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Hearing Kaleidoscopes: Embedded Grouping Dissonance in Electronic Dance Music

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Abstract

The rhythmic and metrical qualities of electronic dance music (EDM) are clearly among its most prominent and appreciated features. Yet scholarship on rhythm, as well as popular discourse surrounding EDM, often frames the pervasively duple metres that characterize popular dance-based styles as simplistic and limited in capacity. Given the allure of EDM's temporal qualities, how do musicians devise creative solutions to the constraints of its duple metrical organization? This article addresses this question through a consideration of embedded grouping dissonance, one of several distinctive rhythmic phenomena found in EDM. In theorizing embedded grouping dissonance, the article both builds upon and expands recent music-theoretical formulations of 'metrical dissonance', which describe similar occurrences without addressing this specific phenomenon. It then situates embedded grouping dissonance in relation to EDM's technologically mediated means of production, arguing that this rhythmic technique exemplifies recurring principles of design that shape and reflect the aesthetics of electronic dance music on a broad scale.

Introduction: Finding the Beat in Electronic Dance Music

> In most commercial rock . . . the 4/4 beat is consistently and oppressively emphasized: there is no tension and therefore no real opportunity to work out tensions.[1]

> Adam Jay: In beats, my single bars usually have two to four beats.
> Mark Butler: OK. So you do sometimes think of them as two beats?
> AJ: Yeah. [counting] 1–2–1–2 – tech-house uses that a lot.
> MB: Oh really?
> AJ: Yeah. And, my friend [name deleted] writes techno tracks in 3/4. . . .
> MB: Really? OK – I want to hear about this!
> AJ: [laughs] A lot of people don't buy his records. But he's a compositional genius. If I'm mixing his records, and I start his 3/4 record at a certain time, a really long way away . . . it'll line up! [laughs] And between then, it'll just sound weird. And it's amazing.[2]

'Commercial' rock versus records with limited sales, 4/4 versus 3/4 metre, a lack of rhythmic tension versus divergent cycles – the two quotations that open this paper introduce a variety

1 Graham, 'Rhythms in Rock Music', 35.
2 Adam Jay Southerland (Adam Jay), interview with the author, 22 March 2002.

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of oppositions. In particular, they offer contrasting depictions of *rhythm*. Indeed, similar, often paradoxical contrasts divide discourse about rhythm in a variety of popular music styles. On the one hand, rhythm is assumed to be one of the most prominent features of popular music, an element that draws listeners in and has a very direct effect on their responses. In discussions of particular styles, fans and musicians frequently describe specific rhythmic attributes that they admire; Adam Jay's remarks on metre in techno constitute just one of many possible examples. On the other hand, rhythm in popular repertoires is often portrayed in surprisingly reductive terms. In particular, a tremendous amount of discourse, both verbal and written, asserts that the vast majority of Western popular music employs but a single metre, namely, 4/4. The '4/4' qualities of popular styles are often put forth simply as fact, as when Deena Weinstein writes that 'as rock slouches in 4/4 time to the millennium, it is up to its ringing ears in history'.[3] In other cases, as in the above quotation from Graham, these attributes are referenced disparagingly, framed as a kind of musical straw man for more 'complex' rhythmic styles.

These paradoxical emphases on rhythm are especially evident in electronic dance music (EDM), a broad category of contemporary popular music that includes styles such as techno, house, drum 'n' bass, and trance. As in rock, metre in EDM styles is routinely portrayed in broad terms as a unitary '4/4'; Kai Fikentscher, for instance, writes that 'the tempo [of underground dance music] is in almost all cases structured in 4/4 meter'.[4] Yet the way in which EDM shapes time is clearly one of its most important and alluring features as well. In discussions about this music, fans speak of broad divisions into 'four-on-the-floor' styles and those based on breakbeats; in dance, they respond to perceived rhythmic characteristics through movement. Within EDM's musical textures percussive elements are pervasive, while pitched parameters such as melody and harmony play relatively minor roles. Rhythm is also central to the selection, combination, and manipulation of records by DJs, whose techniques include important skills such as 'beat matching' and 'dropping the beat'. These examples highlight just a few of the many ways in which rhythm is brought to the foreground in the creation and appreciation of EDM.

As the quotations from Graham, Weinstein, and Fikentscher reveal, the tensions I have highlighted emerge just as frequently in academic sources as they do in popular ones. These statements are drawn, respectively, from (a) one of the earliest sources of popular music research – the inaugural issue of *Popular Music and Society*; (b) a 1998 essay collection entitled *Mapping the Beat*; and (c) the first monograph on EDM by a music scholar. At the same time, many scholars of popular music have also made cases for greater attention to rhythmic and metrical attributes, noting that aspects of rhythm and metre are especially important to the ways in which popular music is experienced and that they have frequently been downplayed or ignored as a result of pitch-centred methodologies. Robert Walser, for instance, writes that 'rhythm has been particularly neglected in Western theories of musical

3 Weinstein, 'The History of Rock's Pasts', 137. As Weinstein's article focuses on intertextual relationships in rock, it is clearly not her purpose to examine its temporal qualities; I present the quotation simply as one of many clear examples of generalizations about metre in popular music.

4 Fikentscher, '*You Better Work!*', 83.

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meaning', while Richard Middleton suggests that 'traditionally, musicology is good with pitch structures and harmony, much less good with rhythm, poor with timbre, and this hierarchy is arguably not congruent with that obtaining in most pop music'.[5]

Labels of '4/4' are accurate in a very broad sense, for it is true that the majority of pop and rock music created in the West since the birth of rock 'n' roll has been based on recurring time spans of four, eight, or sixteen pulses.[6] Theorist Richard Cohn has described such spans as 'pure';[7] in other words, the number of pulses contained in the span is a power of a single prime integer – typically either two ('pure duple') or three ('pure triple'). In popular music 'pure duple' values are especially common; durations of two, four, eight, and sixteen appear at multiple metrical levels.

Yet music-theoretical accounts also frequently portray 4/4 as limited in its capacities. More specifically, theorists have tended to downplay the interpretive possibilities of pure spans in favour of those that are 'mixed', a term that Cohn uses to describe durations based on two or more different primes. Scholars have frequently suggested that the ability to be divided by both two and three makes durations such as six and twelve inherently more capable of supporting complex rhythmic and metrical phenomena. Cohn, for instance, describes pure spans as 'safe, stable, and hermetic', whereas mixed spans 'invite conflict, instability, confusion'.[8] In a second article he reiterates this contrast, noting that 'the potential metric interpretations for a span of mixed length are plural. Consequently, mixed meters have a potential for instability that is denied to pure meters, which admit but a single metric interpretation'.[9]

Generalizations about metre in rock and EDM are problematic because they ignore the many different ways in which a particular metrical type can be constructed in individual works and styles.[10] Furthermore, like many generalizations, they overlook a variety of interesting exceptions. Most significantly, however, they raise key questions concerning the central role of rhythm in popular music and the contradictory ways in which it is discussed. If popular musicians have shunned multiply determined time spans and other 'complex'

5 Walser, *Runnin' with the Devil*, 48; Middleton, 'Introduction: Locating the Popular Music Text', 4. See also Hughes, Review of *Understanding Rock*, 205, 220–1; Krims, *Rap Music and the Poetics of Identity*, 19; and Stewart, ' "Funky Drummer" ', 294.

6 Recurring twelve-pulse spans, which I describe in the following paragraph as 'mixed', have also played a significant role in certain eras of popular music. Alexander Stewart, noting the prominence of 'triplet or shuffle feel (12/8)' from the 1920s into the 1950s, traces the emergence during the 1950s and early 1960s of 'even or straight eighth notes', which he characterizes in neutral terms as '8/8' (Stewart, ' "Funky Drummer" ', 293). 'By the 1960s,' he writes, 'division of the beat into equal halves had become common practice in the new driving style of rock, and the occurrence of 12/8 metre relatively scarce' (293). Since then, recordings featuring 12/8 have continued to be made, but they remain the exception rather than the norm. One might also ask, although an answer is beyond the scope of this paper, to what extent many 'shuffled' or 'swung' rhythms can be understood as modifications of an even prototype.

7 This and other terms introduced in this paragraph appear in Cohn's articles 'The Dramatization of Hypermetric Conflicts in the Scherzo of Beethoven's Ninth Symphony' and 'Metric and Hypermetric Dissonance in the *Menuetto* of Mozart's Symphony in G Minor, K. 550'.

8 Cohn, 'The Dramatization of Hypermetric Conflicts', 195.

9 Cohn, 'Metric and Hypermetric Dissonance', 11.

10 My concern with diverse manifestations of particular metrical types is informed especially by Christopher Hasty's *Meter as Rhythm*, which offers an extended critique of abstract, generalizing depictions of metre.

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metrical constructs, how have they created the rhythmic and metrical interest that drives their music? More specifically, how do popular musicians create rich temporal experiences within pure-duple contexts? Existing research has only begun to address these questions, leaving music based on pure-duple metres significantly undertheorized.[11] In this essay I will begin to suggest some answers, not by attempting to explore every way in which popular musicians devise creative solutions to the constraints of pure-duple metre, but instead by focusing on a particular illustrative practice found in electronic dance music, a distinctive metrical phenomenon that I will describe as 'embedded grouping dissonance'.

My argument unfolds in four main sections. I begin by explaining the elements that constitute embedded grouping dissonance and providing illustrative analyses of several EDM tracks. Then, in the second section, I situate embedded grouping dissonance with respect to discussion of related phenomena in existing scholarship. In the third section I consider the technological means through which embedded grouping dissonance is generated and the relationship of simple and complex elements in its production. I conclude by exploring embedded grouping dissonance in relation to recurring aesthetic values within EDM culture.

Embedded grouping dissonance is common in EDM, but it has not been previously described in literature on Western art music. The three examples I have selected for discussion represent a variety of musical styles, geographical locations, degrees of commercial success, and time periods: 'Dooms Night' by Azzido Da Bass, a major club hit of 2000; 'How to Play our Music' by Reese & Santonio, a Detroit techno track from the 1980s; and 'Connected' (2000), a 'minimal techno' work by English producer James Ruskin. In this study I am particularly interested in a close engagement with the sounds of EDM, and my primary approach will be musical analysis. At the same time, my understanding of the rhythmic qualities of EDM and the techniques through which they are created is informed by field research I have conducted with DJs and recording artists since 2001, and I present these musicians' insights at various points throughout the paper. In the final section I also address the function of embedded grouping dissonance in relation to the cultural traditions of electronic dance music.

I. Theoretical and Analytical Foundations

> I try to get away from having one-bar loops which are repeating, [instead] finding ways to get the permutation within the loop by, for instance, applying envelopes which are not repeating with the loop lengths, but with a different period. For instance, you have a one-bar loop, and you have something on top of this one-bar loop which makes a 1.5-bar change. As a result, you've got a true repetition after three bars. And if you go further and apply a change – another change – which

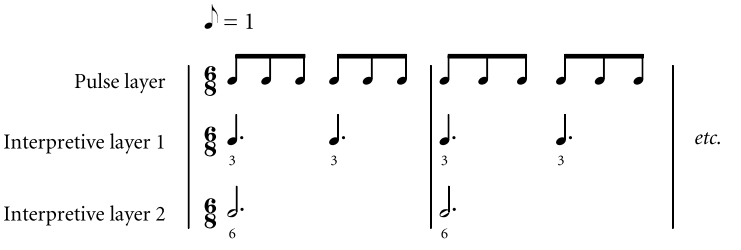
11 A few recent works do begin to address this gap; these include Jocelyn Neal, 'The Metric Makings of a Country Hit' (1998); David Temperley, 'Syncopation in Rock' (1999); Alexander Stewart, '"Funky Drummer"' (2000); and Donald Traut, '"Simply Irresistible"' (2005).

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> now changes after four bars, the next full cycle is twelve bars. So I use very simple changes to get a more complex pattern.[12]

In this statement EDM producer Robert Henke, who issues recordings under the name Monolake, explains to me one way in which he creates metrical interest in his music. I had asked him to comment on a statement on his webpage in which he mentions 'a specific Monolake style which is often permutating complex rhythmical structures interacting with rich textural elements, providing depth and color'.[13] In his response he describes a musical texture comprised of diverse repeating patterns, which EDM musicians describe as 'loops'. In particular, he mentions a specific technique in which simultaneous loops of differing lengths align only infrequently, generating larger patterns of non-alignment and convergence (in this case, a combination of three- and four-bar patterns that align every twelve bars).

The process that Monolake describes can be understood as an instance of metrical dissonance, a term that music theorists have used to describe non-aligned layers of motion within a musical texture. The concept of metrical dissonance arises from a broader body of scholarship that conceptualizes metre itself as a combination of several different layers of motion; this work began with a monograph by Maury Yeston (*The Stratification of Musical Rhythm*, 1976) and has more recently drawn heavily from a book by Harald Krebs (*Fantasy Pieces*, 1999). In the model of metre proposed by Krebs at least three layers are present: a 'pulse layer' – the fastest regular layer of motion – and two or more slower-moving 'interpretive layers' that group the pulse layer into larger units.[14] Example 1 applies this model to 6/8 metre, revealing how it arises through the grouping of a quaver pulse into a 3-layer and a 6-layer, which articulate a dotted crotchet tactus (interpretive layer 1) as well as the dotted minim downbeat (interpretive layer 2). Collectively, these three layers form the 'metrical layers' of a work.



Example 1 Krebs's model applied to 6/8 metre.

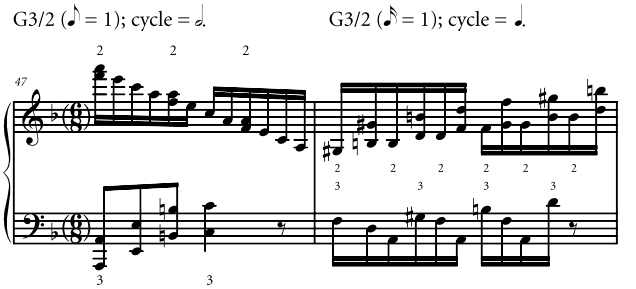
This approach to metre is well suited to electronic dance music, in which layers of motion are made directly perceptible in a variety of ways. As I noted in an earlier work, the individual layers of EDM compositions often appear as unique elements within the texture, differentiated through timbre, register, and pattern repetition; layering is also central to the production of EDM in multichannel MIDI environments and to its performance by DJs, who

12 Robert Henke (Monolake), interview with the author, 22 July 2005.
13 <http://www.monolake.de/about1.html> (accessed 10 May 2006).
14 Krebs, *Fantasy Pieces*, 30.

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devote a great deal of attention to the addition, removal, and combination of various layers of motion.[15]

Metrical dissonance, as Krebs defines it, arises when additional layers fail to align with metrical layers in various ways. In this paper I am concerned with a particular type of metrical dissonance – grouping dissonance – which arises when non-aligned layers of motion contain different numbers of attacks. Example 2, for instance, presents conflicting groupings of three and two; this results in dissonances that Krebs would describe as G3/2 (where 'G' stands for 'grouping' and '3/2' for the conflicting groupings). In the first bar of the example a quaver pulse is grouped, while the semiquaver is the common durational unit in the second bar.[16]



Example 2 Grouping dissonance in Chopin, Ballade No. 2, Op. 38, bb. 47–8.

If the layers involved in a grouping dissonance remain in motion, they will eventually align. Krebs describes the amount of time from one point of alignment to another as the 'cycle'.[17] In most cases the length of the cycle both corresponds to and aligns with a metrical layer or the first hypermetrical layer; the dissonances of Example 2, which involve cycles that align with the bar line and the tactus, are typical. This principle is remarkably consistent across common-practice literature: in fact, it applies to nearly every example of grouping dissonance presented in Krebs's *Fantasy Pieces*. In this way the periodic alignment of grouping dissonance actually tends to reinforce important metrical junctures in this repertory.

Grouping dissonances of a similar nature, such as occasional quaver triplets or short two-against-threes that line up at the minim level, also occur in the 4/4 contexts of electronic dance music. Some dissonances in this repertory relate to the metre in a more unusual manner, however; see Example 3, an excerpt from the Timo Maas remix of 'Dooms Night' by

15 Butler, 'Turning the Beat Around', §§12 and 14.

16 As Krebs analyses all the dissonances in a given work in terms of a single common durational unit, his approach would lead to a label of G6/4 for the dissonance in the first bar of the example. In contrast, I describe each dissonance in its most reduced form, leading to two different G3/2 labels in this case. Although each method has certain advantages, which I will explain subsequently, the points I wish to make are demonstrated more effectively through the latter approach.

17 Krebs, *Fantasy Pieces*, 32. Krebs attributes this term to Horlacher ('The Rhythm of Reiteration') and Yeston (*The Stratification of Musical Rhythm*).

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Larger numerals: G4/3 (♩ = 1); smaller numerals: G3/2 (♪ = 1)

Dotted lines indicate cyclical alignment of G3/2



Example 3 Embedded grouping dissonance in Azzido Da Bass, 'Dooms Night (Timo Maas Mix)', bb. 49–60 (as mixed by Timo Maas, *Music for the Maases*, CD1, track 1).

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Azzido Da Bass.[18] In this passage a constant series of attacks in the synthesizer groups quavers into threes against the clear 4/4 metre of the other instruments. The result is a G3/2 dissonance with a cycle of three crotchet beats; in the example I have indicated the dissonance with a row of small 3s immediately above synth 3, a row of small 2s immediately below the percussion instruments, and dotted lines showing cyclical points of alignment. Because the three-beat duration of this dissonance's cycle is incommensurate with the metre, it generates a larger dissonance with a cycle of three bars. I have labelled this dissonance G4/3, with the crotchet equal to one. As indicated by the larger numerals running along the outer tiers of the staff system, the downbeats of each bar form the 4-layer of this slower-moving dissonance, while the alignment points of the initial dissonance form its 3-layer.[19]

I describe this configuration, in which one grouping dissonance is nested within another whose common durational unit is larger, as an 'embedded' grouping dissonance. At least three distinct dimensions are involved in embedded grouping dissonance: (1) the presentation of more than one grouping dissonance at the same time; (2) the presentation of grouping dissonance on more than one metrical level; and (3) a causal relationship in which the non-congruence of the lower-level dissonance's cycle generates the larger dissonance.

Although electronic dance musicians may realize these conditions in a variety of ways, the embedded grouping dissonances found in this repertory consistently involve a fundamental conflict between the pure-duple values of 4/4 metre and a pure-triple dissonance. The pure-triple layer often consists of dotted crotchets, as in Example 3, but other rhythmic values may occur. Throughout most of the Detroit-techno track shown in Example 4a, for instance, the voice moves in steady dotted quavers, creating a 3-layer that combines with the drumbeat's 4-layer to produce a G4/3 grouping dissonance. This dissonance moves through two complete cycles, shown by brackets and dotted lines at the points where the layers converge. A third cycle is left unfinished when the dotted quaver motion breaks off in the second bar.

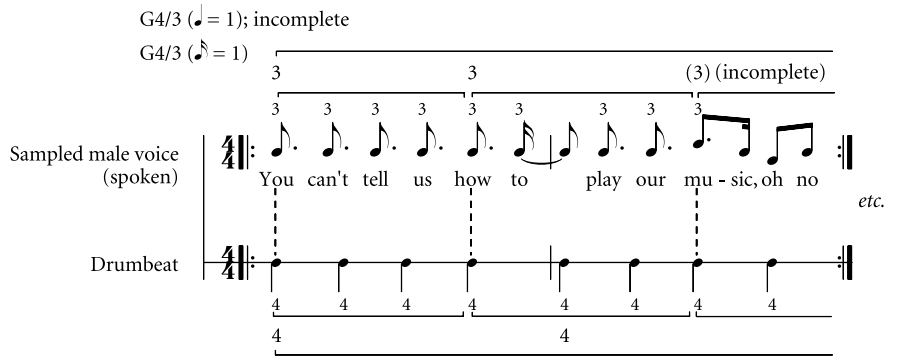
As in the previous example, the lower-level cycle in this excerpt lasts for three beats, thereby creating a larger G4/3 dissonance in which the crotchet equals 'one'. If the slower-moving layers of this dissonance, indicated by larger numerals in the outer tiers, were allowed to continue, they would return to a point of alignment every three bars, as shown in Example 4b. Instead, however, the cessation of the dotted quaver motion leads to a 'resolution' of the dissonance in the second bar of the pattern, thereby reinforcing rather than subverting the two-bar hypermetre. While this behaviour might recall dissonance treatment in common-practice music, the two-bar patterning of this passage is nevertheless realized in a way that is especially characteristic of popular music. As shown in Example 4c, the beginning point of each lower-level cycle divides the two-bar span asymmetrically into durations of 3, 3, and 2 crotchets – or, if the quaver is taken as the common durational unit, into the pattern 33334.

18 All transcriptions are by the author. Readers who wish to hear this and subsequent examples of electronic dance music will find that recordings of the works I discuss are readily available through commercial sources; see the discography below for album and label information.

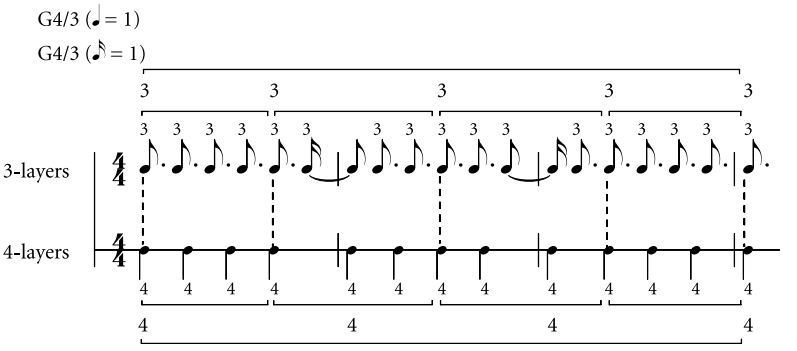
19 Because the synthesizer enters on the 'and' of beat 1, both dissonances begin mid-cycle. The first alignment of the smaller dissonance occurs on the third beat of the first bar of the example, while the initial point of alignment of the larger dissonance falls on the first beat of the third bar.

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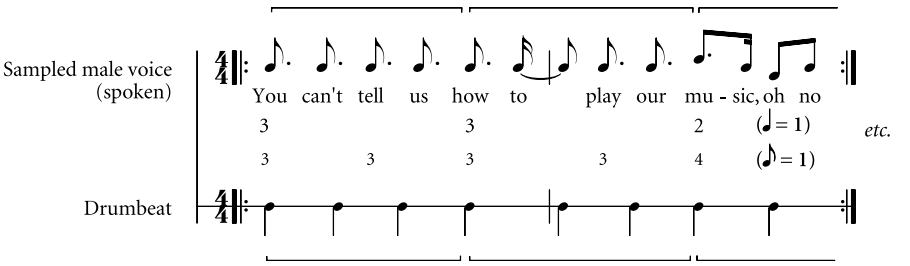
a. The dissonance as realized.



b. Hypothetical continuation of large-scale G4/3.



c. Asymmetrical divisions of the two-bar span.



Example 4 Embedded grouping dissonance in Reese & Santonio, 'How to Play our Music'.

These patterns, which are rare in common-practice music, are widespread in rock and pop, for asymmetrical division offers another solution to the constraints of pure-duple metre.[20] In this case the 332 and 33334 divisions also correspond to the accentual pattern of the lyrics; in response to the metre, they seem to reinforce the defiant message conveyed by the text.

20 Cohn also comments briefly on asymmetry as a means of creating interest within pure-duple spans (see 'Metric and Hypermetric Dissonance', 11 n. 18), while Butler ('Turning the Beat Around') discusses whether the asymmetrical rhythms that occur in electronic dance music should be considered instances of syncopation. In his article ' "Simply Irresistible" ' Donald Traut discusses several such patterns as examples of 'hooks'. One pattern, which he describes as

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In both of the previous examples the dissonant layer is generated through the repetition of a single duration. In other cases distinctive patterning highlights the pure-triple quality of the dissonance; see Example 5a, an excerpt from the track 'Connected' by English techno producer James Ruskin. In this passage a dotted crotchet duration like that found in Example 3 is divided into a crotchet–quaver rhythm, thus making the triple subdivision of the 3/2 dissonance explicit.

Riff 2 is not the only layer creating metrical dissonance in this track, however. Example 5b, a more detailed transcription of the same passage, shows how an additional riff presents another embedded grouping dissonance. This dissonance, a double G4/3 in which the semiquaver is the common durational unit of the smaller dissonance, is like that seen in Example 4, except that both of its cycles reach completion. Although the two riffs in Example 5b are dissonant with each other, they interlock in an interesting manner: the E in riff 3 always falls exactly between the F♯ and the A in riff 2. Because riff 3 is much quieter dynamically, and because its F♯ sounds almost simultaneously with the F♯ in riff 2, it does not stand out clearly as a separate pattern. Instead, the combination of the two patterns suggests the resultant line A–F♯–E, as shown in Example 5c.

In describing the relationships between the hi-hat and the two riffs in this track, I have analysed the hi-hat as a 4-layer in Example 5b and as a 2-layer in Example 5a, a difference that results from my preference for describing dissonances in the most reduced form possible. This strategy highlights the presence of differently sized manifestations of the same dissonance. The dissonance G4/3, for instance, occurs three times in this passage: once between riff 2 and the hi-hat (♩ = 1) and twice between riff 3 and the hi-hat (♪ = 1 and ♩ = 1). Keeping the dissonances reduced also clarifies embedded relationships: for example, the way in which one G4/3 generates another (Example 5b), or the way in which the 3-layer in a G3/2 dissonance can generate a larger-level G4/3 (Example 5a).

At the same time, describing all the dissonances in a given work in terms of a single common durational unit can simplify discussion of complex textures. In this passage, for instance, preserving the semiquaver as a common value reveals the array of dissonances shown in Example 5d. As indicated in the summary beneath the example, the combination of riff 3 with the hi-hat forms the dissonance G4/3, while the combination of riff 2 and hi-hat forms G6/4. The larger grouping dissonances, meanwhile, can be described as G16/12; the bar-level patterning of the hi-hat forms a 16-layer, while 12-layers arise within riffs 2 and 3. The common-unit approach also reveals that the G16/12 formed by the hi-hat and riff 3 is an augmentation (by four) of the lower-level G4/3.[21] In relation to each other, in turn, the two 12-layers form a 'displacement dissonance', a term that Krebs uses to

<333322>, is quite similar to that heard in 'How to Play our Music': it also spans two bars, 'resolving' on beat three of the second bar. In Traut's version, however, the quaver rather than the semiquaver is equal to 'one'; hence the EDM example contains twice as many triple attacks. Nevertheless, several interesting parallels emerge: of the tracks I consider, 'How to Play our Music' is the only one to feature a resolution as well as the only example from the 1980s; the majority of Traut's examples are from mainstream 1980s pop and rock, and all resolve. See Traut, '"Simply Irresistible"', esp. pp. 61–2.

21 Example 4a also involves quadruple augmentation.

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describe a type of metrical dissonance in which layers consisting of the same number of pulse-layer attacks (in this case, twelve) are displaced by a consistent quantity.[22]

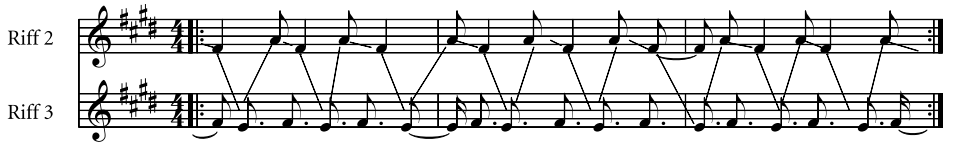
a. Riff 2 as dissonant layer.



b. Riff 3 as additional dissonant layer.



c. Line resulting from the combination of riffs 2 and 3.

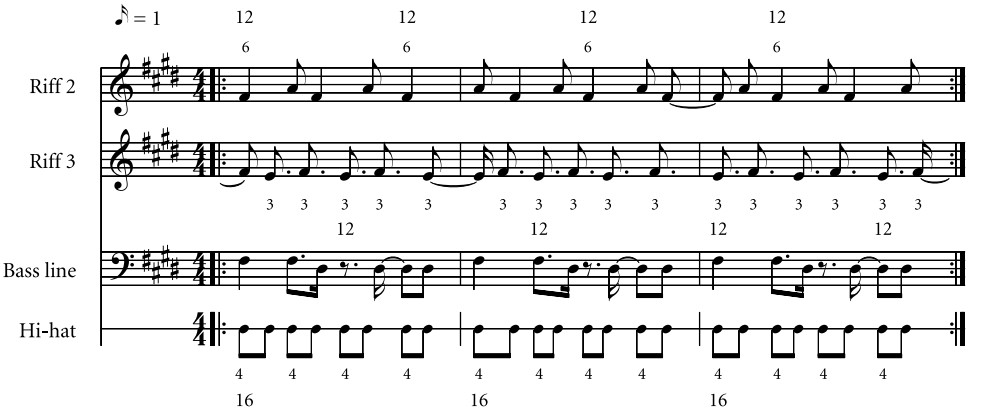


Example 5 Embedded grouping dissonance in James Ruskin, 'Connected'.

22 Krebs, *Fantasy Pieces*, 33. I have provided two possible labels for this particular dissonance: D12+8 or D12–4. In Krebs's system the first number in such a label refers to the number of pulses within each layer of motion, while the second number refers to the amount of displacement. Krebs generally indicates displacements in positive terms, arguing that most are heard in a 'forward' manner, that is, following the direction of musical flow (35). He does acknowledge, however, that contextual factors may contribute to a sense of the displaced layer arriving before the metrical layer. This type of 'backward' displacement is indicated with a minus sign. In the case of Example 5d a backward displacement seems more likely, given that riff 3's 12-layer falls near the end of the 12-layer in riff 2. Either possibility, however, assumes that riff 2 is the referential layer (although neither layer is 'metrical'). It is also possible to speak of a D6+2 (or D6–4) dissonance produced through a subdivision of the two 12-layers in this example.

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d. All metrical dissonances interpreted in terms of a common durational unit



Example 5 *continued.*

II. Embedded Grouping Dissonance and Contemporary Music Theory

I previously described three key features of embedded grouping dissonance: (1) the simultaneous presentation of multiple grouping dissonances; (2) the presentation of grouping dissonance at multiple metrical levels; and (3) a causal relationship in which the cyclical non-congruence of the lower-level dissonance generates the larger dissonance. These distinctive qualities come to the fore when embedded grouping dissonance is considered in light of previous music-theoretical discussions, which describe similar occurrences without addressing this specific phenomenon. Krebs, for instance, has used the term 'compound dissonance' to describe passages that contain more than two conflicting layers of motion,[23] as in Example 6a, in which non-aligned 3-layers combine with a 2-layer to form G3/2 and D3+2 dissonances. Like an embedded grouping dissonance, this passage presents multiple metrical dissonances at the same time; however, it is not based solely on grouping dissonance. In fact, almost all of the examples of compound dissonance in Krebs's *Fantasy Pieces* involve combinations of grouping and displacement dissonance or multiple displacement dissonances rather than grouping dissonances only.[24] Hence, while embedded grouping dissonances certainly qualify as a type of 'compound' dissonance, this category does not sufficiently account for their specific attributes.

Displacement dissonance is not a primary concern in this paper; for further discussions of its use in electronic dance music see Butler, 'Turning the Beat Around'.

23 Krebs, *Fantasy Pieces*, 59.

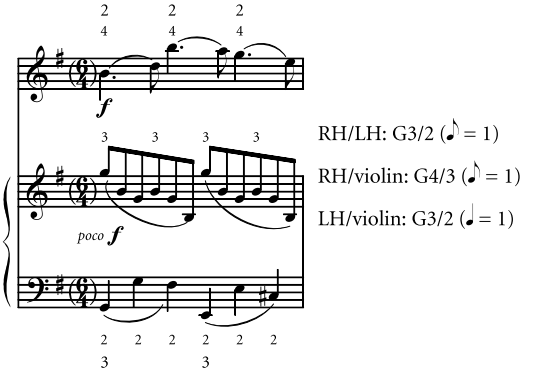
24 As previously described, one EDM example presented in this paper ('Connected') also contains both grouping and displacement dissonance. In the case of the passage shown in Example 5d, however, displacement dissonance is a secondary phenomenon generated through the simultaneous presentation of multiple embedded grouping dissonances. Each embedded dissonance is, in itself, generated solely through grouping.

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a. Krebs's compound dissonance (Schumann, Piano Sonata, Op. 11, 3rd mvt, bb. 51–6; see Krebs, *Fantasy Pieces*, 96).



b. Cohn's double hemiola (Brahms, Violin Sonata No. 1, Op. 78, 1st mvt, b. 235; see Cohn, 'Complex Hemiolas', 304).



Example 6 Related phenomena in current music-theoretical literature.

Another concept, Richard Cohn's 'double hemiola', appears to be more closely related; in fact, Cohn describes it as 'embed[ding] a 2:3 relation at two levels simultaneously'.[25] In a later article he defines this concept more formally as 'the relationship between symmetrical divisions of a time-span that simultaneously bear 3:2 conflicts at two adjacent levels of the metric hierarchy'.[26] An example from the latter article appears as Example 6b; for the sake of consistency with the rest of my paper I have analysed it using Krebs's methodology, adding dissonance labels throughout the passage. According to this analysis the right hand of the piano forms a G3/2 dissonance with the left hand; the left hand forms a larger G3/2 dissonance with the violin; and the right hand forms G4/3 with the violin. Unlike Example 6a, therefore, this excerpt satisfies the first two conditions associated with embedded grouping dissonance: it presents more than one grouping dissonance at the same time, and the dissonances occur at multiple metrical levels. It does not, however, meet the third condition, for there are no generative relationships between the dissonances. The cycle of the smaller G3/2 dissonance, for instance, has no special relationship to the larger G3/2; although the dotted minim duration defined by the cycle of the former does correspond to the 3-layer of

25 Cohn, 'Metric and Hypermetric Dissonance', 13.
26 Cohn, 'Complex Hemiolas', 295.

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the latter, the 2-layer of the larger G3/2 is articulated through independent contextual means. Furthermore, all of the dissonances respect the boundary of the bar line. The key factor, it seems, is the relationship between the metre and the dissonance. If the metre, like the 6/4 that underlies this example, is built to allow multiple groupings, dissonances can occur without disrupting it excessively. If the metre is not designed in this manner, a tiny disagreement can have far-reaching consequences, the fundamental incommensurability of pure duple and pure triple extending outward to progressively larger levels.[27]

All of the terms I have discussed thus far, such as 'compound dissonance', 'double hemiola', and the broad category of 'metrical dissonance', derive their explanatory power from analogies between pitch and rhythmic phenomena. As I noted in the opening section of my paper, however, a number of authors have argued that current approaches to theory and analysis overemphasize pitch, and some of these scholars have also raised specific critiques of 'dissonance'-based theories of rhythm. Robert Walser, for instance, commenting on the way in which 'musicologists and music theorists tend to discuss rhythm', writes:

> Not only is [rhythm] customarily assumed to be cognitive and disembodied, but Western music theory's traditional emphasis on harmony has led many music theorists to conceive of rhythm through harmonic metaphors. Terms like 'metric dissonance' and 'dissonant strata' suggest that rhythmic conflicts must always be resolved, whether in performance or analysis. There seems to be no place for tensions that remain unresolved, differences that can coexist.[28]

Indeed, it is true that Krebs, Yeston, and others have been particularly concerned with the ways in which dissonance and consonance as manifested in the realm of pitch might play out in temporal domains. Krebs, for instance, writes that 'the term ''metrical dissonance'' suggests that, by analogy with pitch theory, dissonance is ornamental and could be subjected to a reductive process to expose underlying consonances'.[29]

The behaviour of non-congruent layers in EDM (and in a variety of other popular music) presents serious challenges to this pitch–rhythm analogy. Whereas the pieces Krebs discusses

27 For instance, while discussion of embedded dissonances has thus far been limited to two levels (which, in all of the examples considered, led to a higher-level mixed span consisting of twelve crotchet beats), the combination of pure-triple dissonance with an insistently pure-duple metre will continue to produce conflict at subsequent levels. The aforementioned twelve-crotchet span, for example, will create a larger conflict between its three-bar duration and a four-bar hypermetre. This dissonance, in turn, will align only after every twelve measures, thus generating a conflict between twelve- and sixteen-bar hypermeasures. (The length of the cycle of such a dissonance, 192 bars, corresponds approximately to the duration of an average EDM track.) The mixed spans involved in these dissonances are therefore inherently different from those found in common-practice music, since they can never be reconciled with the metre. A further (though less significant) point is that the values involved in an embedded grouping dissonance need not be exclusively hemiolic. In theory, conflicts such as 7/4 or 11/3 could also generate dissonances of this type. These dissonances would quickly produce cycles of extreme length, however, thereby stretching the limits of perceptibility. For instance, in the case of a recurring 7-layer within 4/4 metre, where ♩ = 1, the first embedded cycle would take twenty-eight bars to reach a point of alignment. These hypotheticals aside, all of the embedded grouping dissonances I have observed in electronic dance music involve conflicts between duple and triple values.

28 Walser, 'Rhythm, Rhyme, and Rhetoric', 214 n. 20. See also Middleton, *Studying Popular Music*, 104.

29 Krebs, *Fantasy Pieces*, 83.

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typically end in a state of metrical consonance, suggesting an embellishing role for metrical dissonances, the dissonant layers of electronic dance music generally fail to 'resolve', instead becoming a more-or-less permanent part of the piece. As structural elements in their own right, they challenge the distinction between 'metrical' and 'antimetrical' layers, and, more generally, between what is 'consonant' and what is 'dissonant'.

In spite of these differences the term 'dissonance' remains useful for several reasons as a way of describing the sounds I have discussed. The Latin root *dis-sonans*, for instance, suggests a notion of 'sounding apart' that is literally applicable to certain interactions between layers in EDM. When two layers do not align, their relationship will always be 'dissonant' even if they cannot be categorized as 'structural' versus 'embellishing'. Viewed in this way, dissonance is in a certain sense *more* applicable to metrical phenomena than to pitch. Dissonant layers of motion do quite literally sound apart, whereas intervals and harmonies, when so described, are being portrayed in qualitative, evocative terms (although the naturalization of 'dissonance' as a music-theoretical concept tends to veil this poetic strategy). By considering metrical 'dissonance' in a new light, we can arrive at a place where dissonances can 'remain unresolved', and different – even conflicting – layers can 'coexist'. When dissonant layers behave much like metrical layers, they can be considered structural, emancipating metrical dissonance from its need to resolve. The notion of 'sounding apart' also resonates with the cultural and musical practices through which this music is created and appreciated in numerous ways, as I will subsequently explain in detail.

III. Simplicity, Complexity, Technology

A particularly intriguing feature of embedded grouping dissonances in electronic dance music is the way in which complex arrays of dissonance are created with a very limited number of rhythmic values. In fact, when all the layers involved in dissonances in Examples 3–5 are considered as a group, the only surface-level durations to be found are quavers, dotted quavers, crotchets, and dotted crotchets.[30] In classical music, grouping dissonances in common time generally involve tuplets; in fact, it is actually impossible to create a grouping dissonance whose cycles align with pure-duple metre without employing tuplets. In contrast, the embedded grouping dissonances found in EDM always use durations common to 4/4 metre. As Monolake explains in the quotation that opened Section I above, 'I use very simple changes to get a more complex pattern'.

One possible explanation for this situation lies in technology: the most common durations are those that can be entered with the sixteen buttons of a drum machine. Although these machines have been made in a wide variety of makes and models, their design almost always favours 4/4 metre. Consider, for instance, the Roland TR−808, which, with its successor the TR–909, has been one of the most widely used drum machines in the history of

30 When each example is considered individually, the range of durations is even smaller. Example 4, for instance, begins with just two note values (the crotchet and the dotted quaver).

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Figure 1 Roland TR–808 drum machine.

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electronic dance music.[31] As shown on the TR–808 depicted in Figure 1, both machines feature a horizontal row of buttons that, by default, represent semiquavers in a 4/4 bar.[32] To create a rhythm pattern on this type of machine the producer chooses a percussion sound (see the white labels running across the middle of the machine) and then either taps it in (see the 'tap' button in the bottom right corner) or programs it through a process known as 'step entry'. In the latter approach – the more commonly used of the two – the producer presses the button that corresponds to each attack's position in the bar; once pushed, the button lights up and the machine plays the sound that has been selected. To create a four-crotchet pattern in 4/4 time, for instance, one would press buttons 1, 5, 9, and 13. This pattern will then repeat indefinitely until 'stop' is pressed. To write patterns longer than a single bar, the producer specifies the ordinal numbers of the bars involved and then programs each bar individually. It is also possible to create metres other than 4/4, although this requires a special adjustment. To create 12/8 metre, for example, the twelfth step must be defined as the last; in this case, the buttons will represent quavers rather than semiquavers.

In spite of these obvious technological biases towards 4/4 metre, however, counter-groupings are also in evidence. Moreover, certain features inscribed upon the surface of these machines suggest the specific phenomenon of embedded grouping dissonance. On the 808, for instance, four rows of groupings are visible above the sixteen buttons. (The same four rows appear on the 909, though in a different order.) The bottom two rows indicate two different pure-duple groupings of shorter note values into crotchets: the lowest row suggests a 2/4 bar in which the crotchet consists of eight demisemiquaver steps, while the row above corresponds to the standard 4/4 bar with semiquaver divisions. The top two rows, however, reveal pure-triple groupings of the quaver; in relation to a 4/4 bar, these groupings align after three crotchet beats.

The manual for the 909 offers a prosaic explanation for the presence of the pure-triple groupings, suggesting that they were intended as rubrics for metres such as 6/8 and 12/8.[33] However, the direct physical correspondence between the groupings and the alignment patterns of embedded grouping dissonance is striking. It seems highly probable that some EDM producers have chosen to explore the possibilities offered by this alternative reading of the machine's inscriptions. Although producers have not specifically mentioned the rows of notated rhythms in their communications with me, they have clearly indicated that the physical properties of drum machines played a role in their creation of these kinds of

31 Both were widely used during the formative years of house and techno in the 1980s. Furthermore, although they are obsolete by modern standards (both are analog, and the 808 predates MIDI), and they were only manufactured in small, short-lived production runs (about 12,000 TR–808 machines were produced between 1980–3, while just 10,000 TR–909s were manufactured in 1983–4; see Rule, *Electro Shock!*, 81, 95), they continue to be used today. Producers constantly sell and resell them on the second-hand market, and computerized 'soft-synth' replicas are also widely available. Given their prevalence, the design of these machines has undoubtedly shaped the musical development of EDM in important ways.

32 Though not visible in this black-and-white copy, colour creates additional 4/4 groupings on the 808. Buttons are divided into fours, articulating crotchet beats. The first four buttons are red, followed by groupings of orange, yellow, and white.

33 Although the 909 is no longer produced commercially, its manual is available online from sites such as <http://www.vintagesynth.org/> (accessed 10 May 2006). The four rows of groupings are explained on p. 24 of the manual.

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dissonances. Graham Massey of 808 State, for instance, told me that 'some patterns on the 909 would stop at 4 instead of 16. A trick we often employed was to have things stop at 12 or other numbers and then maybe have the other drum machine in 6/8 so you would get shifting grids of beats. "Cobra Bora" off *Ninety* is a good example.'[34]

A strategy of 'misreading' the rubric on the 808 and 909 to produce complex rhythms fits within a well-established EDM tradition, a phenomenon that Brewster and Broughton have described as the 'creative perversion' of technology.[35] Specifically, EDM producers have often deliberately misappropriated technology by using it in ways its makers never intended, an approach that has often led them to striking musical results. A technologically deterministic view of the use of these machines might cause us to assume that their simple design would lead to simplistic music. However, the complex dissonances we have seen suggest otherwise. In fact, it is the fundamental premise of the drum machine – the manufacturing of endlessly repeating rhythms – that enables phenomena such as embedded grouping dissonance, for this technology also allows the creation of endlessly repeating patterns of different lengths, beginning in different places, creating a constantly shifting kaleidoscope of texture and accentuation.

IV. Embedded Grouping Dissonance and EDM Aesthetics

> [Techno is] very loop-based, and very minimal[ly] loop-based. Even when there's a lot going on in a techno song, it's still very loopy and very – to a certain degree – repetitive. But that's kind of the essence of it. You take that repetitiveness and you mesh it with a totally different track which is also somewhat repetitive and then you just work the hell out of it. You can cut back and forth; you can take the bass out and put the bass back in; you can tweak the mids; you can work the effects. I think it gives you a lot more freedom to actually make it your own, instead of just playing records.[36]

The image of the kaleidoscope, introduced at the end of the previous section, suggests broader questions about the aesthetic functions of embedded grouping dissonance. Why do the creators of electronic dance music introduce this phenomenon? What purposes does it serve for those who hear it? We can begin to answer these questions by noting how embedded grouping dissonance reflects certain aspects of musical design that are characteristic of electronic dance music as a whole. The first of these is cyclical repetition, a key structural idea that manifests itself at multiple levels in this repertory. In a typical track most of the textural layers are formed from repeating patterns known as loops. Emphasized by DJ Shiva in the quotation above, loops are the fundamental constructive elements of electronic dance music. Although they can be as short as a single semiquaver or as long as sixteen bars, they typically consist of a single instrumental pattern. Layered on top of each other, loops form sequences:

34 E-mail to the author, 4 July 2004. In addition to the reference to the 909 in Massey's description, the name of his group is a direct tribute to the TR–808.

35 Brewster and Broughton, *Last Night a DJ Saved my Life*, 315–16.

36 Lisa Smith (DJ Shiva), interview with the author, 3 Dec. 2001.

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combinations of multiple instrumental sounds that are typically 8, 16, or 32 bars in length. Sequences in turn form complete tracks, which are then etched into the surfaces of spinning records, and complete tracks join to form DJs' sets.

In an embedded grouping dissonance, loops function as building blocks within a modular approach to structure. By constructing a pattern out of just one or two kinds of rhythmic blocks, producers can create intense metrical dissonance. Once they have been set in motion, these looping patterns align at regular intervals, resulting in cycles that generate larger dissonances. Repetition is integral to this process: the lower-level dissonance must repeat several times before the larger dissonance will complete its cycle, thereby giving the listener time to process the two dissonances and their relationship to the metre. These features of musical design emerge frequently in the quotations I have presented from EDM DJs and producers: repetition is either explicitly referenced or assumed in all of their observations, while the other elements I have mentioned – the use of basic rhythmic constituents and the long-range effects of periodic alignments – are especially evident in the statements from Adam Jay and Monolake.[37]

Also pervasive within EDM is a particular emphasis on the equality and independence of textural layers. This emphasis is especially noticeable when layers fail to align: dissonant layers often seem to float relatively freely rather than being bound by a strict hierarchy. While this independent quality can occur with any type of metrical dissonance, it is particularly noticeable with embedded grouping dissonances. Dance music producers often find interesting ways to explore the tension between the common rhythmic values found in these dissonances and the pure-triple groupings they create. Refer again to 'Dooms Night', for instance (Example 3). Although the instrument described as 'synth 3' forms a dissonance during this passage, it is first heard in a quite different context, a forty-three-second breakdown in which it is the only layer present (0:43–1:26). By itself, with no evidence to the contrary, it seems completely consonant and regular. When the bass line and percussion instruments return at the end of the breakdown, however, the synth is suddenly placed in a highly dissonant context.[38] This play between the exposed solo synth and its dissonant superposition against a percussive backdrop continues throughout the rest of the track, as breakdowns continue to alternate with full-texture sections.

37 For some readers of this journal the use of divergent cycles to generate large-scale structure may also evoke the work of twentieth-century art music composers such as Messiaen, Carter, and Reich. At a general level of compositional technique, potential similarities are certainly not irrelevant; as I have emphasized throughout, however, a key aspect of the use of these cycles within EDM is their appearance within pure-duple metrical contexts.

38 The initial impression of regularity is heightened by the length of the breakdown that precedes the passage shown in Example 3. Within the breakdown's forty-three-second duration, synth 3 is heard a total of sixty-three times, and it is clear from the context that it would appear a sixty-fourth time were it not for a brief rest just before the entrance of the other instruments in b. 49. Sixty-four, of course, is a pure-duple value; given the prevalence of these values as well as the overall clarity of 4/4 metre in the first part of the track (0:00–0:43), it seems likely that listeners would also apply a pure-duple hearing to the stream of attacks that occurs during the breakdown. This interpretation would result in sixteen perceived 4/4 bars. In clock time, however, these bars are longer than those heard in the rest of the track: if the bar line found in Example 3 is taken as the standard of comparison, the breakdown actually lasts for twenty-four bars. The 16:24 (or 2:3) ratio between perceived and 'actual' bars neatly expresses the phenomenological path through which we are led: on its own synth 3 presents itself as pure-duple, but when the other instruments enter its pure-triple nature is revealed.

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In James Ruskin's 'Connected' the dissonance created by riff 2 stands out even more sharply from the metrical layers, since the crotchet–quaver pattern creates an especially strong triple-metre effect. The presence of definite pitch also draws attention to the dissonant layer. Moreover, because the metre itself is not articulated as strongly in this track as it is in 'Dooms Night', it is easier to hear this layer apart from the metrical context; throughout much of the track it seems to hover independently above the rest of the music. A fourth contributing factor – the relationship between the dissonant layers and the track's primary drumbeat – plays an even more significant role. In order to consider this relationship in more detail, I shall return to Example 5d. Although this passage functions as a useful model of the metrical dissonance employed in this track, the texture is actually simplified during these bars, for two prominent components – a bass drum and a snare drum – are absent. When these drum sounds enter the texture, the downbeat seems to shift, creating an effect that I have described elsewhere as 'turning the beat around'.[39] As a result, riffs 2 and 3 stand in an even more dissonant relationship to the metre, for the grouping dissonances they create are now displaced as well. This new interpretation, shown in Example 7, adds a further degree of independence to the dissonant layers: as a result of the displacement, riff 2 never shares an attack with the bass drum or snare drum; it skips across the surface of the music without once alighting upon the beat or its quaver subdivisions.[40]

When a dissonant layer seems to function independently of the metrical context, I describe the resulting effect as 'dissociation'. Dissociation is not involuntary; the degree to which a dissonant layer separates will depend upon how closely the listener focuses on it, as well as on its relationship to the metre and the strength with which the metrical context is asserted. Nevertheless, the music does invite dissociation; its combination of highly distinct patterns repeating non-congruent durations over long spans of time encourages the listener to explore the different projective worlds that are available. If we always choose to hear a particular textural combination in the same way, we will probably become bored; however, if we choose to focus first on this pattern, then on that one, and finally on the combination between the two, we can find more than enough richness to keep our attention engaged.[41]

The experiential qualities of dissociation as a metrical process also suggest broader roles for the phenomenon within electronic dance music culture. Regardless of how listeners choose to experience it, dissociation can imbue the music with a psychedelic aesthetic. For instance, Don Dresser, a dance music fan whom I interviewed, told me that 'there's some

39 See my article of that name (2001).

40 The entry of the snare drum obscures the presence of the hi-hat considerably; nevertheless, it is still audible upon close listening.

41 Lynne Rogers has also written about 'dissociation' in the music of Stravinsky (see 'Stravinsky's Alternative Approach to Counterpoint'; 'Dissociation in Stravinsky's Russian and Neoclassical Music'; 'Stravinsky's Break with Contrapuntal Tradition'). While we each use the term to describe passages involving non-aligned strata, she emphasizes dissociation as a structural technique, which she defines as 'the superimposition of distinctive, harmonically independent layers of musical material' ('Stravinsky's Break', 477; cf. 'Dissociation', 202). In contrast, I employ the term to characterize a perceptual and aesthetic effect. Rogers speaks of dissociation as a 'contrapuntal structure' ('Stravinsky's Break', 476) that Stravinsky employs, whereas I focus on listeners' experiences of dissonant layers. A further distinction is the central role that pitch plays in her depiction.

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Example 7 Displaced embedded grouping dissonance in James Ruskin, 'Connected'.

emphasis in the culture on just having a psychedelic atmosphere . . . using that to take you into a similar place without the chemicals'.[42] In this context, the effect of certain layers being outside the metre mirrors one's sense of being outside of reality. This also relates to the 'virtual reality' of a dance club – the way the environment is artificially constructed. In a typical club the outside world is completely shut out: windows are covered, the walls are painted black, and entrances and exits are isolated as much as possible from the actual club environment; clocks and other indicators of time's passing are avoided. As in the movie theatre (another darkened setting), the goal is to create the effect of another world.

In addition, the dissociative effects of embedded grouping dissonance arise within a club environment that serves to disorient participants in a variety of ways. Clubbing is not like watching a movie or reading a book, where one's attention is (at least ostensibly) directed towards a single object or experience. Rather, there is total sensory overload. The music is extremely loud, to the point of being physically overwhelming. Lights are flashing. Smoke is released onto the dance floor, contributing to a collapse between the club's 'effects' and the actual 'reality' of the environment. The experience is decentralized as well. One can come and go as one chooses, participate in whatever activities one chooses, attend to the music or not, and attend to whichever part of the music one finds most interesting. Consider, for instance, the following description of a particular clubbing experience by Fiona Buckland:

> There was no architectural, scopophilic, sexual, or aural center to the club. [. . .] I found it difficult to get a sense of the mass of movement from the outside, because on the outer margins of the area, dancers were more diffuse in critical mass, density, and energy. [. . .] I wandered deeper onto the floor in search of dance. With few markers to orient my position, the club neutralized typical reference points. As a result of the initial deliberate disorientation effect produced by darkness, flashing lights, and pounding music, the circulation of bodies in the

42 Donald Dresser, interview with the author, 10 Oct. 2001.

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> space became a prominent marker and shaper of not only orientation, but of the nature and energy of the populated club.[43]

Significantly, Buckland describes not only a variety of ways in which disorientation was produced, but also a response. Presented with a complex, multimodal experience, both she and the other clubbers sought to orient themselves within their musical and physical space. Furthermore, they were the agents of this process, for the ultimate effect of EDM's disorienting qualities is to place the listener in the position of actively determining a response. The diverse layers and independent cycles of an embedded grouping dissonance generate an interpretively open soundscape that offers many different paths for listeners to traverse; repetition makes it possible to try first one path and then another.[44] For Buckland, this active determination of experience becomes a central point, which she expresses through the concept of 'world-making': 'After entering a club, I found that many were disorienting spaces within which participants had to orient themselves in order to recognize and make a lifeworld'. 'The lifeworld produced by movement was not fixed, but fluidly determined by the moving participant. The participant actively created the club and the experience, rather than being its passive consumer.'[45]

To conclude, I will return to the role of technology in creating and experiencing EDM, a theme that I previously introduced in relation to the TR–808. The disorienting and dissociative effects I have discussed in this final section call further attention to the presence of technology in this repertory, for part of the perceived independence of metrically dissonant layers may stem from their performance by machines. In styles featuring traditional performance techniques, metrical dissonances must be executed by a single performer or ensemble, requiring a cognitive and performative integration that surely affects the way in which the dissonance is played in certain subtle but perceptible ways. In electronic dance music, however, dissonant layers can unfold independently with absolute precision, thereby setting up a tension between the mechanistic aesthetic of the music and the ways in which humans interact with it. This interplay is part of a broader tradition within EDM, one that has been a part of its history since its development during the early 1980s in large industrial cities such as Detroit and Chicago. On the one hand, technology – from the drum machine to the computer – is central to EDM experience. On the other, so is live performance. Audiences mediate technology by spontaneously enacting the rhythms it produces through dance, while DJs use turntables and a mixing board to respond with a live, continuously unfolding improvisation. As participants negotiate this ongoing dialectic between the mechanical and the human, they reveal a genre defined not so much by the machines with which it is made as by an ongoing commentary on the interaction of humans *with* these machines. As part of this trend, embedded grouping dissonance represents not only a

43 Buckland, *Impossible Dance*, 57–8.

44 Garcia ('On and On', §5.2) posits this process of orientation as a source of pleasure, which he links explicitly to repetition. DJ Shiva also links the repetitive aspects of EDM with 'freedom to actually make it your own' (see the quotation at the beginning of §IV above), although her focus is not on disorientation or dissonance.

45 Buckland, *Impossible Dance*, 56, 61.

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particular way of solving a musical problem – namely, the constraints of pure-duple metre – but also a culturally specific strategy for creating meaning through musical sound.

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