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The Emancipation of Discordance

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The Emancipation of Discordance

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The Emancipation of Discordance

by

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This study proposes a primarily esthesic, listener-oriented approach to discussing music that is "out of tune" or *discordant*. The paper is divided into two main sections: in part one I work to define discordance as a type of qualia experienced when a hypothetical listener perceives something as "out of tune." I then present a classification scheme for categorizing different varieties of discordance qualia, based on the perceived intentionality behind discordant events. This system details three primary categories of discordance: 1) incidental, whereby discordance is introduced via a performer's mistake or oversight; 2) expressive, which includes discordances introduced intentionally by a performer; and 3) structural, whereby the discordance is systemic, resulting from factors outside the control of any individual performer. In part two, I present an analytic essay on a movement from Easley Blackwood's 1980 *Twelve Microtonal Etudes*, a work that invokes structural discordance qualia in listeners enculturated in twelve-tone equal temperament. This analysis explores Blackwood's attempt to mimic functional tonal

syntax in nineteen-tone equal temperament, and describes the impact of the structural discordance qualia on familiar varieties of tonal ambiguity.

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Introduction

Discordance phenomena account for some of the most aurally striking aspects of the listening experience. Such musical events that register as "out of tune" have the power to disrupt audience engagement, drawing listeners away from the musical surface and directing attention instead to contingent, inessential aspects of a given performance. Despite the immense power discordance wields, the subject remains underexplored in the theoretical literature. In this study I address this dearth by examining discordance phenomena in an attempt to understand more fully their consequences for musical perception. I begin by working to define a more nuanced definition of discordance than is commonly employed, approaching the subject from a primarily esthesic perspective, one concerned with the phenomenological experiences of hypothetical listeners. Then, in part one, I describe three primary varieties of discordance, discuss the means by which each is produced and recognized, and detail the resultant effects of each on musical meaning and the interpretation of certain musical structures. In part two I present an extended essay demonstrating some of the analytical insights afforded when attending to discordance.

Before crafting a definition of discordance it will be helpful to clarify what I do *not* mean by the term. Discordance is sometimes deployed colloquially to refer to a sonic event that is largely unpleasant; this is the meaning implied when Oliver Sacks defines dissonance as "the discordant sound produced by a major second, for example."[1] I separate dissonance and discordance into two related but distinctly separate phenomena, and while a dissonant event may be discordant (and vice versa), the presence of one does

[1] Oliver Sacks, *Musicophilia: Tales of Music and the Brain* (New York: Alfred A. Knopf, 2007), 118.

not necessitate the other, for reasons we shall soon see.[2] Discordance is more commonly used to describe pitches that are "out of tune;" this definition is consistent with the present usage, but one that must be further unpacked and refined.

I will temporarily set aside "discordance" as a label, instead proposing the term Subscalar Deviation (SDV), which constitutes any pitch event that deviates microtonally from a posited normative scale or pitch collection. SDVs cannot occur at the level of the local or global governing scale: in a tonal work, for example, a "wrong note" taken from the local diatonic collection would not qualify, nor would a non-diatonic pitch that is a member of the governing chromatic collection; SDVs take place at a finer level of pitch discrimination. Such events are not generally considered musically significant in the Western world, where twelve-tone equal temperament (12tET) has been the largely uncontested de facto tuning system since the early part of the twentieth century. As a result, we tend not to consider pitch events at any level lower than the chromatic collection, which serves as an unquestioned baseline pitch resource.

Other factors contribute to this as well: Western musical notation displays pitches as objects occurring in a fixed space, able to occupy any one of twelve pitch-class locations. There exists no standardized method for notating subscalar pitch events, although individual composers and transcribers have invented idiosyncratic methods.[3] More recently, technological developments such as MIDI (Musical Instrument Digital Interface)—used primarily in popular musics—discourage the use of subscalar pitch

[2] The distinction between dissonance and discordance is addressed more fully in part two.
[3] See, for example, Ben Johnston's system for notating extended just intonation, which employs modified sharp and flat symbols to represent a number of small pitch distinctions.

events, as the MIDI protocol does not permit any deviations from 12tET. Additionally, such MIDI information is frequently manipulated in Digital Audio Workstations (DAWs), which display pitch events as static objects easily manipulable down to the level of the chromatic scale, but no further.

In Western musics which employ 12tET as the referential tuning system, any pitch event that deviates from that system would, under this definition, be considered an SDV. Of course, given any piece of music written for some other tuning system—say the *Pelog* system of Bali and Java—it is deviation in pitch from Pelog that constitutes a SDV. This underscores the fundamentally contingent nature of SDVs: a normative reference system must be in place before an SDV can be said to have occurred. There can be no SDV in the abstract, nor can any pitch event said to be an "objective" SDV. Consider an analogous case of consonance and dissonance: within the context of western classical music of the 18th century, certain harmonic intervals—such as the tritone and major seventh—can be considered intersubjectively dissonant within the context in which the piece was composed and for the audience for whom it was intended. Nevertheless, the stylistic norms of this music were cultural constructs bound to a specific time and place (or to current attempts to reassemble those constructs). We cannot call such intervals 'objectively dissonant,' for they may act as pleasant consonances within a different musical style—indeed, the same aural phenomena may be considered consonant even in an entirely different tuning system.

The notion of SDVs is relatively neat and useful in describing microtonal pitch events within a single self-contained musical system. Of course, the actual musical world

is not comprised of a number of isolated musical genres, cultures, and tuning systems, but an endlessly swirling interplay of stylistic and cultural interactions. In order to model this complex reality of pitch worlds I would like to develop a more refined approach to pitch perception, one concerned with the esthesic, experiential qualities of SDVs and other non-SDV "out of tune" pitch events. It is toward this end, with the intention of describing what takes place in the interaction *between* tuning systems and between various musical styles that employ different SDVs that the idea of discordance becomes useful. Here I will adopt a perceptual, listener-oriented approach to discordance, positing *discordance qualia* as the primary focus point of the following discussion. Any event that registers as "out of tune" to a hypothetical listener—regardless of whether or not the event in question qualifies as an SDV as described above—can be said to elicit discordance qualia. The presence of a listener in this definition is imperative, for qualia cannot exist outside of an individual; discordance qualia are therefore subjective phenomena that can vary between persons and cultures. A quale is one intrasubjective experiential quality of any perceptual phenomenon, one which cannot fully be described or further reduced beyond the label ascribed to that experiential quality—for example, the "redness" of the color red. Discordance actually maps on to this kind of experience quite similarly: for although we can define, in terms of cents or some other quantitative measure, a deviation in pitch content from what is expected—as we do in the case of SDVs—we cannot fully describe the *feeling* of something being, say, 38¢ flat, any more than we can describe the *feeling* of something being blue (although we can describe the frequency of the waves of light involved, the physical makeup of the material reflecting the light into our eyes, etc.).

Discordance qualia are the basis for the discussion that follows. In order to reduce a potentially infinite quantity of information it will be necessary to make some generalizations, since listeners can vary on a number of issues pertaining to discordance qualia, including but not limited to: 1) the types of aural phenomena that elicit discordance qualia; 2) the types of discordance qualia that are considered 'permissible,' (i.e. are familiar, enjoyable, etc.); 3) the range (strength) of discordance qualia that are considered 'permissible;' 4) the stylistic and generic associations aroused by different varieties of discordance qualia; and 5) the qualitative value judgments that arise from the experiencing of various discordance qualia. Despite this variability, it seems reasonable to conclude that there will be many commonalities between listeners of similar cultural origin and musical upbringing, whose musical experiences have shaped their perspectives on discordance qualia in corresponding ways; various such hypothetical listeners will be posited throughout the discussion that follows. The selection of such a hypothetical listener is often crucial, for the determination of vantage point dictates the entire context from which discordance qualia may be described, evaluated, and interpreted.

In this paper I delineate three distinct varieties of discordance, each produced via different types of aural phenomena and resulting in divergent expressive consequences. The primary criteria by which these categories are distinguished is the intentionality lurking behind the discordant event as perceived by a hypothetical listener. I contend that the manner of audience engagement varies significantly between the three types, such that some varieties of discordance will be welcomed as musically significant, while others are more likely to arouse strong distaste. In part one I describe each type and the

contexts in which they emerge, before presenting in part two an analysis that explores the final category more fully.

Part One: Three Types of Discordance

Incidental Discordance

The first type of discordance qualia is *incidental discordance*, wherein discordance is introduced unintentionally in the process of performance. This discordance may be the result of an accidental 'wrong note' (SDV), poorly tuned instrument, etc., and is the type of discordance that comes to mind most commonly when someone speaks of something being "out of tune." Incidental discords are not indicated by any notation, nor are they the result of the intention of a composer or performer. In order for events that register discordance qualia to be interpretable as incidental discordance it must seem to the listener that the pitch event in question was not the result of any intentionality, but occurred as the result of a performer's mistake, oversight, nonchalance, carelessness, indifference, etc. (though as we shall see, qualitative evaluation of such discordance qualia need not necessarily be negative). Such moments wield an immense power over a musical performance, pulling the listener away from attending to the temporal flow of the music and towards the making of qualitative evaluations of a given performer's skill, stylistic competence, preparedness, etc. Incidental discordance occurs not only when seemingly "wrong" and "out of tune" pitches are sounded, but also when a performer's musical instrument sounds incorrectly tuned, such that an entire series of notes (or perhaps an entire performance) seems noticeably more flat or sharp than intended. Incidental discordance nearly always necessitates the presence of an SDV.

Within the confines of the Western art music tradition, at least, there is strong distaste for incidental discordance. Consider, for example, the act of tuning the modern

symphony orchestra, whereby all members of the ensemble attempt to align themselves as closely as possible with a single sounding tone, thereby eliminating any possible discord that might arise between themselves and the ensemble in the performance to follow. We can consider this action a symbolic rejection of discordance, a ritual guaranteeing that all subsequent discordances will likely be interpreted as instances of incidental discordance. The situation is similar in western popular music, where recent technological innovations in both recording and in live performance have resulted in ever more effective means of reducing incidental discordance. In live performance of pop music, at least, lip-syncing is a common technique for avoiding incidental discordance (sometimes called "pitchiness") in vocalists, among other potential pitfalls (forgotten words, poor vocal timbre, strained vocal chords, etc.). Lip-syncing presents a single approved version of a song that is guaranteed to be free of incidental discordance.

Yet lip-syncing technology has its potential pitfalls, as exemplified by Ashlee Simpson's performance in the 2005 Orange Bowl halftime show, during which lip-synching technology was employed in her performance of "La La." On this day an unusually significant amount of Simpson's own live voice was mixed in alongside the pre-recorded track, enough to overpower the recorded vocals at times. Simpson, perhaps unaware of her level in the mix, belted out a performance with harsh, nasal tone quality that became increasingly flat as the performance went on. Simpson's ability to reach the higher-pitched notes decreased, causing her to strain upon each iteration of the chorus. This is prototypical incidental discordance, manifesting as a strikingly out of tune melodic line that is obviously the result of the performer's unintended actions. The

audience responded to this performance vehemently, resoundingly booing her discordant performance.

As mentioned previously, the recording industry is also strongly devoted to reducing and controlling occurrences of incidental discordance. The very fact that a single authorized discordance-free recording exists to be lip-synced to is further evidence of this interdiction. The increasingly prevalent use of auto-tune and other pitch-correcting software makes this kind of recording possible, as does the common technique of splicing together segments of different 'takes' of the same song to produce the final released version; quite often, the segments that are selected are those at that possess the least incidental discordance. Dan Carlin describes his experiences of the pitch-correcting process of Whitney Houston's music while working with producer Mervyn Warren:

> After we finished recording Mervyn's version, he spent a full day comping and pitching Whitney's performance…Whitney records five or six versions of the song, after which Mervyn compiles what he determines to be the best version of each phrase and then edits them all together to create one complete new version of the song. And then he pitches it, which is to say that he adjusts Whitney's intonation to bring her into as perfect a pitch as his fantastic ears can hear. In those days, before you had Auto-Tune and whatnot, you would sit and guess how to adjust the intonation. Mervyn spent a full day doing that comping and pitching.[4]

Clearly, that Mervyn Warren would spend an entire day devoted primarily to pitch-correcting makes apparent the importance he placed on minimizing incidental discordance in the final released version of the song. Nor is Warren alone in this respect, although the process has become significantly streamlined with auto-tune such that it can be completed essentially automatically and nearly instantaneously. While we can

[4] Ron Standoff, "Panel Discussion: Songs in Films Part One," *Music and the Moving Image* 6/2 (2013): 50.

consider this example to represent a fairly typical attitude towards discordance in popular music production, Carlin's experience with producer David Foster provides a different perspective, one clearly concerned with intonation but willing to approach the phenomenon from a slightly different perspective:

> It was completely different with David Foster. He recorded several new versions of Whitney performing his arrangement. Then, David, the engineer, and I quickly comped a new version, after which David announced, "OK there are three pitchy things I want to fix. Does anyone hear anything else?"
> And I had, oh maybe nine or ten things on my list. Now, I think I have pretty good ears for intonation, but I wouldn't claim that they're better than David Foster. So I decided to pick the one that bothered me the most, a spot where Whitney clearly was flat…he listened to the area that I was concerned about and he said, "Oh yeah, I agree. So let's fix that." And we fixed it, and he then he [sic] said, "Well, now it's in tune but I don't like it as well." And he put it back to the way Whitney had sung it. And I thought, "Well, that's really interesting," and that may be why David Foster has more hits than Mervyn Warren, because when you try and make it too perfect, maybe you take too much soul out of it…[5]

Carlin's description of intonational perfection as the death of 'soul' clearly captures an entirely different way of evaluating instances of incidental discordance, one which seems to reflect a new vantage point from which incidental discordance is valued. Within certain cultures and musical traditions, a certain (generally small) degree of discordance can function a signifier for authenticity, marking an idealized 'raw' musical utterance. Take, for example, a figure such as the blues singer Robert Johnson, whose name has become nearly synonymous with a kind of essentialized authentic blues musicality (however problematic such a notion may be). Leaving aside the intonational fluctuation in Johnson's vocal utterances—a topic to which we will return shortly—the sound of his accompanying acoustic guitar is likely to register as highly out-of-tune to

[5] Ibid., 50.

modern listeners enculturated in 12tET and familiar with more recent, more 'polished' blues and blues/rock types of music. Here it is essential to bear in mind the necessarily contingent nature of such statements on tuning, despite how 'wrong' the instrument may sound to us, who may feel that we know what a guitar 'should' sound like. The tuning of Johnson's guitar seems less the result of exact and calculated intentionality than of a free, imprecise approach to tuning. Johnson—and perhaps the general audience for whom his music was originally performed—seems to have possessed a greater tolerance for discordance qualia than do most of us in the West today—certainly more than do producers of contemporary pop.

Incidental discordance continues to play a significant role in notions of authenticity in current popular music; central to such discussions is the perceived role of auto-tune in pop music production. As mentioned above, the technology is widespread, yet it is not without its opponents. In 2009 Jay-Z released a song called D.O.A. (Death of Auto-Tune) that begins "This is anti auto-tune, death of the ringtone, This ain't for iTunes, this ain't for sing alongs…" which received considerable backlash from a number of figures in the recording industry for his perceived conservatism.[6] In response to this song, many rose to the defense of figures such as T-Pain, who uses auto-tune in creative, aurally foregrounded ways. For some artists, including Christina Aguilera, it is only the

[6] Jay-Z, "D.O.A. (Death Of Auto-Tune)," http://www.azlyrics.com/lyrics/jayz/doadeathofautotune.html (accessed April 22, 2014).

"creative" variety of auto-tune incorporation that is justified; the use of the technology for mere pitch correcting is seen as lazy and inauthentic.[7]

Yet there are those who view the software in the complete opposite light. Ne-Yo views auto-tune as a support mechanism for the singer at risk of straining their voice:

> Auto-tune was meant to be a safety net. …You don't want to blow your throat out trying to do the same note a thousand different times, so you'll sing it a few of the times and you'll let the Auto-Tune catch whatever notes fall out, 'kay? It was not meant to be wings. You were not supposed to strap it on your back and jump off the building, that's not what auto-tune was meant to be.[8]

Admittedly, the contentious issues surrounding the use of auto-tune in pop music involve more than simply incidental discordance qualia. Also at stake are issues regarding the acceptability of technology in music in general, the role of the human voice in recorded and in live performance, and the ways in which these issues define certain constructed identities and musical cultures. Yet the pitch-normalizing function of the software speaks to the non-trivial relationship between discordance qualia and broader cultural issues in various popular music genres.

Thus we see that incidental discordance serves a multifaceted and somewhat contradictory function in popular music, acting—at different times and to different people—as either an evil to be minimized at all costs, or as one indicator of a pure, unsullied artistic expression. While this qualia's status in Western art music is much less malleable due to mostly rigid tuning standards, the question of how incidental

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[7] YouTube, "Christina Aguilera Talks Use of Auto-Tune // SiriusXM // Hits 1," https://www.youtube.com/watch?v=fjVG55By_9s (accessed April 22, 2014).
[8] YouTube, "Amaru Don TV Speaks with NeYo – Auto Tune Usage & The Difficulties In Finding Love As A Musician," https://www.youtube.com/watch?v=0MscK8Daor4 (accessed April 22, 2014).

discordance is registered by listeners and what ultimate effect it has on the listening experience merits further attention. These types of questions would lend themselves well to empirical study, an undertaking that has—to the best of my knowledge—not yet been attempted.

Expressive Discordance

Although incidental discordance carries a charged and largely negative status, there is one variety of discordance that has become widely accepted and adopted into countless musical genres. This second type is, like incidental discordance, similarly unspecified by notation or compositional syntax; however, in contrast to the incidental variety, SDVs are here perceived as *actively intended* by the performer. This variety of discordance, generally employed for specific rhetorical purposes, is termed *expressive discordance*.

Certain musical cultures make much more extensive use of expressive discordance than others. Western art music of the common practice era, for example, permits very little modification of pitch information by the performer (vibrato being a clear exception). On the other end of the spectrum, expressive discordance may be so thoroughly adopted into the style that it no longer registers as discordant to enculturated listeners, but becomes a defining feature of the genre itself. In this category we might place vocal bends and slides in popular musics—especially blues and jazz—and bent notes on the guitar as common examples; Eric Clarke goes so far as to suggest that bent notes act as a defining feature of rock music, which may suggest the rock genre even

when played in a non-rock context.[9] The primary difference between incidental and expressive discordance—at least in the abstract—is a difference of perceived intentionality. In practice, however, there are manifest differences, as expressive discordance tends to be deployed in specific ways in different musical styles, while incidental discordance remains relatively random (albeit a randomness that may cluster in statistically and musically significant ways).

Perhaps the most well-known example of expressive discordance are the so-called "blue notes" of blues and jazz music, a shorthand for a variety of pitch phenomena which explore liminal spaces between normative 12tET scale-degrees. Because of the ubiquity of the term, it is easy to imagine we intuitively feel we know what blue notes entail: some amount of 'flattening' of certain scale degrees. But what exactly what is meant by 'flattening?' Of course, flattening a pitch need not result in a subscalar pitch event: we commonly speak of chromatic modifications that 'flatten' pitches (by lowering them one chromatic 12tET step) in Western art music; indeed, this may be the most common understanding of the term. This is the kind of flattening described by Naphtali Wagner in her "'Domestication' of Blue Notes in the Beatles' Songs."[10] Yet according to this usage, blue notes are not SDVs, and therefore cannot constitute instances of expressive discordance.

A definition that better suits our present purposes recognizes the microtonal nature of blue notes and describes them as existing in the liminal space between various

[9] Eric F. Clarke, *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning* (Oxford: Oxford University Press, 2005): 54, 59.
[10] Naphtali Wagner, "'Domestication'" of Blue Notes in the Beatles' Songs," *Music Theory Spectrum* 25/2 (2003): 353-365.

scale degrees: Richard Middleton calls Blue notes the "'out-of-tune' third and seventh degrees of the major scale."[11] Discussions of 'out of tune' kinds of blue notes accompany a significant number of in-depth treatments of the genre, often painted as an indispensible element: "Several characteristics of the early blues became the genre's identifying features. One of these was the use of seemingly ambivalent "blue notes" at certain points in the scale."[12] Of course, some historians have employed terms such as "out of tune" in more ethnocentric ways than I intend them here; Tilford Brooks clarifies the matter elegantly when he states:

> …the musicians who employ these tones [blue notes and other non-12tET pitches] often are fine musicians capable of minutely distinguishing one tone from another. These tones are, for the most part, incidentally conceived rather than being conceived by chance.[13]

I do not think Brooks uses the word "incidental" in the sense in which I employ it. I interpret him as meaning that blue notes are intended by the performer but are determined somewhat spontaneously (expressive discordance), and are therefore not the product of a performer's lack of skill or of random chance (incidental discordance).

The subject of blue notes is, of course, more problematic than just described. Hans Weisethaunet, for example, has argued that there are no such 'things' as blue notes, but that the phenomenon shades off imperceptibly into all manner of expressive intonation and pitch bending:

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[11] Richard Middleton, *Pop Music and the Blues* (London: Victor Gollancz Ltd, 1972), 35.
[12] David Evans, "The Development of the Blues," in *The Cambridge Companion to Blues and Gospel Music*, ed. Allan Moore (Cambridge: Cambridge University Press, 2002), 21.
[13] Tilford Brooks, *America's Black Musical heritage* (Englewood Cliffs: Prentice-Hall, 1984), 17.

> …[the concept of the 'blue note'] has originated from the scholars describing the music. In addition, in blues performance every note may be bent or altered, but in different ways depending on style and on how such notes appear in the harmonic texture. …in fact every note of the twelve-note chromatic scale may appear in a blues tune, possibly also as 'blue notes,' because microtonality, attack, and timbre variation are such essential parts of blues expression. The aesthetics behind this practice – being crucial to the 'meaning' of blues performance – is that of 'putting things to the notes' as described by B.B. King…[14]

Weisethaunet's point is well taken, but even abandoning the term 'blue note' would not detract from the relevance of expressive discordance to blues music. On the contrary, for Weisethaunet's emphasis of the myriad varieties of pitch bending and altering in blues highlights just how important such discordances are.

Although it is apparent that expressive discordance plays a significant role in genre delineation, it is not clear what effect blue notes and other SDVs have on the listening experience. Could it be that these types of pitch phenomena become so fully incorporated into a musical style that they are no longer as strongly marked as, for instance, incidental discordances? Might they become so familiar that they no longer arouse discordance qualia at all, but pass by as largely unnoticed SDVs? This does seem to be a possibility, particularly for instances of more minute pitch deviation. Yet it seems to me that expressive discordance phenomena such as the blue note—although sometimes stylistically normative—retain their striking quality due the clash they produce with the pitch contexts in which they appear. This perspective is captured well by Graeme Boone's description of Bessie Smith's 1925 recording of "St. Louis Blues:"

> Her voice is extraordinarily powerful, and bends the tune in a subtle way that, of course, cannot be notated. '*Feeling* to*morrow* like I *feel* today': this line is a good

[14] Hans Weisethaunet, "Is There Such a Things as the 'Blue Note'?," *Popular Music* 20/1 (2001): 101.

> example of how she presses into the microtonal spaces inside a blue note, making a sinuous melody that almost hurts in the strength of its bluesy dissonance. The recording only begins to evoke the impact of her performances, which, according to eyewitnesses, could make listeners weep with emotion.[15]

Although Boone is describing a recording which he presumably knows quite well, he nevertheless feels an almost visceral response to Bessie Smith's expressive discordances; the impact of such moments does not seem to be lessened by familiarity.

It seems apparent that expressive discordance is an essential feature of many musical styles: pitch bending functions as a defining feature of blues music, and some scholars have argued further that the blue note is the ancestor of pitch bending practice in rock.[16] Of course, subscalar pitch manipulations of various kinds are also extremely common in non-western musics.[17] Expressive discordances are capable of arousing strong emotional and even physical responses in listeners: certain subscalar gestures may become typified and then begin to accrue cultural significance, as described by Guthrie Ramsey, Jr.:

> …meaning is always contingent and extremely fluid; it is never essential to a musical figuration. Real people negotiate and eventually agree on what cultural expressions such as musical gesture mean. They collectively decide what associations are conjured by a well-placed blue note…or the raspy grain of a church mother's vocal declamation on a Sunday morning.[18]

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[15] Graeme M. Boone, "Twelve Key Recordings," in *The Cambridge Companion to Blues and Gospel Music*, ed. Allan Moore (Cambridge: Cambridge University Press, 2002), 69-70.

[16] Tilford Brooks, *America's Black Musical Heritage* (Englewood Cliffs: Prentice-Hall, 1984), 149.

[17] That is, in repertoires conceived of as preceding from a normative referential scale or pitch collection.

[18] Guthrie P. Ramsey, Jr., *Race Music: Black Cultures from Bebop to Hip-Hop* (Berkeley: University of California Press, 2003), 25-26.

Thus the same 'blue note' pitch figuration will doubtless carry different meanings when employed in a rock context than within a country blues style. Having established the relevance of expressive discordance qualia, the study of how such figurations become codified and begin to accrue cultural significance and musical meaning remains a promising area for future research.

Structural Discordance

Structural discordance may be distinguished from the incidental and expressive varieties most clearly by the reduced significance of performer intentionality in the production of SDV events. This category comprises all other sources of discordance qualia that are not attributable primarily to performer's actions, intentional or otherwise, but seem to stem from some larger system or context extending outside the control of any single performer. As such, this category is the most broadly encompassing of the three, and one that could be subdivided into a number of fruitful subcategories according varying criteria. At present, I will posit two subcategories: *intercultural* and *aesthetically motivated* structural discordance.

Intercultural discordance qualia are attributable to what amounts to cultural unfamiliarity. Whenever a given listener encounters music written for a tuning system in which they are not enculturated, discordance qualia are likely to result, assuming the system is sufficiently dissimilar to those with which they are familiar. Consider, for example, the case of a listener enculturated primarily in Western classical music coming into contact with Balinese gamelan for the first time. The intervallic ratios of the Slendro system will doubtless strike the listener as strange and bizarre (or, conversely, as exciting

and seductively exotic). However, there are no SDVs taking place, at least, none within the bounds of the Slendro system and the larger context of Indonesian musical practice. There are, of course, SDVs if the observer is measuring intervals in terms of their own familiar 12tET system. This is ostensibly what they are doing intuitively, and why structural discordance qualia result from the experience. It is intercultural because the listener recognizes the disconnect as resulting some manner of institutionalized unfamiliarity; that there exists a significant body of listeners for whom Slendro is perfectly natural and concordant, and that the discordance results merely from vantage point and cultural positioning.

Contrast this experience with that of aesthetically motivated structural discordance, which involves the perception of particular intentions on the part of a composer.[19] This broad category encompasses a substantial body of twentieth-century avant-garde repertoire, primarily so-called "microtonal" musics written in non-standard tuning systems. Here we are likely to find works such as Charles Ives' *Three Quarter-Tone Pieces*, Easley Blackwood's *Twelve Microtonal Etudes*, a substantial representation of spectral music, and nearly everything written by Harry Partch and Ben Johnston (each exemplifying approaches to "extended just intonation" tuning). In these cases the listener interprets discordance qualia as aesthetically desired and actively sought after for certain creative purposes. Most essential to this distinction is the perceived ubiquity of the tuning

[19] Although these categories are couched in terms of prototypically Western notions of performer and composer, they are generally malleable enough to encompass other cultural formations. In the same way that "composed piece" may be juxtaposed against "improvised performance," so too may "traditional piece" be set against a performance solely the production of the performer in a cultural context where "composer" is not an important category.

system in question: if the listener believes it to have originated in some widespread musical practice—as in the case of Slendro—the discordance is intercultural, whereas systems that register as unique and idiosyncratic—such as Harry Partch's 43-tone scale—the discordance can be considered aesthetically motivated. I posit these subcategories of structural discordance in hopes that the distinction is productive regarding issues of intent, cultural acceptability, and aesthetic purpose, although in reality the two categories act more as poles on a continuum than clearly delineated categories. Further details of the function and expressive consequences of structural discordance are explored in the analytical essay below in part two.

Having now set forth the three basic types of discordance qualia, it will be useful to pause momentarily and reflect upon the issues raised thus far. I have put forth a system of categorizing discordance qualia based primarily upon *perceived intentionality*: the discordances aroused by a given performers actions may be interpreted as intentional or unintentional, as may those aroused by a compositional syntax.[20] This is an admittedly atypical method of classification, but one constructed so as to maintain the primarily esthesic approach first established in this paper by discussing discordance in terms of *qualia*. As suggested by the above discussion, the use of these categories may be justified by the very real differences in resultant musical meaning produced in each case. Listeners will approach each variety of discordance with a different interpretative lens, viewing some as productive and potentially meaningful; others as intrusive, obnoxious, and unwanted. Certainly other useful classification systems might be developed that revolve

[20] I am using the word "unintentional" broadly here so as to mean unintended by any one individual, but rather the product of an ingrained cultural norm.

around different parameters; I do not present this system as final or immutable, but merely as a provisional tool helpful in this introductory foray into the subject of discordance qualia.

While each of the above types of discordance bears promise as a site of future in-depth investigation, I have selected for the following analytic essay a work that exemplifies the final type by eliciting aesthetically motivated structural discordance qualia. Although it is not my intention to privilege any one variety of discordance over another, it does seem that this category permits an extremely productive back-and-forth between compositional syntax and audience reception—poiesis and esthesis—which makes it somewhat unique in the classification system outlined above. It is my hope that the following analytic essay on the music of Easley Blackwood—a telling example of a compositional syntax that elicits aesthetically motivated structural discordance qualia—will serve to demonstrate the potential analytical insights afforded by attending to discordance qualia and their effects on the listening experience.

Part Two: Analytical Essay

American composer Easley Blackwood stated clearly that his 1980 *Twelve Microtonal Compositions* served a primarily didactic function as "illustrations of a research project."[21] This project sought to explore the potential for recognizable tonal function within equal tunings of 13 through 24 notes to the octave and to develop fruitful notational systems, as detailed in his later article "Modes and Chord Progressions in Equal Tunings."[22] Filled with allusions to prototypical tonal patterns, these instructional pieces provides a productive entry point for studying points of contact between familiar tonal function and the strikingly alien pitch-space of nineteen-tone equal temperament in Blackwood's *XII. 19 notes: Allegro moderato* from the *Twelve Microtonal Compositions*.

Composers of music for non-standard tuning systems have tended towards famously prolix descriptions their compositional practice. One need only turn to Harry Partch's *Genesis of a Music* or Ben Johnston's numerous essays to discover a wealth of information about the aesthetic origins and technical syntax of their respective musical languages.[23] Yet the theoretical literature suffers from a relative lack of investigation into these repertoires from the perspective of analysts untethered to the specific aesthetic goals of the creative process. This shortage has, in recent years, begun to be addressed by scholars such as Robert Hasegawa and Bob Gilmore, who have written on the musical

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[21] Easley Blackwood, *Microtonal Compositions,* (Cedille Records, 1994), Liner Notes.
[22] Easley Blackwood, "Modes and Chord Progressions in Equal Tunings," *Perspectives of New Music* 29/2 (1991), 166-201.
[23] Harry Partch, *Genesis of a Music* (New York: Da Capo Press, 1974).
Ben Johnston, *Maximum Clarity and Other Writings on Music*, ed. Bob Gilmore (Chicago: University of Illinois Press, 2006).

languages of Harry Partch, Ben Johnston, Hans Zender, and other "microtonal" composers.[24]

In discussing Blackwood's compositions, however, I have found it necessary to deviate from the methodology of the aforementioned scholars in several respects, most notably in the technical language employed. Intervallic ratios—while perfectly suited to the just intonation-based systems of Partch and Johnston—are wholly inappropriate in any discussion of Blackwood's equally-tempered constructs, which do not purport to be accurate reflections of simple ratios.[25] Instead, this analysis will develop a technology based loosely upon Steven Rings' work in *Tonality and Transformation*, in order to highlight unique properties of Blackwood's idiosyncratic language.[26] In particular, Rings' multi-dimensional approach to tonal percepts, which examines the interaction between scale-degree function and pitch-class, will be modified so as to reveal multi-dimensional interactions between tonal function and discordance. Before this work can be done, however, several preliminary remarks on Blackwood's system are in order.

The octave, when divided into nineteen equal segments, produces a series of chromatic tones separated by approximately 63.2 cents (¢), less than two-thirds the size of 12tET's 100¢ chromatic steps. Example 1, which will serve as a useful reference throughout the following discussion, visualizes this space in terms of pitch-class number,

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[24] See Bob Gilmore, "On Harry Partch's *Seventeen Lyrics of Li-Po," Perspectives of New Music* 33/2 (1995), 22-59; and Hasegawa, "*Gegenstrebige Harmonik* in the Music of Hans Zender," *Perspectives of New Music* 49/1 (2011), 207-234.

[25] See Bob Gilmore, "Changing the Metaphor: Ratio Models of Musical Pitch in the work of Harry Partch, Ben Johnston, and James Tenney," *Perspectives of New Music* 33/2 (1995), 458-503.

[26] Steven Rings, *Tonality and Transformation* (Oxford: Oxford University Press, 2011).

tuning (in ¢), and pitch letter-name, as employed by Blackwood. Remarkably, Blackwood manages to craft a functional tonal hierarchy out of this unusual system. This hierarchy maintains a fundamental feature of the 12tET diatonic scale: the sequence of unequally spaced "half steps" (H) and "whole steps," (W), which can be expressed as the ordered septuple (W, W, H, W, W, W, H). He accomplishes this feat by modifying the relationship between half steps and whole steps, such that whole steps in 19tET comprise *three* chromatic tones, and half steps *two* chromatic tones. While this 3/2 relationship between the two types of steps distorts the familiar 2/1 relationship of 12tET, thereby rendering the labels "whole" and "half" technically inaccurate, I will follow Blackwood's lead in retaining these familiar descriptors on account of their *functional* equivalence to familiar 12tET concepts.

Pitch:	**C**	C#	Db	**D**	D#	Eb	**E**	E#/Fb	**F**	F#	Gb	**G**	G#	Ab	**A**	A#	Bb	**B**	B#/Cb	**C**
Pitch-Class Number:	**0**	1	2	**3**	4	5	**6**	7	**8**	9	10	**11**	12	13	**14**	15	16	**17**	18	**0**
Cents (¢):	**0**	63	126	**190**	253	316	**379**	442	**506**	569	632	**695**	758	822	**885**	948	1011	**1074**	1137	**1200**

Ex. 1 – 19-tone space, with a diatonic scale on 'C' in bold.

As indicated by the bold letters in example 1, Blackwood notates the diatonic scale precisely as it would appear in 12tET. Additionally, chromatic alterations function identically: the addition of a sharp or flat raises or given pitch by one chromatic degree (63.2¢), respectively. Yet striking consequences for tonality result: since *two* chromatic steps lie between tones a whole step apart, the familiar enharmonic equivalence of 12tET vanishes in a nineteen-tone equally-tempered system. Additionally, "new," enharmonically-equivalent chromatic pitches appear within the bounds of the diatonic scale's half steps (E#/Fb and B#/Cb in example 1).

Fred Lerdahl's notation of the "basic space" of pitch-class relatedness can serve to illuminate some of the unique features of this tuning system.[27] Two graphical representations of this hierarchy appear as examples 2a and 2b, tailored to 12tET and 19tET, respectively. The charts depict the tonal stability of all pitch classes within a single tonal region, ordered from top to bottom as most stable to least stable: 1. Octave (root) space; 2. Fifth space; 3. Triadic space, 4. Diatonic space, and level 5. Chromatic space. This model makes clear that *structural* differences between the systems arise only at the level of chromatic space, where a flurry of new pitch-classes are made available in the nineteen-tone system.

Octave	0												(12=0)
Fifth	0							7					(12=0)
Triad	0				4			7					(12=0)
Diatonic	0		2		4		5	7		9		11	(12=0)
Chromatic	0	1	2	3	4		5	6	7	8	9	10	11	(12=0)

Ex. 2a – The "basic space" of 12tET. After Lerdahl, 2001.

Octave	0																		(19=0)
Fifth	0											11							(19=0)
Triad	0						6					11							(19=0)
Diatonic	0			3			6		8			11			14			17	(19=0)
Chromatic	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 (19=0)

Ex. 2b – The "basic space" of 19tET.

[27] Fred Lerdahl, *Tonal Pitch Space* (Oxford: Oxford University Press, 2001), 47.

In what sense is Blackwood's 19tET tonality worthy of the label "tonal," given the significant deviation from familiar 12tET structures? Admittedly, the system merits more formal attention.[28] Yet it can be demonstrated to adhere to Dmitri Tymoczko's five basic features of tonality that describe the "extended common practice," as discussed in his 2011 book *A Geometry of Music*.[29] Four of the five principles—conjunct melodic motion, harmonic consistency, limited macroharmony, and centricity—can all be demonstrated to accurately describe Blackwood's 19tET tonal practice.

The fifth principle, acoustic consonance, is a possible source of contention. The unusual tuning of the 19tET scale, although it closely approximates the justly-tuned diatonic system, presents the listener with moments of striking discordance that might be seen as voiding this principle. However, given the ill-defined nature of this criterion, such a determination must ultimately be made on a largely subjective basis. To my ear, the tuning deviations of 19tET are insufficient to invalidate the label of acoustic consonance.

As example 2 indicates, the purely structural differences between these equal systems arise only at the chromatic level. Of course, differences of intonation permeate the entire nineteen-tone complex. Blackwood emphasizes this point when he claims that "…all diatonic progressions of triads and seventh chords have the same behavior and produce the same musical effect in twelve-note and nineteen-note tuning, save for slight differences only, the most noticeable being the peculiar tuning of the nineteen-note major

[28] For example, Blackwood's 19tET diatonic system might be assessed with respect to its well-formedness. See Norman Carey and David Clampitt, "Aspects of Well-Formed Scales," *Music Theory Spectrum* 11/2 (1989), 187-206.
[29] Dmitri Tymoczko, *A Geometry of Music* (Oxford: Oxford University Press, 2011).

scale."[30] It is the "peculiar tuning" of the 19-tone system that I intend to examine and, to this end, I will adopt Blackwood's related conceptual categories of *dissonance* and *discordance*.[31] He uses the former—difficult as it may be to define explicitly—in a manner analogous to its usage in the context of 12tET. Certain intervals, such as seconds and sevenths, are dissonant regardless of the tuning system in which they are realized.[32] Conversely, discordance is necessarily tuning-dependent, and corresponds to that which might otherwise be termed "out of tune-ness," as described in part one. Thus an interval may be simultaneously consonant and discordant.[33]

The intervals of the nineteen-tone system are largely more discordant than those of 12tET. However, in contrast to Blackwood, who measures this discordance in comparison to just intonation, I intend to assess the discord of 19tET intervals in relation to their 12tET equivalents. My assumption is that for a listener fully enculturated in western musical practice, the 12tET system—mildly discordant though it may be—has, through repeated exposure, become the *de facto* tuning system to which all other systems are compared. The ubiquity of 12tET in modern Western musical practice ensures that the system's inherent discords are no longer an recognized as such, so that listeners will approach Blackwood's music with the expectation of 12tET-tuned intervals. Pitch events

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[30] Easley Blackwood, "Modes and Chord Progressions in Equal Tunings," *Perspectives of New Music* 29/2 (1991), 169.
[31] Ibid., 177.
[32] This claim assumes the labels "second" and "seventh" retain their familiar *functional* meaning and relative size in different tuning systems. One could, of course, imagine a tuning system in which seconds and sevenths describe intervals that are very large or very small, respectively, though in such contexts functional meaning would be lost.
[33] For example, the consonant major third of the 12tET system is approximately 14¢ discordant (sharp) with respect to the "pure" 5/4 of just intonation (approx. 386¢).

that deviate significantly from 12tET analogues will therefore be *marked* for listener attention; in addressing these moments, I thus hope to shine light on some of the most salient features of this musical practice.[34]

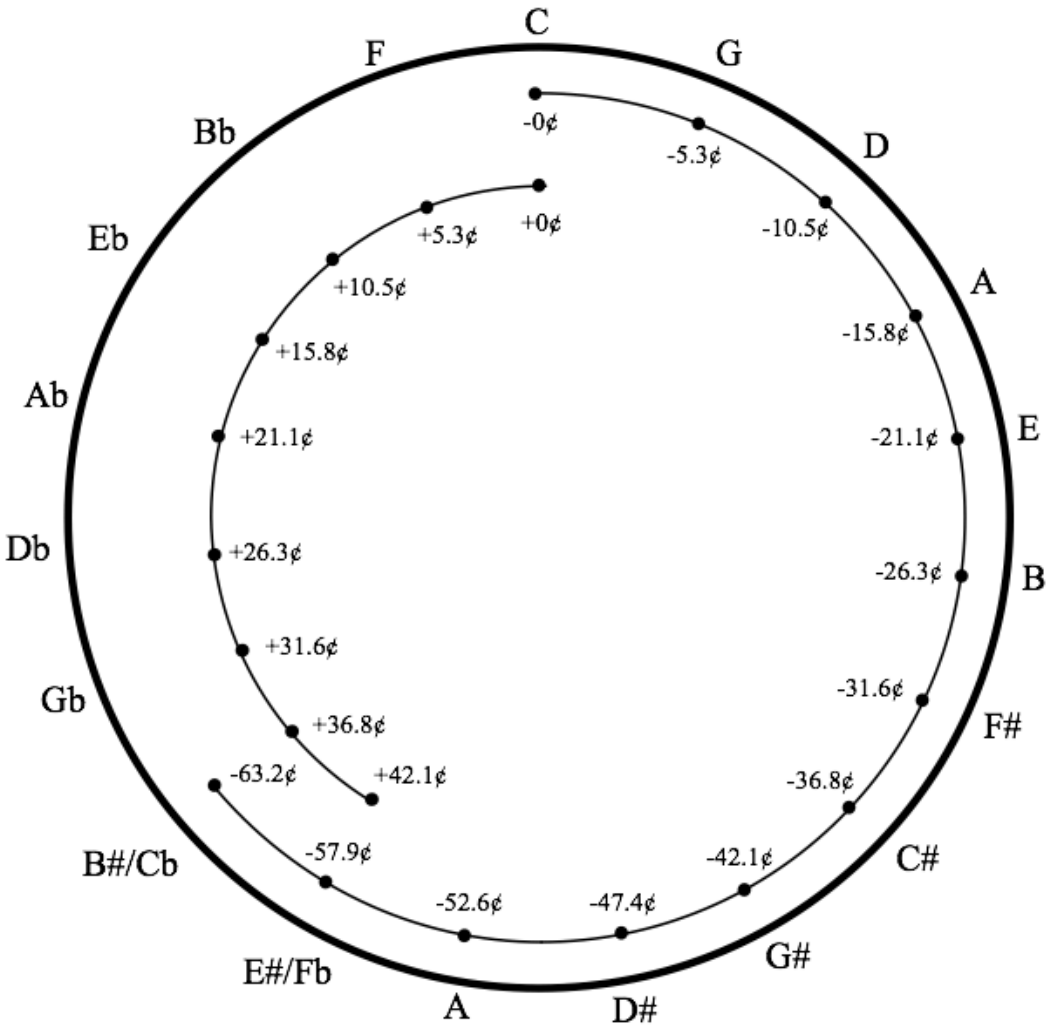
In his discussion of the inherent discordance of the 19tET system, Blackwood seeks to determine which intervals are the most usable. To do so, he focuses on both harmonic discordance, which is concerned with the tuning deviations that appear between simultaneous pitch-classes of individual harmonic verticalities; and melodic discordance, which addresses the intervals between successive pitch events within individual voices. Although these methods prove useful for Blackwood's purposes, the analytical results prove to be relatively impoverished. I instead propose a third method of calculating of discordance, which I term *tonal discordance*.

Tonal discordance is calculated for each pc within a single tonal region in relation to some tonic which serves as a perfectly concordant reference point. Most often this stable point will be the locally prevailing tonal center, although larger-scale motions may also be analyzed (for example, key areas in relation to the global tonic). Although the reference tonic remains 0¢ discordant, all other scale degrees—as well as chromatic pitch-classes—project varying degrees of discordance, as illustrated in Example 3 (which uses a modally neutral 'C' as a tonic reference point). As this diagram makes explicit, the discordance of each pc increases by approximately 5.3¢ for each step taken around the "circle of fifths;" clockwise motion creates increasing discordance via flattening, counterclockwise motion via sharpening. As a result of this observation, it can be seen

[34] For more on markedness, see Robert Hatten, *Musical Meaning in Beethoven* (Bloomington: Indiana University Press, 1994).

that tonal discordance maps very roughly onto familiar notions of tonal distance. Diatonic pitch-classes are never more than |26.3|¢ out of tune, while chromatically-raised scale-degree 7 expresses the greatest discordance at 63.2¢.

Pitch-classes belonging to the minor mode can be found by moving counter-clockwise along the circle of fifths, and also lie within the |0-26.3|¢ range of major-mode pcs. Oddly, lowered scale-degree 2 is the only pc in this range that does not belong to either diatonic mode. Two important conclusions result from this observation. First, it should be noted that the mapping of tonal discordance onto notions of tonal distance is only approximate. Some of the discordance qualities noted in example 3 are obvious—for example, that ^5 is more closely related to ^1 than is ^#4—while others (i.e. the aforementioned equivalent discord between ^7 and ^b2) do not conform to musical intuitions grounded in common-practice tonality.



Ex. 3 – the 19tET circle of fifths, with tonal discordance indicated.

Second, and more significantly, the mapping of tonal discordance makes tonal distance manifest; that is, it confirms and *makes audible* many of our musical intuitions about tonal distance, albeit in an approximated fashion. For example: in 12tET, intuition (as well as standard notational practices) suggest that b2 is a less tonally distant region than #1, and b6 less distant than #5. In 19tET these differences are highlighted in two

stages. First, loss of familiar enharmonic equivalence necessitates that familiarly-equivalent pcs are split into two distinct pcs. Second, these now enharmonically-inequivalent pcs exhibit differing degrees of tonal discordance that confirm our intuitions: while b2 is only 26.3¢ deviant, #1 is out 36.8¢; whereas b6 is a mere 21.1¢ out of tune, #5 is a striking 42.1¢ discordant.

The analytical technology Steven Rings developed in his 2011 book *Tonality and Transformation* is well-suited to exploring the multiple perceptual regions that pitch events may simultaneously inhabit; specifically, Ring's *Tonal GIS* is designed to concurrently capture the pc and scale-degree (sd) qualia of pitches within tonal contexts.[35] In order to capture information regarding the tuning of each pitch event, a third category of information is needed. To keep the data manageable and visible within a single chart, I have appended tonal discordance to the (pc, sd) set, resulting in the ordered pairing (sd, pc, discordance(¢)) to describe pitch events, as seen in example 4. When discussing functional harmonic entities, I will substitute harmonic function for scale-degree information.[36] Armed with this technology, we are now prepared to examine the impact of discordance on familiar notions of harmonic function.

[35] Steven Rings, *Tonality and Transformation* (Oxford: Oxford University Press, 2011).
[36] The notion of functional harmonic entities as qualia—and their relationship to scale-degree qualia—is a subject that deserves further explication. However, such a discussion is beyond the scope of the present project.

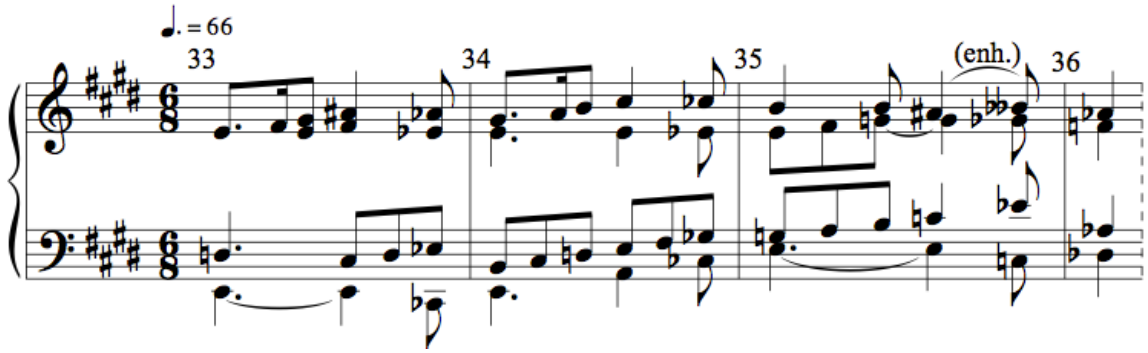
	^1	^2	^3	^4	^5	^6	^7
18	(^b1, 18, +36.8)						(^#7, 18, -63.2)
17							(^7, 17, -26.3)
16							(^b7, 16, +10.5)
15						(^#6, 15, -52.6)	
14						(^6, 14, -15.8)	
13						(^b6, 13, +21.1)	
12					(^#5, 12, -42.1)		
11					(^5, 11, -5.3)		
10					(^b5, 10, +31.6)		
9				(^#4, 9, -31.6)			
8				(^4, 8, +5.3)			
7			(^#3, 7, -57.9)	(^b4, 7, +42.1)			
6			(^3, 6, -21.1)				
5			(^b3, 5, +15.8)				
4		(^#2, 4, -47.4)					
3		(^2, 3, -10.5)					
2		(^b2, 2, +26.3)					
1	(^#1, 1, -36.8)						
0	(^1, 0, 0)						

Ex. 4 – Scale-degree, Pitch-class, and Discordance in Blackwood's 19tET tonal system.

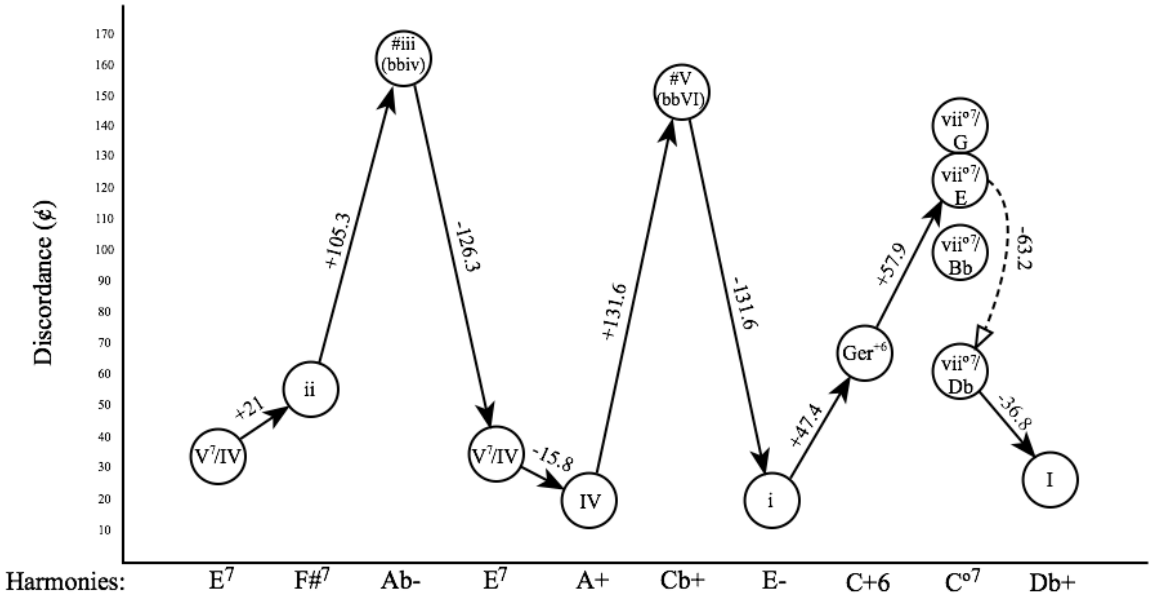
In measures 33-36 of Blackwood's *Allegro Moderato*, an unusual sequence of triads appears in a prevailing E major tonal context, as shown in example 5a. Example 5b presents a discordance graph of this passage, which arranges the harmonies in order of appearance along the x axis. The y axis is utilized to indicate the discordance of each harmony, calculated as the sum of the tonal discordance of each chord's constituent scale-degrees. Since tonal discordance is relative to tonal function, a given harmony may be represented by multiple points on the graph, as in the case of the C^{o7} harmony in example 5b.

The majority of these harmonies are not particularly discordant, as nearly all of the pcs in the passage are diatonic or closely-related chromatic tones. However, as the y axis of example 5b makes apparent, two triads—Ab- (^b4 or ^#3) and Cb+ (^bb6 or ^#5)—stand out as extremely tonally distant, and therefore jarringly discordant, against

an otherwise relatively concordant context.[37] What accounts for the intrusion of such distant harmonic phenomena?



Ex. 5a – reduction of mm. 33-36 of Blackwood's *Allegro Moderato.*



Ex. 5b – discordance graph of Ex. 5a.

[37] It should be noted that, given the familiar enharmonic equivalence of 12tET, these harmonies would be atypical spellings of the iii and a V chord, respectively.

To answer this question, it must be noted that a new tonal center of Db+ is established in m. 36 at the close of this passage. Heard in this new context, the aforementioned discordant triads are notably concordant, interpretable as closely-related v and VII harmonies, respectively. This modulation shines light on the function of the foreign triads, which serve to destabilize their immediate E+ context with biting discordance, while simultaneously preparing the arrival of the subsequent Db+ tonal area in which they may be retrospectively understood as concords. Harmonies that would otherwise be abrupt and non-functional chromatic aberrations thus serve to create some manner of coherence through their discord qualia.

The harmonies that take part in the actual modulation—the German augmented sixth and fully diminished seventh of measure 35—also merit attention, as the absence of familiar enharmonic equivalence in 19tET has striking consequences for both of these harmonies. First, given that A# and Bb no longer describe the same pc, this German augmented sixth chord now represents a distinct harmony no longer aurally equivalent to a major-minor seventh chord. Second, the odd number of pcs in nineteen-tone space means that a truly symmetrical fully-diminished seventh chord is no longer possible; the pcs of the C diminished seventh of m. 35 are all separated by five chromatic tones with the exception of the seventh and root, which are only four chromatic steps distant.

These two facts would seem to spell certain doom for familiar nineteenth-century methods of modulation involving enharmonic reinterpretation of these two harmonies. To a listener enculturated in 19tET tonal practice, this would almost certainly be the case. And yet, to the listener for whom 12tET forms a basis of comparison, it seems likely that

the identifiably familiar quality of these harmonies will permit modulation via enharmonic interpretation despite the discrepancies cited previously.

Given this perspective, the C^{o7} harmony that appears in measure 35 projects an ambiguous tonal function. Created via stepwise voice-leading from the preceding German augmented sixth chord, it is not immediately clear how this dissonance must resolve. As discussed above, the pcs that appear as members of this sonority indicate that it must resolve to a Db+ triad, as indeed it does in the following measure. Yet, due to this chord's similarities to a 12tET diminished seventh and the familiarity of the motion by which it is brought about (a diminished-seventh chord in 12tET could be created via the same stepwise voice-leading), I argue that it is more probable that this harmony will be interpreted in context as a diatonic diminished-seventh chord on scale-degree 7 of E+.

As illustrated in example 5b, a 12tET-enculturated listener might interpret the C°7 chord of m. 35 in four different tonal contexts: as $vii^{o4/2}$ of E, $vii^{o6/5}$ of Bb, $vii^{o4/3}$ of G, or vii^{o7} of Db. This visual aid demonstrates that the differing tonal contexts in which this harmony might be interpreted result in wildly varying degrees of tonal discordance. It is significant to note that within the context the listener will likely interpret this chord—that is, the prevailing E tonality of the previous bars—the harmony will appear to be a striking 126.4¢ out of tune. Yet when heard as vii°7 in Db+, the discord qualia is significantly lessened, a mere 63.2¢. The relatively ambiguous tonal function of this sonority allows it to cohabitate two tonal regions simultaneously, as would be the case for its 12tET analogue. Yet the varying discordance qualia of its possible harmonic contexts weaken

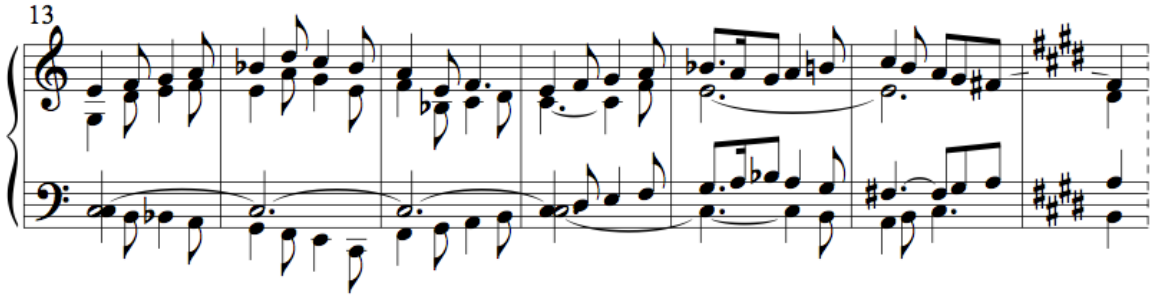
the chord's capacity to function in the preceding tonal context, and simultaneously strengthen its resolution (and thus the entire modulation) to Db+.

Similar tensions between tonal function and discordance qualia can be found scattered throughout the *Allegro Moderato*. A more striking example occurs early on in this movement, following an initial twelve measures of purely diatonic C major. Given the pedagogical nature of this work, these first 12 bars most probably serve to establish that the strictly diatonic sphere can be captured coherently and concordantly by 19tET, when the available pitch resources are limited to those of levels 1-4 of Lerdahl's "Basic Space" (see example 2b).[38] Tonal sequences in mm. 6-8 and 10-13 reinforce the prototypically diatonic character of this passage.

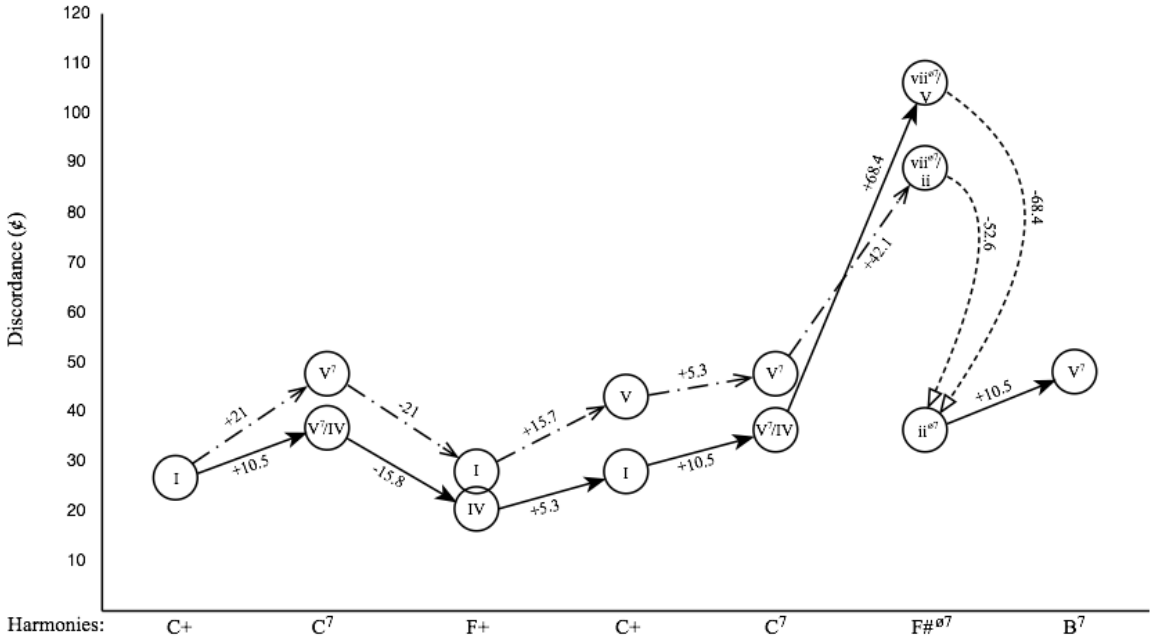
Example 6a presents a six-bar transition section spanning mm. 13-19 that immediately follows this diatonic passage and introduces the first chromatic elements found in this piece, which serve to modulate to the E+ tonality of m. 19. These chromatic elements usher in two tonally ambiguous moments: the V^7-I motion in F+ (mm. 14-15) and the $F\#^{ø7}$ chord (m. 18). The differing possible tonal interpretations of these elements are shown in example 6b. In the first instance, the tonal context that suggests the smallest amount of discord—the "path of least discordance"—corresponds with musical intuition. Given the significant expansion of C+ in the previous section and the brief nature of the motion to F, mm. 14-15 feel much more like a tonicization than a modulation; C will almost certainly be retained as the locally prevailing tonic. If heard in the context of F+,

[38] Fred Lerdahl, *Tonal Pitch Space* (Oxford: Oxford University Press, 2001), 47.

this progression would actually be less concordant than if the previously established C+ context were to persist.



Ex. 6a – Reduction of mm. 13-19 of Blackwood's *Allegro Moderato*.



Ex. 6b – Discordance graph of ex. 6a.

The F#^{ø7} of m. 18 is more ambiguous still: example 6b presents three possible tonal functions. Given the prevailing C+ context, the most probable interpretation of this chord is as vii$^{ø4/2}$/V. However, a listener who happened to interpret the previous move to F+ as a true modulation would hear the harmony as vii$^{ø4/2}$ of ii. Yet, when the subsequent B^7 harmony of m. 19 arrives, our perception of the F#^{ø7} chord is likely to shift to ii^{ø7}, thus creating a predominant-to-dominant motion that ultimately resolves to E+ several measures later, when E is established as a new tonal center.

In this instance, it is not our musical intuition that corresponds with the path of least discordance—as with aforementioned motion to F+—but rather the actual events of the musical surface. The most likely interpretation of the ambiguous half-diminished sonority is actually the most discordant, while most concordant interpretation is, at least initially, unlikely to occur at all. It is highly improbable that the "path of least discordance" will allow the listener to predict the arrival of E+, given the absence of evidence in any other element of the musical surface that would suggest such a modulation. Yet the transition between key areas is made less jarring when this sonority is retrospectively heard as relatively well-tuned concord.

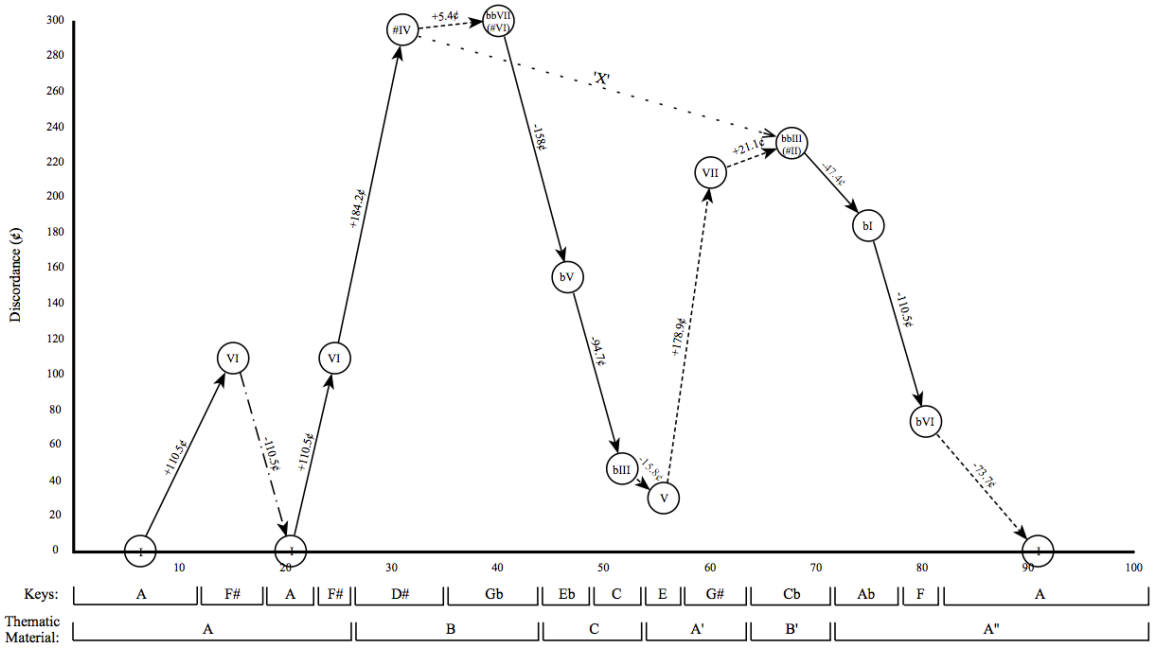
As was in the case in example 5, example 6 illustrates that discordance qualia is capable of smoothing the transition between distant tonal regions where functionally ambiguous sonorities are involved. When Blackwood's modulatory passages follow the path of least discordance—as they do in these and other examples—the resolution of obscure dissonances results in reduced discordance, not only via motion to the more concordant triads of resolution, but *within the ambiguous sonorities themselves*. Thus

discordance qualia appears capable of, in some respect, actually *guiding* the tonal interpretation of otherwise unclear tonal phenomena.

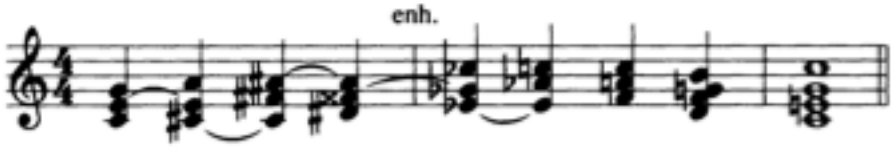
It was mentioned previously that tonal discordance need not always be calculated in reference to the local tonic; it may also be examined with respect to key areas in relation to a global tonal center. A final analysis exploring large-scale tonal relations in another of Blackwood's 19tET compositions, the *WFMT Fanfare in 19-note Equal Tuning,* Op. 28a, illustrates such an approach.

The sequence of key areas in the Fanfare, visible at the bottom of example 7, seems fairly incoherent at first glance. Yet Blackwood gives a clue to its interpretation in his article "Modes and Chord Progressions in Equal Tunings," wherein he describes a modulating sequence which moves by descending minor thirds.[39] His model progression is here reproduced as example 8a, with a an accompanying discordance graph in example 8b. This passage moves from the tonic triad to the subdominant via a chain of Neo-Riemannian RP transformations, whose discord peaks at a major #2 harmony before decreasing en route to IV.

[39] Easley Blackwood, "Modes and Chord Progressions in Equal Tunings," *Perspectives of New Music* 29/2 (1991), 171.



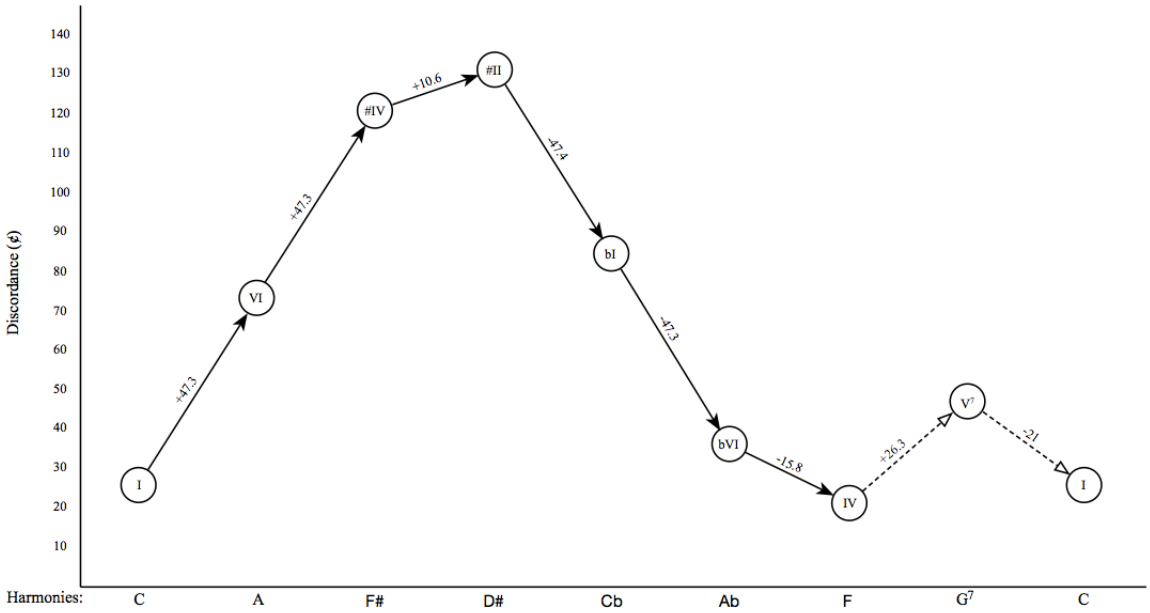
Ex. 7 – Discordance graph of the key areas in Blackwood's *WMFT Fanfare*.



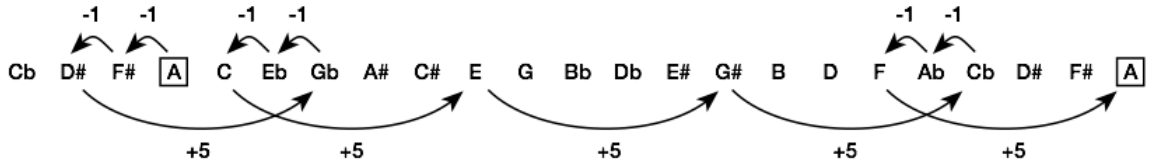
Ex. 8a – Blackwood's model m3 sequence (after Blackwood, 1991).

The key scheme of the *Fanfare* is best understood as a series of motions within this minor-third (m3) space, as depicted in example 9. After establishing the m3 axis via motion back and forth from A+ to F#+, the music proceeds to move through keys by one of two motions: descending m3, labeled "-1" on example 9**,** and ascending M3, which can be understood as five steps *up* the m3 system, and is therefore labeled "+5." The +5 motions interrupt the continuous -1 motion described in Blackwood's example, which

"should" proceed directly from the D#+ area to Cb+ area that appears after five intervening regions.



Ex. 8b – Discrodance graph of ex. 8a.



Ex. 9 – Motion of key areas along Blackwood's m3 axis in the *WMFT Fanfare*.

Returning to example 7, we see that the different types of motion in m3 space are notated with different types of lines. The primary -1 motions are marked with solid lines, +5 with dotted lines, and the singular aberrant +1 with a dash-dot line. Additionally, there exists a segment marked "X" that cuts across the graph; this line indicates the motion that

would correspond to Blackwood's model sequence (example 8a), which the first +5 motion denies. If example 7 is indeed a modification of Blackwood's model sequence, the material encompassed by the "X" line is the primary deviation from this model, an interpolation of key areas.

Example 7 also describes the thematic content of the *Fanfare*, notated with letters A through C below the graph. The B material clearly plays a significant role in the aforementioned interpolation: the second half of B initiates the interjection, while the return of B' concludes it. The material appearing in-between—A' and C—are, in a certain sense, "unnecessary;" B' could replace the second half (Gb portion) of B, thereby creating a large-scale ABA structure for the piece and removing the interpolated key areas. The thematic material of the *Fanfare* thus underscores the interpretation of the passage spanned by "X" as deviant.

Through the confluence of new thematic material (C) and the interruption of the otherwise consistent -1 motion through m3 space, this passage has an ultimately destabilizing effect. However, this section expresses a significant *decrease* in tonal discordance with respect to the global tonic of A+, as visible in example 7. Rather than the relatively smooth arc seen in the model passage of example 8b, a temporary reduction of discordance accompanies the intervening material, thereby offsetting the nominally destabilizing qualities of the new material and the disrupted tonal pattern with stabilizing concordance.

Clearly, discordance qualia play a significant role in the structure of Easley Blackwood's microtonal compositions. Capable of guiding the interpretation of

ambiguous tonal events, smoothing transitions between key areas, and informing large-scale structural relationships between tonal regions, this perceptual phenomena is a much more integral aspect of tonal functionality than might be initially assumed. Although the ideas presented here represent a preliminary stage of research, the methodology is sufficiently generalized so as to be applicable to a variety of tuning systems and stylistic repertoires.

Many fruitful lines of inquiry remain to be explored. In unequal tuning systems, for example, tonal discordance does *not* always map onto intuitions of tonal distance. A variety of approaches is doubtless required to fully explicate the roles of aesthetically motivated discordance qualia in non-standard tuning systems. It may be that tools similar to those developed in this analysis will be capable of informing discussions of tuning system selection with regard to historical performance practice, or the ongoing debate on the relevance of "pure" small-numbered ratios to the listening experience.

The findings of this analysis also raise important questions concerning the much more familiar 12tET system. Although I have assumed that, through its ubiquity, 12tET no longer arouses feelings of discordance, the fact remains that the system deviates from justly-tuned small-numbered ratios. Could it be that discordance qualia—though sufficiently familiar so as to pass unnoticed—also play a role in our experience of tonal function in 12tET? If it is indeed the case that discordance qualia guides the interpretation of tonal structures in 12tET as in 19tET, the consequences to familiar notions of tonal ambiguity would be striking. Further investigation is required to fully address this question; in the meantime, it is my hope that the findings of this analytical essay may

serve to free—in whatever small way—discordance from being discussed in necessarily qualitative terms. Rather than viewing discordance as a necessary evil to be minimized at all costs, perhaps we can begin to move toward an understanding of this variety of qualia as an active, relevant, and *functional* aspect of the listening experience.

Conclusion

Of course, several of the findings of the preceding analytic essay are not generalizable to discordance qualia in general. One would not, for example, expect moments of incidental discordance to have such profound consequences on the interpretation of tonal function as do the Blackwood's idiosyncratic structures. This is in fact one of the strengths of the model, for it highlights the profound differences that underscore the various categories put forth in part one of this paper. We should expect and welcome divergent interpretive results, given the markedly different nature of the perceived intentionalities behind each type of discordance qualia.

The classification scheme put forth in this paper should be considered provisional, an invitation to further exploration of the subject, yet it is notable for the range of methodologies it permits. In the above analytic essay I fashioned an approach based on Steven Rings' methodology, yet other pieces exemplifying structural discordance would likely require different approaches, as would investigations into the other types of discordance qualia. Whatever the method, it is my hope that this study will encourage further attention to discordance qualia, so that this striking and impactful phenomenon may be given the attention it truly deserves.

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