. They wanted to end on their own terms, to have some control over their legacy.

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[88] Epstein, Dan. "Dillinger Escape Plan's 10 Craziest Shows." Published on rollingstone.com, 14 Oct 2016, accessed 2017. http://www.rollingstone.com/music/lists/dillinger-escape-plans-10-craziest-shows-w444546

[89] Dedman, Remfry. "The Dillinger Escape Plan Interview: 'The only way to finish this correctly is to do it in a way that has a definitive end'" published on independent.co.uk 13 Oct 2016, accessed 2017. http://www.independent.co.uk/arts-entertainment/music/features/the-dillinger-escape-plan-interview-the-only-way-to-finish-this-correctly-is-to-do-it-in-a-way-that-a7359221.html

[90] ibid

I believe that all of these aspects of the band's character form a coherent way of interpreting the non-repeating, non-pulsed passages such as the third section of "Prancer" and in the rest of their music. The artistic idiosyncratic will is portrayed not only in the creation of a non-pulsed, non-repeating passage, which goes against implicit genre rules for all of the band's many parent genres, but also metaphorically in the placement of attacks off the usual metric grid - placing attacks where (when) they are not supposed to be.

Conclusions

There are several conclusions to be drawn from my analysis. First, I highlight some of the ideas I've developed that are most widely applicable to understanding many different uses of rhythmic difficulty. I group these into two types of conclusions, those that apply to listening to the music from the outside (without a deeper understanding of the music's theoretical logics) and those that apply to listening from the inside (with a conception of how the music is structured and a deep familiarity with it).

Dr. Olivia Lucas, in one of the most accurate and insightful descriptions of the live metal experience I've read, describes two archetypal groups of fans of Meshuggah's music which correspond to these two types of conclusions. One group is in the mosh pit, right in front of the stage; this group feels the music viscerally and focuses on the heaviness, the grooves, the 4/4 pulse, and turns the energy of the music into an intense physical experience full of pushing, jumping, headbanging, and crowd surfing. For this group of fans, I highlight the role of disorientation in creating and enhancing heaviness.

The other is on the balconies above the pit; this group consists of "those who come not to mosh but to count."[91] This group marvels at the musicianship and technical brilliance of the band and contemplates the intricacies of the rhythmic architecture of Meshuggah's music. For this group of fans, I expand on conclusions about systems of polymetric syntax and the social implications of listening to music in this way.

Of course these groups are archetypes metaphorically represented by different physical spaces at a concert, and any fan may exist on a spectrum between the two types of appreciation

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[91] Lucas, O. "Loudness, Rhythm, and Environment" 66

or be invested in both - I say this from personal experience, because while writing this thesis may seem to place me in the balcony, when I actually attend Meshuggah's concerts I always experience them from the mosh pit.

Finally, I synthesize and add to the conversation about the cultural place of extreme and progressive metal, drawing heavily on Smialek's and Lucas' ethnographic analyses and looking at the ways in which it is possible to think of extreme metal as becoming increasingly closely related to the art music tradition rather than to the popular music tradition from which it originates. Implicit in all of this is a continued argument for the value of close, specific, technical but flexible reading of metal music in general and progressive and extreme metal in particular.

Hearing Outside: Heaviness Through Disorientation

I theorize in various of my examples a direct relation between disorientation caused by rhythmic complexity and perceived heaviness. Rhythmic complexity creates disorientation - in all of my examples, there is something that makes either the pattern of attacks, the pulse rate, or both obscure and difficult to follow or predict. Heaviness is a catch-all term that Mynett describes through several parameters such as loudness, precision, and sonic weight.[92] I link the two both from personal experience and through several arguments in my analysis of "I Am Colossus." The link will be strengthened by other musical features, and disorientation and heaviness are not mutually inclusive, but can serve to amplify each other in the work of progressive and extreme metal bands.

This is important because it addresses a subtle gap in the scholarship on Meshuggah and use of rhythm in extreme and progressive metal. Scholars have done admirable work on the

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[92] Mynett *Metal Music Manual* 9-21.

complexities of the construction of Meshuggah's rhythms, and many have acknowledged that the background 4/4 beat plays an important role in allowing listeners to groove to the music and mosh to it. However, this interpretation does not hold up for the music of bands like The Dillinger Escape Plan - at their shows there is plenty of moshing, but often with no background 4/4 beat or even any beat. It seems that the link has not been made between disorientation and enjoyment - there are the enjoyments linked to the 4/4 pulse, and the enjoyments linked to understanding patterns, but no discussion of the pleasures of opaque, bewildering rhythms. The idea that these complex rhythms create perceptions of heaviness bridges this gap.

Hearing Inside: Systems of Rhythmic Difficulty, Connoisseurship

Another key conclusion that emerges from my analysis is the way in which meaning has been created from the consistent implementation of rhythmic structures, specifically Meshuggah's characteristic use of polymeter within regular hypermeter. Listeners who gain familiarity with these structures, through the expenditure of much time listening and often studying, gain access to a wide variety of meanings that are presented by subtle differences in the presentation of these rhythmic structures, as I show in my analyses of "Clockworks" and "Dancers to a Discordant System."

Knowledge of these structuring systems also gives a syntactical understanding of the music as it is happening and a starting point for analysis, and in this way rhythm in the music of Meshuggah and other bands can take on a role loosely parallel to that of harmony in tonal music, as I point out in general in my analysis of "Clockworks" and with more specific analogies in the idea of the polymetrical cadence to resolve metric dissonance and in uses of metric modulation.

I also wish to return to one of my basic premises about this music - that it is not just rhythmically complex but rhythmically difficult. This is the basis for another overreaching conclusion - that fans of this music are often attracted to the music partly because of the difficulty and complexity itself, along with whatever other aspects of the music might be appealing. While disorientation can be appealing because of its links to heaviness, disorientation can also be appealing simply because it means that the music is difficult and therefore potentially rewarding. Smialek notes this response among some reviews of *I*:

> Some reviewers who spoke highly of I and Catch Thirtythr33 seem to embrace barriers to their comprehension, either rationalizing their sense of incomprehension or labouring to 'appreciate' Meshuggah. During the long introduction to *I* for example, one reviewer describes his or her initial frustration with the guitars' repeated rhythmic patterns but then is grateful in retrospect for the mood it creates.[93]

It seems, then, that difficulty itself can be a desirable attribute in its potential for growth - having a barrier to get past leads to a more rewarding musical experience in the long run.

Without downplaying distanced, technical appreciation as a genuine mode of enjoyment for fans, it can also be said to be a way of cultivating both subcultural *and* cultural capital. Keith Kahn-Harris, after Sarah Thornton, describes subcultural capital in the extreme metal scene as a way to "gain self-esteem and a rewarding experience of the scene."[94] Subcultural capital is "most effectively displayed through knowledge of individual bands and albums."[95] In the case of Meshuggah's music, this can be extended to knowledge of the musical structures and rhythms of specific songs. Evidence for this exists in the plethora of highly accurate fan covers of

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[93] Smialek, "Rethinking Metal Aesthetics" 112

[94] Kahn-Harris, *Extreme Metal* 121

[95] ibid 123

Meshuggah songs, mostly on guitar and drums, on YouTube, and the detailed praise and critique that these performers receive in the comments sections.[96] What better way to demonstrate a complete and detailed knowledge of the music, and thus gain subcultural capital, than to actually learn to play it?

However, I argue that accruing subcultural capital, when it takes this form, begins to look like more mainstream (art music) methods of cultural capital production. Nicola Allet describes how fans of extreme metal music often position themselves as connoisseurs of extremity and "dissonance" (a term that can be applied to traditional harmonic dissonance as well as timbral abrasiveness and, in the case of my research, metrical dissonance) in order to differentiate themselves from a culture that is increasingly saturated with the "extreme." She concludes that her interviewees "placed importance upon musical virtuosity, intelligence, expert knowledge, and distanced judgement,"[97] and notes the similarities between this mode of interacting with the music and that of art music listeners. There is some give and take between fans who listen to music like this, the music, and ideals of high culture - by creating music like this, Meshuggah and similar bands enable fans to interact with metal in this way and thereby gain access to higher subcultural and, perhaps eventually, cultural standing. This leads to interesting conclusions about the place of extreme metal music in culture, which I explore in the final section of my conclusion.

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[96] For one example, see this guitar cover that features a counting metronome on the screen to highlight the precision of the rhythms: https://www.youtube.com/watch?v=uMR0wW-T2pA

[97] Allet, N. (2012). The extreme metal 'connoisseur'. *Popular Music History* , 164-179.

Art music vs pop music (the djentrification of extreme metal)

In light of my analyses, I will make a fairly large closing argument: that, aware of the problems of dividing music along lines of art and popular music, I see extreme and progressive metal[98] as having enough archetypical characteristics of art music that it is problematic to continue to classify it as "popular music." For one, metal music is not popular (widely listened to), at least not on the scale of hip hop, rock, country, or electronic music. It is hard to gauge the relative levels exactly, especially because many album sale data lump metal under the larger category of rock. However, it seems like a safe bet that the popularity of metal, and of the type of extreme metal I discuss, is globally much less than that of hip hop, country music, rock, and electronic dance music.

For another, there is a greater focus on musical structures than there is in other music styles. In most pop music songs, there are subtle (if any) variations on the same song structures, harmonic content, and rhythms. The interest comes more from individualized performances, individualized voices and instrumental performers, from lyrics, from production choices and timbral details. The interest in progressive and extreme metal of the type I focus on comes more from the compositions, the forms, riffs and rhythms of the songs. Metal production is largely homogenous - loud, compressed, distorted. Individual voices are often metaphorical rather than literal - metal bands' individuality is expressed more often through compositional style than performance style. There are still guitar solos, and vocalists and drummers have distinct styles

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[98] by which, again, I mean specifically the type of metal that I have looked at, though the argument is essentially the same for the music of many black metal, death metal, progressive metal, grindcore, and doom metal bands

and sounds, but overall it is ensemble tightness, the ability to realize complex compositions that is prized.

The content of these compositions also reflects the care for structures that the bands have. My analysis section can be read as an extended, symbolic conversation between bands that react to and elaborate on rhythmic ideas presented by other bands. This is certainly true of the younger bands influenced by Meshuggah, such as TesseracT, Animals As Leaders, and The Contortionist. They take elements of Meshuggah's style and elaborate on them in highly technical and specific ways; by playing with tempo, as I explore in my examples, but also in their different uses of hypermeter and polymeter as well as their different timbral and harmonic languages.

Lyrics are also less important in metal than in other genres, for the obvious reason that they are normally screamed or growled rather than sung clearly.[99] They are less important than they are in other genres simply because they are much harder to decipher. Not all of the examples I've looked at use exclusively growled vocals, but on the whole this generalization holds.

The priority of the musical structures and technical details of performance is also evident in the ascendant trend of published tab books (written music for guitar players) of whole albums: progressive metal bands have started publish transcriptions of their recordings for musicians to buy and play. While there are of course "fake books" published with transcriptions of other music from other popular styles, the difference is that metal tab books are published by the people who wrote the music. While the commercially released studio recording is still undoubtedly the primary "unit" of music for progressive metal, closely followed by the live

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[99] This was studied in Geliebter, Ziegler, Mandery, "Lyrical stresses of heavy metal and rap" (2015)

performance, the rise of published scores is another aspect of the subgenre that is similar to art music archetypes, where the musical score is the essential version of a piece of music.

Along with this, the thriving online community of amateur transcribers (see the wealth of detailed progressive metal Guitar Pro transcriptions to be found on websites like ultimate-guitar.com) is another indicator of the importance of precise knowledge of musical details. One tab for Meshuggah's song "Bleed," for example, has had over 115,000 views.[100] As of May 4th 2017, "Bleed" has been streamed almost 7 million times on Spotify. If we estimate that on average a listener on Spotify might stream the same track around 10 times (a rough estimate that seems reasonable), this would suggest that a significant percentage of listeners (10-20%) also look at a written representation of it. For many of these listeners, it is probably with the aim of learning to play it - as mentioned above, there are plenty of fan covers of Meshuggah songs to be found on YouTube.[101]

But for at least some listeners, myself included, a primary reason for looking at transcriptions of the music of Meshuggah and others is analytical. Smialek explores many of the ways in which listeners interact analytically with Meshuggah's music, including pointing out the implications of the fact that their music has been written about academically by so many (and there have been several more important studies of Meshuggah published since he wrote this):

> That so many analytically-minded scholars have been drawn to Meshuggah is likely due to both their rhythmic and metrical complexity and the particular way in which that complexity is easily understood through Western notation. If we are to ask what importance technical complexity might have for Meshuggah's fans, it is worthwhile to

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[100] https://tabs.ultimate-guitar.com/m/meshuggah/bleed_ver2_guitar_pro.htm

[101] "About 78% of respondents studied music, and more than 2/3 of that number studied formally instead of being self-taught. " (Individual Thought Patterns Thesis 33)

> note that each of the analytical authors I've discussed above are themselves fans. Their way of engaging with Meshuggah's music in a contemplative fashion is not some academically distanced activity symptomatic of what Frith calls "the music/listener value gap" but rather a sign that many Meshuggah fans are musicians (with what Bourdieu might call an academic habitus).[102]

I would add that many of these fans are not only musicians but theorists. All of this points to the ways in which fans of extreme metal music interact with the music (sounds) in a more technical and detailed, intimate way than may be the case for other genres normally thought of as "popular."

Finally, many of the bands I discuss have begun to interact with the world of western art music. This goes in two directions - Smialek has argued for a decidedly modernist aesthetic in Meshuggah's music, as well as pointed out the ways that the influence of jazz guitarist Allan Holdsworth on Meshuggah guitarist, Frederik Thorendal points to the art music tradition. Tosin Abasi, founder and lead guitarist of Animals As Leaders, has had jazz training and likewise uses jazz harmony extensively. In the other direction, classically trained composers such as Miles Okazaki and Dan Weiss cite Meshuggah as an influence, and SEVEN)SUNS, a Brooklyn-based string quartet, has collaborated extensively with The Dillinger Escape Plan.

There are of course still many aspects of progressive metal that are firmly in the realm of popular music. It runs on the popular band archetype: record, get signed by a metal record label, record CDs, sell CDs and merch, tour. Most metal musicians are largely self-taught, and if they are taught it is almost always from private lessons rather than institutional education, though many metal musicians are school-taught in other genres of music (jazz or classical education). While some bands have moved toward more text-based conceptions of music (selling tab books),

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[102] Smialek, "Rethinking Metal Aesthetics" 36

the recording on a CD, on vinyl, on cassette, or downloaded online is still the way that metal music primarily exists, with live performances as a close second. Finally, like in many other popular music genres, there is no division of labor as there is in art music archetypes: in metal, performers are composers and often also producers, and bands stay together and are defined collectively.

These points are summarized below (FIG 28):

Fig 28: Progressive metal as art music vs progressive metal as popular music

Progressive Metal as Art Music	**Progressive Metal as Pop Music**
Not popular	Selling CDs, touring, selling merch, record labels
Focus on musical structures, less than bands	Not taught in academic spaces
Less focus on lyrics	Formal training is rare
Starting to see the rise of published texts (tab books)	Recordings and performances as primary unit of music
Beginning of conversation with the art music tradition	Composers are performers and often producers

This may seem like a bid to argue for greater cultural prestige for metal music, if one conflates art music with “more artistic”, i.e. “better”, music. This is not the case - I am simply pointing out a trend that seems to indicate that certain types of extreme metal can no longer be unambiguously labelled as “low culture” or “popular” forms of music.

Lucas details a parallel trend in the introduction to her dissertation, which charts the increasingly institutionalized nature of metal, in changes to festival organization and the increasing reach of metal studies, which is starting to make its ways into universities in the form

of courses and ensembles. Lucas succinctly discusses the pros and cons of these trends, which include increased access but decreased vitality.[103]

The increased institutionalization that Lucas points out, along with the factors outlined above that point to metal looking like an art music, have important implications for metal as a subject of academic study. While there is much admirable work on the popular aspects of the music (timbres and production, formation of metal scenes, nature of fandom, sociological perspectives), there is less work so far that examines the intricacies of musical recordings, the ways that these recordings make meaning with musical details in the realm of music theory. Metal studies will do well to deal with the ways in which, as Walser argued in 1992, "metal musicians adapt classical signs for their own purposes, to signify to their audience, to have real meanings in the present."[104] His exhortation is more relevant than ever today, and this analysis has been a foray into this area that hopefully demonstrates the potential richness of the approach.

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[103] Lucas, O. "Loudness, Rhythm, and Environment" 10-20

[104] Walser *Running With The Devil* 104

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