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Multi-Centric Complexes in Pop-Rock Music

by Matthew Ferrandino

Abstract. In this article, I explore the availability of multiple pitch centers in pop-rock songs that emerge from the application of what John Covach has called "positional listening." I demonstrate how different methods of listening and analysis have a drastic effect on our interpretation of a song's pitch center. Adapting Robert Bailey's term "double-tonic complex," I refer to songs that exhibit multivalent centers as "multi-centric complexes." Through several examples I demonstrate how different instruments—such as lead vocals, guitar, keyboards, or bass—can present their own, sometimes competing, centers. I use a variety of listening strategies and analytical methods in order to demonstrate and justify multiple centric interpretations that emerge when a listener compares a single instrument's projected center with others in pop-rock songs. Allowing for a "thick" interpretation of a pop-rock song's pitch center not only celebrates pop-rock's oft-cited tonal complexity, but also the overlooked complexity of the listening subject. Who is listening? How? And why?

Keywords and phrases: Popular music; rock music; centricity; tonality; perception.

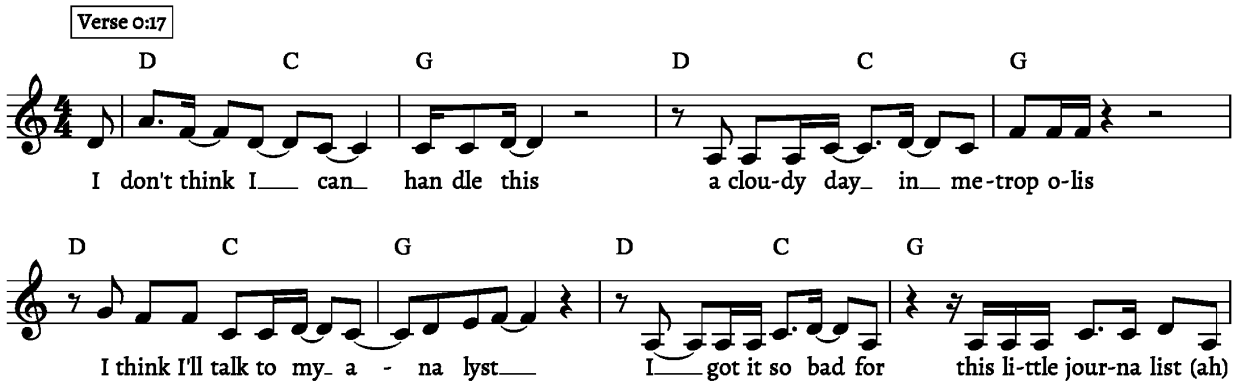
Introduction

When listening to pop-rock music, a listener can employ several different strategies in order to identify a centric pitch class that represents their perception of the music. For example, one can attend in time to dominant-tonic relationships established through functional harmony and root movement of fifths.[1] Similarly, centric orientation can be based on an overall diatonic collection's intervallic content using a method Richmond Browne (1981) calls *position finding*.[2] A different approach entails recognizing a pitch's salience, as distinguished by factors such as repetition, metric position, and formal position: what Charles Smith (1986) calls *presentational tonality*.[3] Certain strategies may be more appropriate for a particular style or genre over another but they are *not* mutually exclusive, and over the course of the listening experience one may shift their process of identifying a centric pitch class, either consciously or unconsciously. A listener can therefore hypothetically perceive different centers de-

[1] Brad Osborn offers a concise description of functional centers in pop-rock: "[a] center is established by what sounds like some dominant-functioning chord relative to some tonic […] the root of which lies a perfect fifth below the dominant-functioning chord" (2017b, 61).

[2] Richmond Browne's *position finding* relies on the rarity of interval class occurrences to determine a center. In the case of a diatonic scale, set-class 7–35, with an interval vector of ⟨254361⟩, ic 6, the tritone, and ic 1, the minor seconds, act as cues for deducing a diatonic center (Browne 1981, 5). Browne's strategy does not account for modal centers; Daniel Harrison elaborates further on this methodology. In this respect, see Harrison (1994, 73–76).

[3] Smith explains *presentational tonality*, in opposition to *functional tonality*, as cases where the center is established through "brute-force reiteration, registral prominence, and motivic fixing, as with anything that can be more systematically described" (1986, 129).



Example 1. Vocal Center versus Guitar Center in Spin Doctors' "Jimmy Olsen's Blues"*, Verse,* Pocket Full of Kryptonite *(1991).*

pending on which strategy they employ and when they employ it. Even different listeners employing the same strategy may identify different centers either due to ambiguity presented in the musical track or as a result of different musical experiences. By considering and employing these different strategies to certain musical tracks one can attend to an in-time, or diachronic, shift in center (e.g., tonicization or modulation) or one could become aware of multiple centers, available simultaneously.[4]

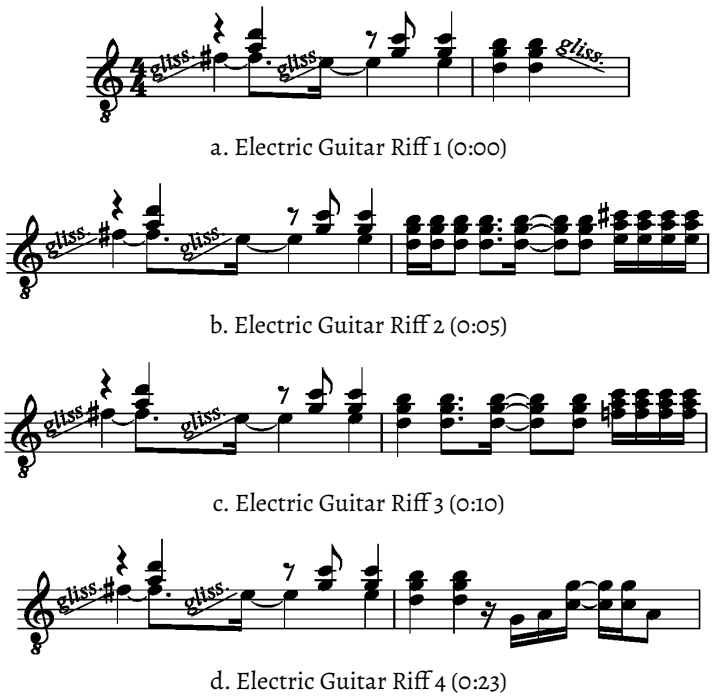
The Spin Doctors' track "Jimmy Olsen's Blues" (Example 1) presents an interesting test case for the initial consideration of multiple, simultaneous pitch centers. The harmonic progression of D–C–G(–G), in the electric guitar is repeated throughout the track. This progression is an example of what Christopher Doll (2017) calls an *ambiguous three-chord schema*, meaning that we can interpret this as either a G-centered progression: V–IV–I, or a D-centered progression: I–♭VII–IV, depending on context.[5] Nevertheless, this schema is realized as a four-chord rotation that repeats every two measures with half-note harmonic rhythm. If we apply a position-finding strategy for deducing centricity we are most likely to hear the D chord as dominant and the G as tonic center; this is further reinforced by the full-measure harmonic rhythm on the tonic G chord. Example 2a–d illustrates the opening guitar riff and four different turnarounds that guitarist Erik Schenkman uses at the end of each progression. A listener who is cued in to a D center during this opening riff may latch on to the brief A-major sonority in Example 2b as the dominant, but this is somewhat thwarted in the subsequent turnarounds in Examples 2c and 2d that contain C naturals. The turnarounds in Example 2a–d serve primarily as embellishments on the basic four-chord rotation, leading from the final G-major sonority back to the initial D-major sonority. Despite the second-inversion voicings of the G-major chord, it can be heard as the arrival point of the registral descent in the progression. The roots of the guitar chords are more clearly established with the entrance of the electric bass at 0:08.

If we focus instead on Chris Barron's vocal melody, we may be more inclined to hear a D center. This D-centric hearing is supported by phrase beginnings and endings, which outline a D-minor triad, and the relative weak positioning of melodic pitches G or C, the other roots in the harmonic progression and therefore the two other most likely centers. Furthermore, the range of the melody emphasizes the perfect fourth/fifth relation between A_3/A_4 and D_4. D can therefore be heard as center using Daniel Harrison's (2016) concept of *overtonality*, in which a center is established "by two pitch-classes related by perfect fifth or its compound; the lower of the two is the foremost over the entire hierarchy."[6] We are thus presented with conflict-

[4] In Temperley's (2018) discussion of scales and key finding in rock, he offers four factors that contribute to key-finding in rock: "1. Prefer a key whose supermode includes all pitches of the passage . . . 2. Prefer a key whose major scale includes all the pitches of the passage . . . 3. Prefer a tonal interpretation in which the tonic harmony is hypermetrically strong . . . 4. Prefer a tonal interpretation such that emphasized notes of the melody are notes of the tonic triad" (17–40). Temperley admits that this process of preference may generate conflicting candidates for the tonal center and offers two examples in which this is the case: Fleetwood Mac's "Dreams" and U2's "Beautiful Day."

[5] Doll offers a detailed comparison of two tracks that utilize the same three-chord schema, at the same transposition as "Jimmy Olsen's Blues": Warren Zevon's "Werewolves of London" and Lynyrd Skynyrd's "Sweet Home Alabama." While "Werewolves of London" presents a clear G center, "Sweet Home Alabama" presents melodic material in the guitar and vocals that Doll ultimately interprets as primarily a D center moving to a G center during the guitar solo (Doll 2017, 221–229 and 249). Nicole Biamonte favors the I–♭VII–IV hearing of this schema (as does Stephenson 2002, 110) in "Sweet Home Alabama" as an *open double plagal* progression (2010, 99–101).

[6] Harrison's concept is similar to Browne's *position finding*, but uses the overtone series to determine a pitch center rather than the interval vector of the diatonic set (Harrison 2016, 16–18).



a. Electric Guitar Riff 1 (0:00)

b. Electric Guitar Riff 2 (0:05)

c. Electric Guitar Riff 3 (0:10)

d. Electric Guitar Riff 4 (0:23)

Example 2. Guitar Turnarounds in "Jimmy Olsen's Blues".

Jimmy Olsen's Blues

Audio Example 1–2. (click to play audio).

ing claims to centricity: a G center, suggested by the guitar's harmonic progression, simultaneously discernible with a D center, by the vocal melody's emphasis on D and suggested by the guitar's and bass's hypermetric emphasis of D at the start of the progression. Depending on what strategy we employ at a given time, we can perceive two relatively equal pitch centers for the same musical passage. This feature of simultaneous centers in the context of pop-rock music represents the focus of this study.

In the case of pop-rock music—which utilizes the lexicon of traditional harmony without the necessity of function—the problem of identifying pitch centers and tonics has generated a number of theoretical models that attempt to justify a mono-centric reading. Mark Spicer (2017) applies concepts of absent, fragile, and emergent tonics in cases where a functional tonic does not occur at expected cadential or hypermetrical moments.[7] Brett Clement (2013) argues for the notion of modal tonalities in cases where the apparent pitch center does not align with the diatonic collection used to generate harmony. To clarify both Spicer's and Clement's methods it is helpful to consider a simple two-chord shuttle between major chords whose roots are a major second apart—as appears, for example, in Fleetwood Mac's "Dreams," which shuttles between F major and G major for the entirety of the track. Using Spicer's absent tonic, we can perceive two possible tonal centers implied by the two chords' potential function: a C-major tonic with the shuttle as IV–V, or an A-minor tonic with the shuttle as VI–VII. In either interpretation, the G-major sonority functions as a dominant chord. Clement's modal approach also considers G major as a tonicizing chord, but with F major as tonic, the shuttle as I–II.[8] Given the occurrence of B natural in the overall pitch collection, Clement labels this as an example of F-Lydian tonality. Taking a different approach, Drew Nobile (2017) offers a syntactical redefinition of function where familiar labels such as "Dominant" or "Tonic" are ascribed to a sonority's formal position rather than its diatonic context.[9]

[7] Spicer's methodology outlines a tonic-finding procedure that illuminates interesting centric possibilities but at the cost of dismissing salient features at the surface level.

[8] Clement argues that, in a Lydian interpretation, "I and II represent the strongest tonic and tonicizing chords, respectively" (2013, 106).

[9] The terms "Tonic" (T), "Predominant" (PD), and "Dominant" (D) are assigned to a chord's structural placement rather than to relative scale degrees and roots. Nobile (2017) offers several examples where the roles of PD and D are taken by chords other than ii, IV, and V.

The present commentary incorporates these different analytical methodologies as a means of supporting multiple available pitch centers that may be suggested by different listening and interpretative strategies. I explore concurrent pitch centers that occur in pop-rock music by reimagining Guy Capuzzo's (2009) *sectional centricity*, a theory that accounts for multiple non-hierarchical pitch centers within a song.[10] While Capuzzo's method accounts for different pitch centers in different sections, I shall instead look at pieces where multiple pitch centers are available to the listener simultaneously within a section. I refer to these instances as *multi-centric complexes*.[11]

The present methodology also incorporates a performance perspective and encourages us to consider *positional listening* in the pursuit of pitch centricity by considering how various performers on a given recording (i.e., bassist, guitarist, and vocalist) might perceive different pitch centers.[12] John Covach defines positional listening as "the purposeful suppression of some element(s) in the texture to create increased focus on other element(s) … [but] *the entire texture is available at all times*: the listener chooses what to focus on" (2016, emphasis in original). As contrast, Covach uses the term "ideal listening position" to describe "a kind of balanced, objective or even distanced view of the complete texture … [that] might be considered the default perspective from which music is discussed among listeners and scholars" (2020, 56). As will be shown, multi-centric complexes emerge from positional analysis, whereas monotonic hearings of tracks may represent the ideal listening position. I also refrain from describing multi-centric complexes as examples of "centric ambiguity," as used by Doll (2017) and Richards (2017), since the descriptor comes from an ideal listening position, and downplays the nuance of positional analysis.

The current study focuses on perception from an analytical lens rather than through quantitative case studies. Nevertheless, a more quantitative study into the examples presented here could further enlighten the complexities of centric identification in pop-rock music from a variety of perspectives. William Forde Thompson's and Shulamit Mor's research has "suggest[ed] that listeners can perceive more than one tonal organization or key at the same time, and that each key may be weighted to its perceived importance in the music" (1992, 70). One way in which a center's "perceived importance" may be distinguished is through positional analysis, especially in the case of multi-centric complexes. However, I am not arguing that listeners should be able to hear simultaneous centers in these cases. Instead, I propose that listeners strive for what Mitchell Ohriner calls "adaptive listening," in which a listener actively switches between different modes of hearing, be it rhythms or grooves, positional listening, or pitch centers (2020, 96).[13]

While my approach is similar to the melodic-harmonic divorce as explored by Allan F. Moore (1995), David Temperley (2007), and more recently Drew Nobile (2015), the difference between multi-centric complex and melodic-harmonic divorce is one of degree.[14] Melodic-harmonic divorce considers localized instances of dissonant prolongations between melody and harmony, whereas multi-centric complexes involve an extensive multiplicity of perceptible pitch centers. It is also useful to clarify the distinction between competing vocal (melodic) and guitar (harmonic) centers and melodic-harmonic divorce. Melodic-harmonic divorce accounts for prolongational dissonances between a structural melody and its supporting foreground harmony. In terms of voice leading, this means that pitch classes can "act as structural tones even if they are dissonant with foreground harmonies" (Nobile 2015, 189). Examples of different melodic and harmonic centers, on the other hand, are not concerned with *dissonance* between strata, but *difference* between their apparent pitch centers. Melodic-harmonic divorce and harmonic-bass divorce rely on a hierarchical arrangement of voice leading whereas multi-centric complexes do not.[15]

Two recent articles by Brett Clement and Trevor de Clercq take two different approaches to reconsidering har-

[10] A clear example of sectional tonality is Dexys Midnight Runners' "Come On Eileen" in which the verse in C major shifts abruptly to D major for the chorus. Each section maintains its centricity, "result[ing in] a patchwork tonality of sorts" (Capuzzo 2009, 157–158).

[11] This term is adapted from Robert Bailey's *double-tonic complex*, in which chromatic third-related keys "are linked together in such a way that either triad can serve as the local representative of the tonic complex" (Bailey 1985, 122). Nobile (2020) applied Bailey's *double-tonic complex* to rock music in his "Double-Tonic Complexes in Rock Music."

[12] Graeme M. Boone's article on the Grateful Dead song "Dark Star" is appended with a brief paraphrasing of several band members' claim for centricity in the song. Notably, lead guitarist and singer Jerry Garcia hears the song in E Mixolydian, while rhythm guitarist Bob Weir and bassist Phil Lesh concretely hear the song's center as A (1997, 205). The harmonic progression for the majority of "Dark Star" consists of a repeated two-chord shuttle, A–G.

[13] Ohriner (2020) contrasts adaptive listening with "persistent listening," wherein a listener stays fixed on a single mode of hearing throughout a track (96).

[14] The term *melodic-harmonic divorce* was coined by Moore (1995). Moore's concept is further explored by Temperley (2007) and further qualified into types by Nobile (2015).

[15] Ben Duinker (2020) posits that in some songs the "melodic and harmonic layers each operate to *their own* tonal logic" (emphasis in original), and that "entertaining the possibility that a song's textural layers are not inextricably bound to a unified tonal system…can broaden our perspective on pitch relationships in songs featuring ambiguous or inconclusive tonalities in one or more textural layers."

Table 1. Common Instrumental Roles in Pop-Rock music.

Stratum	Common Instruments in Pop-Rock
Melodic	Voice Lead Guitar (Electric & Acoustic) Synthesizer/Keyboard Piano (Right Hand)
Harmonic	Guitar (Electric & Acoustic) Synthesizer/Keyboards Vocal Harmonies Piano
Bass	Electric Bass Upright (Double) Bass Synth Bass Piano (Left Hand)

mony in pop-rock music. Clement (2019) considers the issue of tonicization and how a tonal center can be established through harmonic motion. However, Clement's focus is on triads other than the tonic that establish a sense of resolution at both primary and secondary levels—akin to the role of the V chord and secondary dominants in common-practice progressions, but with different factors in pop-rock music.[16] De Clercq (2019) instead builds off of Nobile's (2017) taxonomy for melodic-harmonic divorce by considering structural dissonances between the harmony and bass, what he calls "the harmonic-bass divorce." For de Clercq, these moments of divorce represent some degree of autonomy and independence between musical strata, specifically melody, harmony, and bass. Table 1 offers some common instrumental realizations of these strata.[17] If this independence between musical layers can occur at local levels, can they also act at a more global one? Is it then possible for musical strata, and specific instruments, to make available different, independent, centers to a listener? [18]

In defining multi-centric complexes it is necessary to clarify the distinction between pitch center and tonic.[19] I define "pitch center" as a referential pitch class that is emphasized through repetition, hypermetric/metric emphasis, formal position, agogic accent, dynamics, or registral extreme.[20] By contrast, I use the term "tonic" to refer to a referential pitch class that is established through functional harmony (i.e., "common-practice") and represents either a major or minor diatonic collection.[21] Pitch centers can be found in three constituent strata of music: melody, harmony, and bass, and in pop-rock music these strata can be distinguished by an instrument's timbre and the mix of the track (Table 1).[22] Since my approach to multi-centric complexes is similar to that of divorced musical strata, Table 2 offers a contextual comparison of the two methods. While the "divorce" approach identifies the independence of a particular stratum, a "multi-centric" approach emphasizes a particular stratum's compliance with the two strata that conflict. For example, in the context of a melodic-harmonic conflict, the "divorce" approach highlights the melodic stratum's independence whereas the "multi-centric" approach accentuates the bass's accommodation of pitch centers in both the melodic and harmonic strata. In the following discussion, however, I will frame my analyses and interpretations by specific instrumentation rather than abstract musical strata. We will consider first an example in which the lead vocals (melodic stratum) and the acoustic guitar (harmonic stratum) suggest two independent centers.

1. Multiple Centricity in Pop-Rock

1.1 Vocal Center versus Guitar Center

Some multi-centric complexes occur when a recognizable pitch center in the melody is different from a pitch center suggested by the guitar's harmony. We have already encountered an example of a split between vocal center and guitar center in "Jimmy Olsen's Blues," where the electric

[16] Like Temperley (2018), Clement (2019) offers a set of preference factors for rating a triad's tonicizing quality in relation to some tonic (see Clement 2019, 5).

[17] The strata here account for three of the four textures of rock described by Moore (1992). Missing here is the explicit beat stratum most commonly provided by drum kit, drum machine, or a sampler.

[18] Dmitri Tymoczko remarks that "many pieces . . . naturally segregate themselves into independent auditory streams, each of which, if heard in isolation, would suggest different tonal regions" (2002, 84). While Tymoczko is concerned primarily with the music of Stravinsky, the notion of separating different "auditory streams" is equally applicable to rock music and is particularly useful in distinguishing textural strata.

[19] This distinction between center and tonic is based in part on Stanley V. Kleppinger's (2011), in which *center* is established through "perceptual prominence." However, for the purpose of this study I consider Kleppinger's distinction between *tonal* and *tonality* to be arguably redundant in the case of rock music. Therefore, my use of *tonic* aligns with Kleppinger's definition of *tonality*.

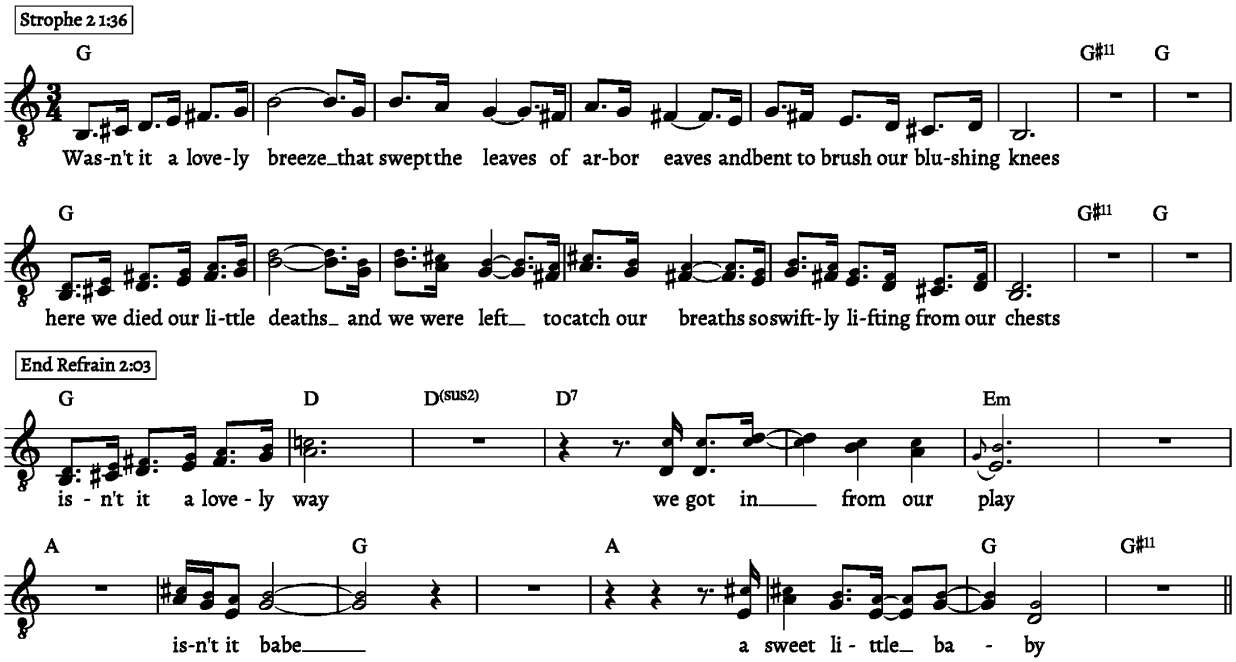
[20] Doll offers thirteen parameters for centric-finding information, including: Schema, Meter, Phrasing, Repetition, Texture, Scale, Duration, Pedal, Arpeggiation, Penultima (pre-tonic chord), Loudness, Parallel, and Expression (2017, 222). Richards (2017) adopts these parameters in his discussion of *axis progressions* that include the progression Am–F–C–G, all of its rotations, and all of its transpositions.

[21] While there is much debate about the efficacy and appropriateness of applying "common-practice" expectations in the listening to and analysis of rock—see Temperley (2018, 17), Covach (1997, 10–22), Everett (2009, 190–91), and Stephenson (2002, 29–34)—I include it here as a possible mode of hearing and analysis.

[22] Moore's (1992) *soundbox* is a visual representation of the mix of a track with an instrument's physical position within the box correlating to its sonic position. See also Moore (2012, 29–44).

Table 2. Comparison Between Divorced Stratum and Multi-Centric Complex.

Divorced Stratum versus Multi-Centric Complex (MCC)	
Melodic-Harmonic *(e.g., Nobile 2017)*	Divorce: Melody presents a structural dissonance over the underlying harmony. MCC: Harmony suggests a different pitch center than Melody, Bass fits both.
Bass-Melodic *(e.g., de Clercq 2019)*	Divorce: de Clercq argues that this can be explained through M-H or H-B divorces. MCC: Melody suggests a different pitch center than Bass, Harmony fits both.
Harmonic-Bass *(e.g., de Clercq 2019)*	Divorce: Bass presents instances of independence from the underlying harmony. MCC: Bass suggests a different pitch center than Harmony, Melody fits both.



Example 3. Vocal Center versus Guitar Center in The Decemberists' "Isn't it a Lovely Night," *Second Strophe,* Hazards of Love *(2009).*

guitar's harmonic progression D–C–G–(G) suggests a G-major tonal center, while the melody suggests a D pitch center. This type of split may also occur when a specific harmonic progression suggests a functional tonic different from the melodic pitch center as either a fragile, weakly supported tonic, or as an absent, implied, but not realized tonic.

The Decemberists' "Isn't it a Lovely Night" is a clear example of competing vocal and guitar centers. The song presents a definite harmonic emphasis on G major with Lydian C♯ inflections in the acoustic guitar, while the vocal melody and harmony rely on a D-major collection moving in parallel thirds (Example 3).[23]

For the majority of the track the bass layer is heard as G drones in the guitar and accordion. An upright bass enters the texture in the third strophe (2:31) with the opening melodic ascent B_2–$C♯_3$–D_3–E_3–$F♯_3$–G_3, and then supports the G drone with an alteration of $\hat{1}$ and $\hat{5}$.[24]

Isn't it a Lovely Night

Audio Example 3. (click to play audio).

The transcription of the second strophe of the track highlights where the vocal harmony—which sounds an octave higher than notated—enters the texture. The vocal harmony in the end refrain anticipates the guitar's D dominant-seventh sonority by two measures with a held C♮. Harmonically, this D sonority can be interpreted as a

[23] The G center in "Isn't it a Lovely Night" can be considered as an example of what Harrison calls *dronality*, that is, a center emphasized through a repetitive drone pitch (Harrison 2016, 19–20).

[24] I am using the terms *strophe* and *end refrain* rather than *verse* and *chorus* because I hear the second sixteen measures as dependent on the first. This is an example in which either label would be appropriate (de Clercq 2017).

functional dominant to the preceding G-major emphasis. However, it can also be interpreted as a fragile tonic with the G–A motion in the last system in the transcription of the example suggesting, but not realizing, a IV–V cadential progression. This second perceivable hearing is supported by the D-major collection presented in both the vocal melody and its parallel harmony and therefore interprets the strophe as a prolongation of the subdominant. In a third interpretation, from a modal listening perspective, one could hear G as the center and the track as a whole in G Lydian with the A-major chord as a Lydian dominant: II–I. But what does a multi-centric approach to the piece contribute to our interpretation of the track? Why not settle on a modal hearing? To address these questions, let us consider the context of the album on which "Isn't It a Lovely Night" appears.

Hazards of Love is an example of what David Nicholls (2004) calls *virtual opera*: a hybridization of pop-rock formal structures (e.g., verse-chorus forms) and an album-length narrative plot that involves interaction between multiple characters who may, or may not, be represented by different recorded personae. Furthermore, "the ideal performance takes place in the minds, and between the ears, of individual listeners . . . with each unit [track] being able to focus on a specific event, tableau or situation" (Nicholls 2004, 105).[25] Pitch centers—and drones in particular—play an important role in the context of *The Hazards of Love*. Many of the tracks utilize a drop-D tuning on the guitar, and accordingly present a salient D center through dronality. However, there are three exceptional tracks where the emphasis in the guitar shifts to a G center: "Isn't it a Lovely Night" (track 7), "The Rake's Song" (track 10), and "Hazards of Love 4 (The Drowned)" (track 17). The lyrical content of these three tracks is plainly intertwined, either focusing on a previous event, as in the case of tracks 7 and 17, or introducing an event that otherwise lies outside the narrative trajectory, as occurs in track 10. By contrast, "Isn't it a Lovely Night" presents an explicit recollection of track 2, "The Hazards of Love 1 (The Prettiest Whistles Won't Wrestle the Thistles Undone)," in which the two romantic protagonists—Margaret (sung by Becky Stark) and William (sung by Colin Meloy)—copulate and conceive a child. Track 2 is centered on D in both melody and harmony. A multi-centric reading of "Isn't it a Lovely Night" complement this recollection: the G in the accompaniment suggesting a reminiscence, as in tracks 10 and 17, and the D, sung by the characters Margaret and William, directing the retrospective to track 2. Applying a positional analysis to "Isn't It a Lovely Night" supports the expressive trajectory of the album, something that would be lost in a mono-centric or modal interpretation of the track.

[25] An early example of virtual opera is The Who's *Tommy* (1969), whose plot was in part conveyed through the original LP's album art and sleeve notes as contributing aspects of the narrative.

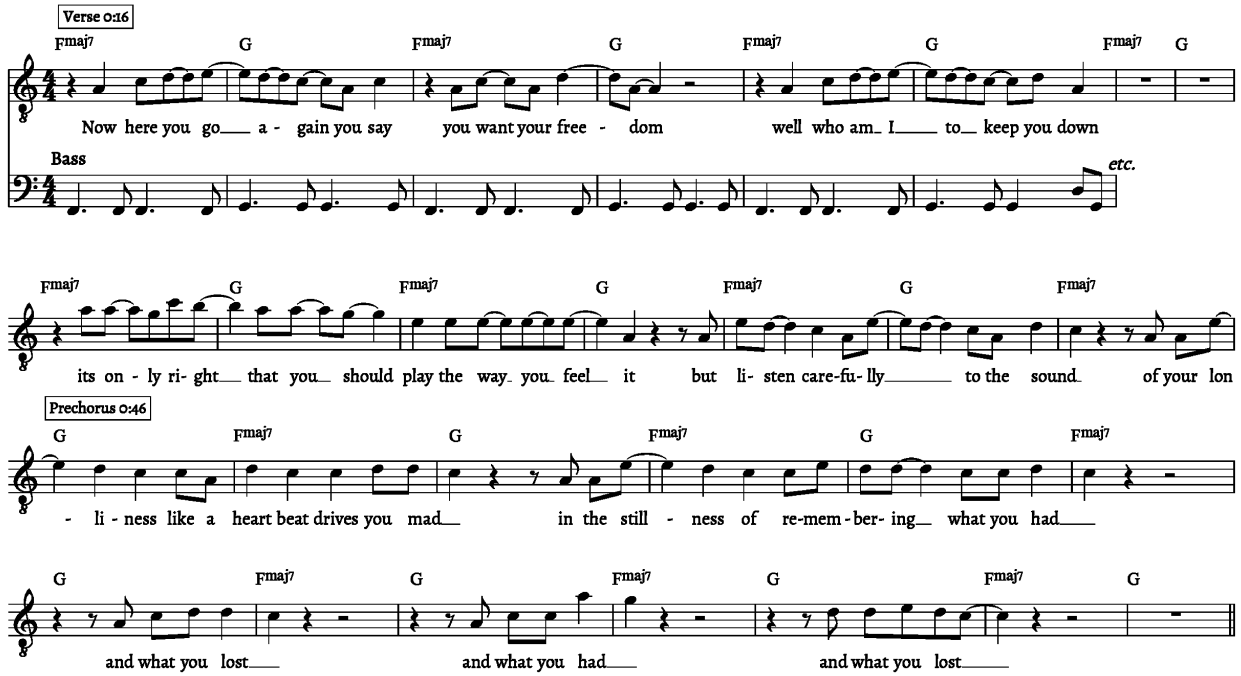
1.2 Vocal Center versus Bass Center

In the foregoing examples ("Jimmy Olsen's Blues" and "Isn't it a Lovely Night") the bass supported both the guitar's harmonic projection of G as center and the vocal melody's projection of a D center. In other cases of multi-centric complexes, the harmonic stratum can support both a vocal center and a bass center that differ from one another. The notion of harmony as a multivalent stratum against which the bass projects a clear center departs from pop-rock's stylistic norm wherein bass lines typically coincide with the root progression of the harmony, as noted in de Clercq (2019, 272). This type of split can be realized in at least two ways: 1) the harmonic content is underdetermined either through minimal or absent chordal progressions, or 2) the harmonic content is overdetermined (obscured) either through the use of extended tertiary chords (obscuring root identification) or through *wandering* harmonies, where modal mixture and chromatic alterations obscure chordal roots.[26] In Fleetwood Mac's "Dreams," the harmonic stratum is underdetermined both in terms of pitch content, a two-chord shuttle in the keyboards, and the mixing of the track. By comparison, Michael Jackson's "Rock With You" projects an overdetermined harmonic content through the use of extended tertiary chords in the guitar and keyboards. Both examples will be discussed in turn.

"Dreams" consists of a repeated F–G shuttle in the bass, supported by F^{maj7} and G major harmonies in the Fender Rhodes, contrasted with a mostly pentatonic collection in the melody (Example 4).[27] The shuttle continues for the entirety of the track with the Rhodes mixed

[26] Two examples of wandering harmony are Glen Campbell's "Wichita Lineman" (1968) and Elvis Costello's "Boy With a Problem" (1982). Both tracks consistently modulate without settling on a clear pitch center or tonic.

[27] Clement cites two possible centers, F and G, as the roots of the harmonic shuttle, ultimately settling on F and interpreting the progression as "Lydian I–II" (2013, 111). On the other hand, Ken Stephenson argues that the initial F center, as Lydian tonic, is "highly unusual," thus once the melody enters "the notes most likely to be identified as the tonic are A and C" (2002, 41). Stephenson ultimately settles on a C major hearing of the track, arguing that the IV–V progression is "more common" than VI–VII (2002, 42). Doll argues that the F-major–G-major loop "does not project either of its roots as strong possible centers," and offers A and C as potential centers, though "A is certainly the stronger candidate" (2017, 247). Temperley instead opts to hear F and C as simultaneously available throughout the track (2004, 264). Duinker (2020) argues that different layers exhibit different degrees of tonal ambiguity and tonal inconclusiveness. Furthermore, identifying a single unifying center is less interesting than the multiple perspectives and theories used to justify them.



Example 4. Vocal Center versus Bass Center in Fleetwood Mac's "Dreams," *Verse,* Rumours *(1977).*

Dreams

Audio Example 4. (click to play audio).

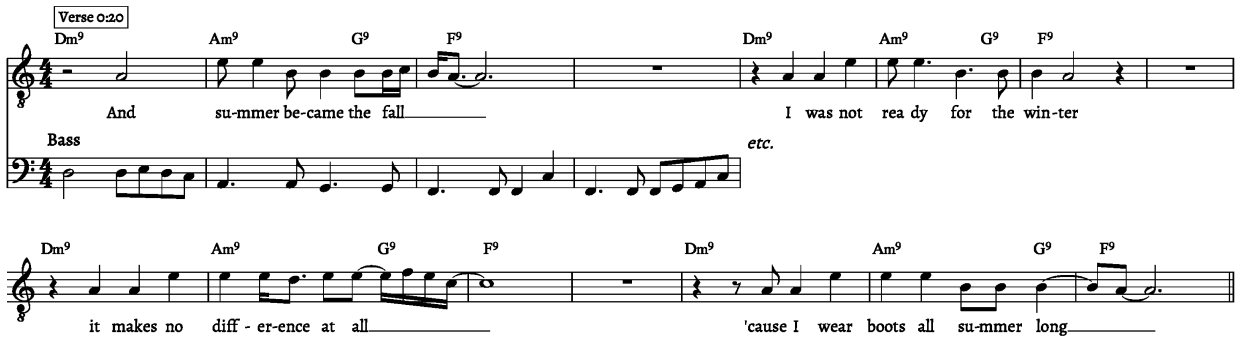
slightly right and behind the bass.[28] The electric guitar, panned mid-left, moves from melodic participation in the verse to arpeggiations in the prechorus, and is replaced by strummed acoustic guitar chords in the chorus.[29] While the harmony, like the bass, supports an F center through constant hypermetric emphasis as an example of presentational tonality, it is underdetermined from a functional perspective. We can hear the shuttle as an incomplete progression, or absent tonic, either as a IV–V shuttle that never resolves to C major, or as a VI–VII shuttle that never resolves to A minor. Therefore, the harmonic stratum does not clearly identify any one of the three possible centers—F, C, and A—but instead makes them simultaneously available for the listener to pick up on.

An F center is the most salient and available center to hear from the position of the bass player (John McVie). On the other hand, the melody, sung by Stevie Nicks, makes both A and C centers recognizable. I invite the reader to sing or play through both the bass line and the melody independent of the harmonic context to make the centers available through positional listening clear. The phrases of the verse clearly outline a perfect fifth from A_3–E_4, supporting an A center through overtonality (as in the vocal D center in "Jimmy Olsen's Blues"). Additionally, the treatment of the non-pentatonic pitch B_4 acts as part of a $\hat{3}$–$\hat{2}$–$\hat{1}$ descent ("it's only *right*") rather than a leading tone to C. However, the subtle change in the melodic line in the prechorus surely makes the C center more salient—nearly all of the phrases end on C, whereas the verse phrases ended on A. This availability of diatonic centers, also noted in "Isn't it a Lovely Night," is a common occurrence in pop-rock music, both melodically and harmonically, though usually as a sectional phenomenon rather than made apparent as a simultaneity.[30] Since the underdetermined harmony can be

[28] One exceptional A-minor chord, with A_2 in the bass, occurs after the first chorus (1:52). However, this moment does little to confirm an overall centricity of A and, as Doll puts it, "our dream-state is not so easily broken" (2017, 247).

[29] I label the section at 0:46 of "Dreams" as a prechorus due to the repeated lyrical content and the shift from syncopated melodic rhythms to downbeat ones. This is a subtle example of Jason Summach's description of prechorus, which is characterized by "momentum-building device[s] … [such as] changes in groove, lyric phrasing, and the length of formal units, as well as dynamic level, register, instrumentation, timbre, harmonic progression, and harmonic rhythm" (2011).

[30] A clear example of an emergent relative major tonic is Counting Crows' "Mr. Jones" (1993), which hypermetrically emphasizes A minor in the verse and then functionally moves to C major in the chorus. Doll (2011) refers to this type of tonal shift as a *breakout chorus*. Also worth noting is Fastball's "The Way" (1998), which employs



Example 5. Vocal Center versus Bass Center in Stevie Nicks's "Nightbird," *Verse,* Wild Heart *(1983a).*

Nightbird

Audio Example 5. (click to play audio).

interpreted to fit either center, "Dreams" is an example of melodic-bass split, the melody suggesting both A or C centers and the bass an F center.

It is worth considering another track by Stevie Nicks that utilizes a similar, but slightly more complex, separation of vocal and bass centers. Like "Dreams," "Nightbird" presents the same complex of discernible centers in the verse: A and C in the melody and F in the bass, (Example 5). The F center is less apparent in this example, but is strengthened by the phrase endings and the bass's major pentatonic descent from $\hat{6}$ down to $\hat{1}$ in F that unfolds over the course of the progression. Again, singing or playing through the bass and melody individually will clarify the available centers. Harmonically, the verse makes available the same F center as the bass, but also projects an A center through the embellished Aeolian progression iv–i–VII–VI.[31] For its part, the melody traces a diatonic A-minor collection, and, like "Dreams," the pitch class B is presented as part of a $\hat{2}$–$\hat{1}$ linear motion in A minor rather than $\hat{7}$–$\hat{1}$ in C major. Unlike "Dreams" however, the chorus of "Nightbird" moves to a more convincing C-major tonality. Each stratum—vocal melody, harmony, and bass—converges on a C center; therefore, only the verse of "Nightbird" presents a multi-centric complex.[32]

In Michael Jackson's "Rock With You" (Example 6) the bass repeats $\hat{1}$ and $\hat{5}$ in E♭ for the majority of the verse and chorus, except in the prechorus which ascends from $\hat{1}$ to $\hat{4}$. Furthermore, the bass's E♭ consistently lands on hypermetrically accented downbeats in both the verse and the chorus. If we adapt to the bassist's perspective, the repeated metric emphasis on E♭ alternating with B♭ remains a consistent indication of an E♭ center, regardless of the harmonic and melodic content.[33]

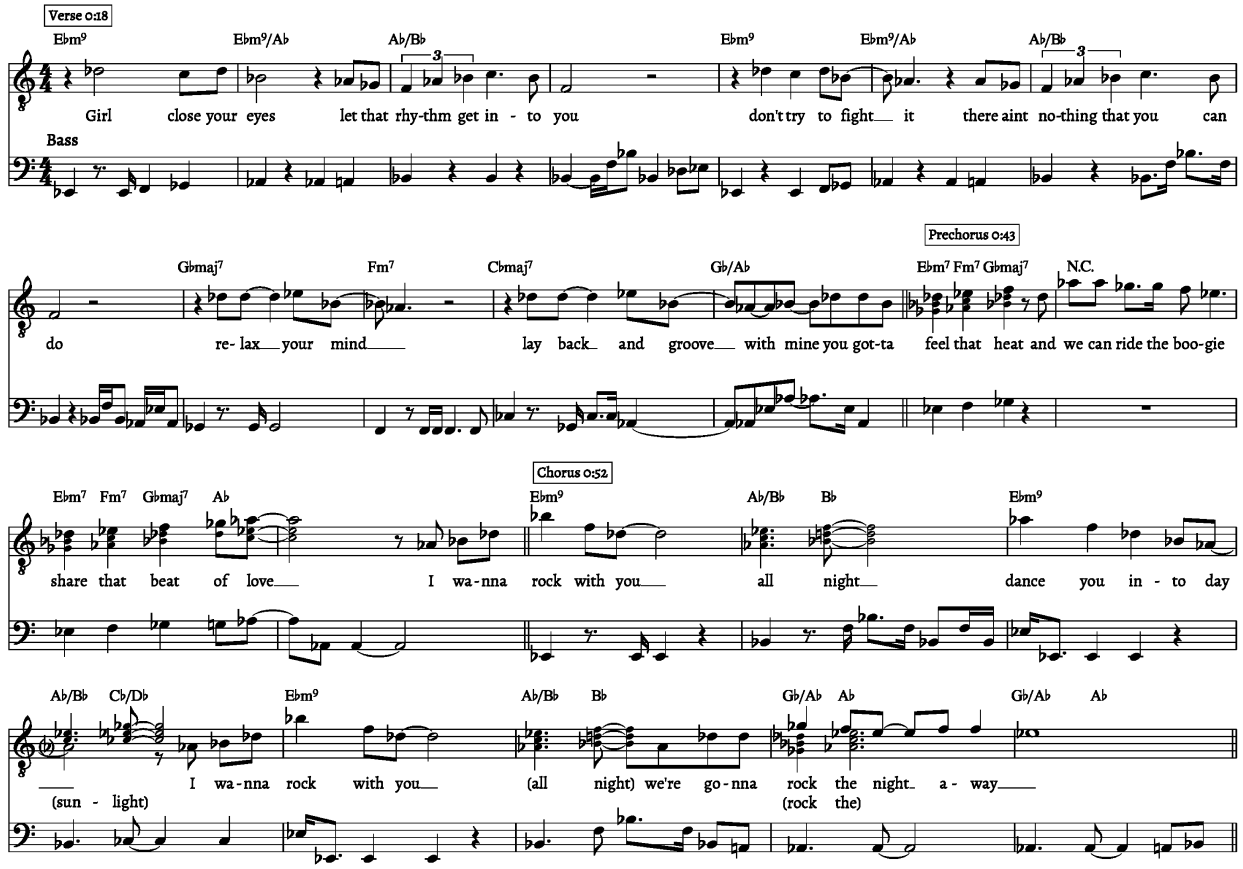
Jackson's vocals present a conflicting center through a D♭-major/B♭-minor diatonic melody. The verse outlines both B♭-minor and D♭-major triads through agogic accents and phrase endings and beginnings: B♭ minor over the lyrics "girl" (D♭), "eyes" (B♭), and "you" (F); and D♭ major over the lyrics "don't" (D♭), "it" (A♭), and "do" (F). The chorus reiterates these arpeggios in different inversions, but retains D♭ and B♭ as salient diatonic centers, ending on an interruption: $\hat{2}$ over V in D♭ major. However, the prechorus makes D♭ more discernible given the $\hat{5}$–$\hat{4}$–$\hat{3}$–$\hat{2}$–$\hat{1}$ descent in

sectional tonality moving from a functionally established F♯-minor verse to an A-major tonality in the chorus. However, the relative major is not always the strongest candidate, as in Cake's "Daria" (1996), which establishes a functional E-minor tonality in the verse, yet presents a comparatively weaker emphasis of G major in the chorus.

[31] Nicole Biamonte uses "Aeolian progression" to describe a basic schema of i–(VII)–VI–(VII)–i as T–D–SD–D–T, and further delineates them into functional types (Biamonte 2010, 101–104). In "Nightbird," the D minor (iv) is an embellishment of the basic Aeolian progression. Nicks uses a variation of the Aeolian progression for several other tracks as well, including "Edge of Seventeen" (1981) and "Stand Back" (1983b). These tracks do not present multi-centric complexes, although both reverse the progression hypermetrically to VI–VII–i, making $\hat{6}$ an available center through hypermetric emphasis, but one which is not supported by other criteria. A fragment of the Aeolian progression also occurs in "Dreams" (1977) as VI–VII.

[32] Another common schema that often exhibits distinct vocal and bass centers is IV–V–iii–IV, in which the iii could also be realized as I^6. The bass's double neighbor figure around IV allows for an available center as the root of the starting chord, despite the absent or fragile tonic implied by the progression. Two examples of this are New Order's "Bizarre Love Triangle" (1986), realized as E♭–F–Dm–E♭, with bass emphasis on E♭ and melodic emphasis on B♭; and Star's "Fixed" (2010), realized as A♭–B♭–Gm–A♭, with bass emphasis on A♭ and melodic emphasis on E♭.

[33] Spicer confirms the available E♭ center from the bassist's perspective, recalling how the bassist for his cover band taught "the rest of us the chords. The first thing he said was that the song was in E♭" (Spicer, 2017). It is also worth noting that Spicer refers to his role as keyboardist in the band informing his own hearing of D♭ as an absent tonic.



*Example 6. Vocal Center versus Bass Center in Michael Jackson's "*Rock With You,*" Verse/Prechorus/Chorus,* Off the Wall *(1979).*

Rock With You

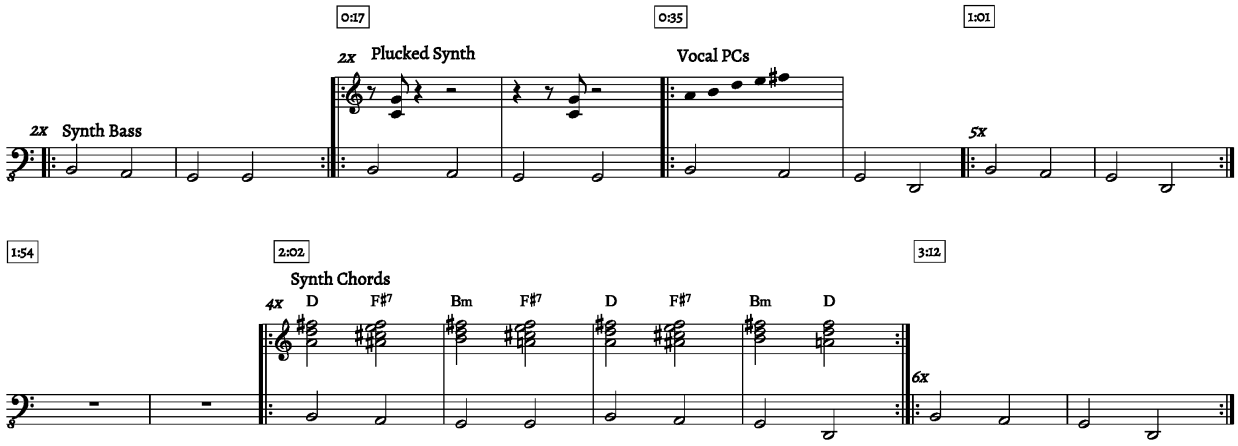
Audio Example 6. (click to play audio).

D♭ major over the lyrics "we can ride the boogie." Depending on which center-finding strategies are employed, both a D♭ and an E♭ are possible centers and both are supported harmonically. As in previous examples, it is helpful to sing or play the bass line and melody independently in order to get a sense of the different available centers.

If a functional approach to the harmony is employed, D♭ major is likely to be heard as an absent tonic. This hearing is further supported by interpreting the A♭-major end-phrase sonorities as the dominant to an implied, but not realized, D♭-major tonality. To this end, Spicer (2017) argues that the *soul dominant*, "a close position IV chord over $\hat{5}$ in the bass," that occurs at the end of the verse (the G♭/A♭ over the lyrics "groove with mine you gotta"), functions as a paradigmatic substitution for V.[34] Therefore, the focus on functional harmony makes the D♭ of the melody available as a salient center, with each section goal-directed toward a tonic resolution on D♭ major that never arrives.

What does a multi-centric reading offer over a functional or absent-tonic interpretation of "Rock With You?" In one sense, it addresses one of Covach's questions regarding positional analysis: "If multiple positions are possible, how do these perspectives interact with one another and with the [ideal listening position]" (2020, 58)? If the ideal listening position is represented in a functional hearing of the harmony and melody, it would suggest a strong pull toward D♭ major, and a slightly lesser pull toward B♭ minor. A multi-centric reading includes the projection of E♭ in the bass, adding a more nuanced level of interaction between positional perspectives and the ideal listening position. We could also make the link between multiple available centers and certain dualisms in the lyrics such as the "girl" and the recorded persona, or dancing from "night" into "day." We could even go a step further and make the case that adapting back and forth between available centers is analogous to dancing, as referenced throughout the lyrics.

[34] Spicer states, "the soul dominant is a loaded sonority whose harmonic function as dominant is usually very clear" (Spicer 2017).



Example 7. Bass Center versus Synthesizer Center in XXYYXX's "Alone," XXYYXX *(2012).*

1.3 Bass Center versus Synthesizer (Harmonic) Center

Different centers in the bass and harmony, while theoretically sound, present a practical problem in pop-rock because the majority of bass lines, in my experience, tend to follow either a song's chord progression or its melodic riff. In general, the bassist accompanies the song following a simple or embellished root progression established in the harmonic stratum. Even in riff-based music the bass and melodic strata tend to coordinate around a pitch center in the absence of an explicit harmonic layer. Since some multi-centric complexes are realized when the salient pitch center presented in the bass is at odds with the harmonic center—as either presentational center or functional tonal center—it is fruitful to consider tracks that utilize layering as a compositional technique. In the most general sense, the technique of layering is concerned more with a resultant composite texture rather than a defined harmonic goal.[35]

A clear example of this is XXYYXX's "Alone" (Example 7). The bass line alternates between B_1–A_1–G_1 and B_1–A_1–G_1–D_1 for the entirety of the track. A G center is agogically accented at the opening and reinforced with the lower D_1 through overtonality. It should be noted however, that hearing the above fundamentals as the bass line is dependent on one's listening environment and bass response in speakers or headphones. When the plucked synth enters at 0:17 on a C_4–G_4 fifth, the higher G_4 reemphasizes the bass's G center. In this case, hearing the registral extremes of G_1 and G_4 is more salient than an overtonal hearing of C_4 as center. Vocals enter at 0:35 and are shown as a reduced collection of pitch classes in Example 7. In sum, the processed vocals are differentiated by panning, register, and timbre, the total collection of which represents a D-major pentatonic collection. This reading is somewhat misleading, however, as individual lines of the track can be interpreted in different ways. For instance, the lower male voice centers more or less on F♯ while the higher male voice and female voice repeat A. The female vocal's A is salient as an unresolved $\hat{2}$ to the bass's emphasized G. However, the lower male vocal's F♯ emphasis is hard to hear as functioning as $\hat{7}$ for several reasons, the first of which being that it never resolves up by step. Instead, the repeated F♯ ends each iteration with a minor pentatonic descent to B, which, to my ear, makes the F♯ function more as a tertian extension than as a frustrated leading tone. The lower male voice's F♯ center is given some context as $\hat{5}$ beginning at 2:02, when the synth's chord progression enters in B minor. Therefore, the melodic stratum, realized in the vocals and staccato plucked synth, works with both a G center and a B-minor tonic presented in the bass and harmony respectively.

Alone. Part 1

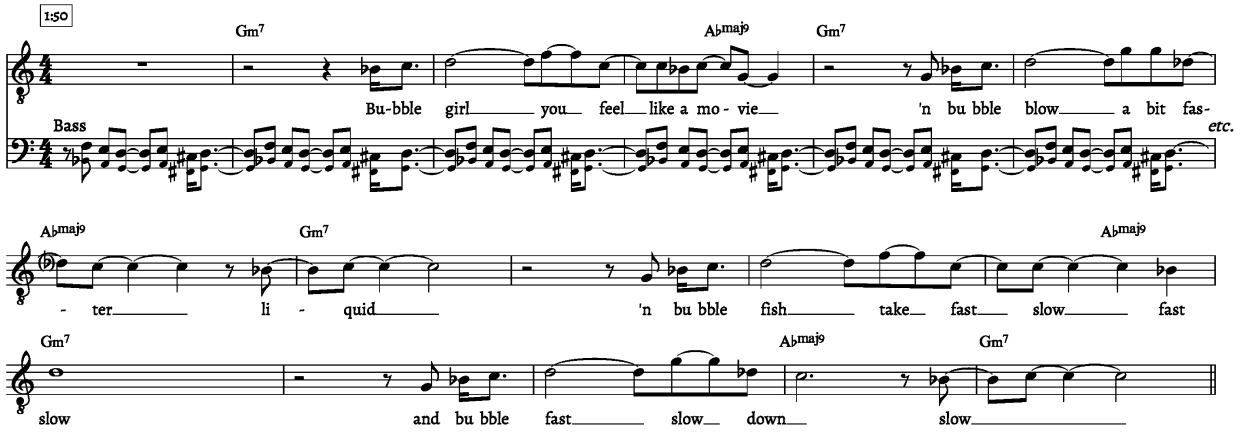
Audio Example 7a. (click to play audio).

Alone. Part 2

Audio Example 7b. (click to play audio).

A different realization of a multi-centric complex occurs in Underworld's "Cups." Mark Butler refers to this track as an instance of metrical dissonance wherein the ini-

[35] Adam Krims has dubbed this forcing together of disjunct musical layers the *hip-hop sublime*: "a product of dense combinations of musical layers . . . [wherein] no pitch combinations may form conventionally representational relationships with the others" (2000, 73). While Krims is concerned primarily with the micro-intervals that result from combining manipulated samples, recordings, and live sounds, it is also possible that multi-centric complexes could emerge from this layering process.



*Example 8. Bass Center versus Synthesizer Center in Underworld's "*Cups,*"* Beaucoup Fish *(1999).*

Cups

Audio Example 8. (click to play audio).

tial perceptible downbeat of the bass riff is shifted forward by an eighth note with the entrance of the drums (2001, Butler's Example 2).[36] In this example the bass riff itself presents a sort of internal split: as in "Alone," depending on the listening environment and bass response of a listener's speakers we can either focus on D as the center, or on the lower amplitude G_1 as center (indicated by the smaller note heads in Example 8).[37] Since the overtone D_2 is higher in amplitude than the G_1, it is more appropriate to focus on D as the center projected by the bass stratum of this track as this is the pitch a listener is most likely to hear as the bass. The harmonic stratum repeats an alternation between Gm^7 and $A♭^{maj9}$ sonorities, agogically emphasizing the G-minor sonority. The melody can be interpreted as either D- or G-centered, with hypermetric and agogic accents on D_4 but an overall trajectory of G minor within each phrase. Like "Alone," hearing a bass-harmonic split in "Cups" is partly dependent on both listening equipment and environment. If we do perceive the lower G_1 as emphasized by the bass, there does not seem to be a multi-centric complex in this track. Nevertheless, the mixing of the overtone D_2 makes a D center available and in contrast with the harmonically projected G center.

2. And Then There Were Three: A Potential "Melodic-Harmonic-Bass Divorce"

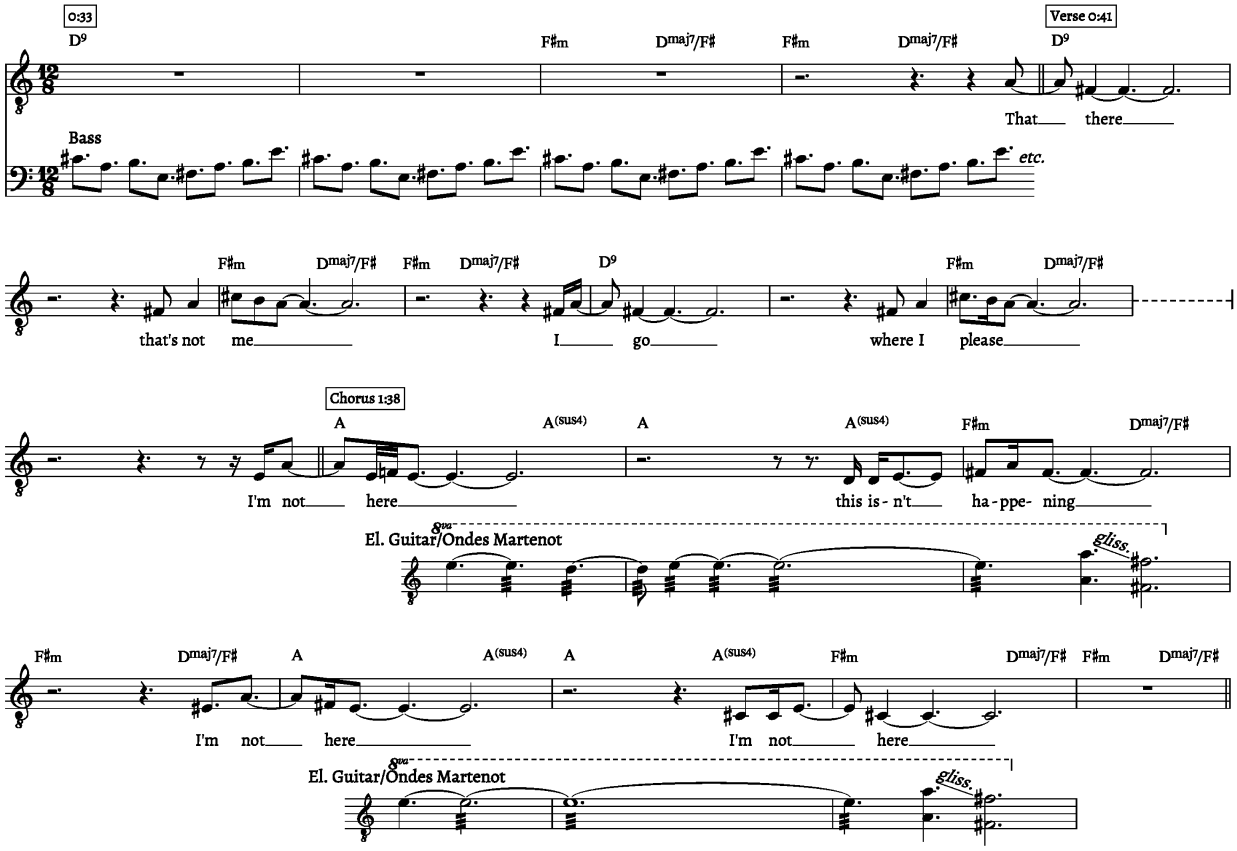
Radiohead's "How to Disappear Completely" serves as a potential extreme instance of a multi-centric complex in which vocals, guitar, and bass each suggest independent and competing centers.[38] Both Marianne Tatom Letts (2010) and Brad Osborn (2017a) have remarked on the ambiguity of this track, particularly in respect of the bassist's metric and harmonic independence throughout. Letts hears the track as a variation of sectional centricity, claiming that it "sounds mainly in F-sharp minor, with competing passages that center on D and A" (2010, 222).[39] For Osborn, the track is an example of an "absent tonic that emerges tentatively, and is finally confirmed in the final section of the song (literally at the last minute)" (2017a, 147). Letts focuses on an F♯-minor tonic hearing of the piece, allowing for D- and A-sectional centricities, while Osborn dismisses the ambiguous D and F♯ projections, favoring instead an emergent A major based on a functional hearing of the track. By contrast, I propose that all three centers remain simultaneously available throughout the track with

[36] Butler (2001) transcribes the bass layer beginning at D.

[37] In both Examples 7 and 8 there is some perceptible ambiguity in terms of the actual pitch of the bass's low frequencies (ranging from ~30–100 Hz). The transcriptions of both tracks are therefore based on a spectrograph reading for consistency and should be taken as an optimal point of reference, not accounting for listening environment or variations in perceived pitches.

[38] De Clercq (2019) describes a "melodic-harmonic-bass divorce" as an instance in which "all three layers . . . act independently from one another" (272). He points out that this is a rare occurrence in rock music.

[39] Letts elsewhere argues that "'How to Disappear Completely' shifts between D and F-sharp," not considering A and hearing D and F♯ as centric axes (Letts 2005, 50). This demonstrates not only the multivalence of available centers within the track, but also the importance of a listener's individual employment of center-identifying strategies as a means of attending available centers, which may change either within a single audition or perhaps between listenings.



Example 9. Three independent centers in Radiohead's "How to Disappear Completely," *Verse/Chorus,* Kid A *(2000).*

How to Disappear Completely

Audio Example 9. (click to play audio).

each instrument projecting its own center and supporting another instrument's center at any given time.

Example 9 shows the first iteration of the verse and first chorus while also demonstrating the relative independence of the bass, vocals, and guitar. The bass plays a repeated riff in a pentatonic collection centered on A that continues for the duration of the verse and chorus. The fifth-relation of this riff frames the A center through overtonality, with the E_4 and E_3 suggesting a hierarchical emphasis on A_3. Although A_3 is hypermetrically weak, it is supported harmonically by the progression I–ii^7–V in A major, implied by the arpeggiations in the bass riff: ($C♯_4$–A_3)–(B_3–[E_3]–$F♯_3$–A_3)–(B_3–E_4). Furthermore, the only linear triad arpeggiation outlines A major (E_4–$C♯_4$–A_3), which occurs before and through the downbeat of each measure. Another viable hearing centers on F♯, with the bass playing in an F♯-minor pentatonic collection, metrically emphasizing the $C♯_4$–$F♯_3$ on beats one and three of the riff and outlining a harmonic progression of III–VII–I–VII in F♯ minor.

Thom Yorke's melody projects an F♯ center through repeated F♯-minor triad arpeggiations. The verse prolongs $F♯_3$ through an unfolded third ("That there, that's not me"), which is echoed in the chorus by the recurring ondes Martenot and octave guitar slides: $\hat{3}$–$\hat{1}$ in F♯ minor. The chorus opens with a lower neighbor to $\hat{1}$ and ends on $\hat{5}$, $C♯_3$.

The D center is arguably the easiest to focus in on at the start of the track since it is emphasized hypermetrically in the acoustic guitar. Moreover, D is added to each subsequent harmony of the verse and chorus: for instance, the F♯-minor triad gets embellished with a D, which I have labeled as a D-major seventh chord over F♯ on the lead sheet transcription. In the chorus, the D–F♯ shuttle shifts to an A–F♯ variant, which can be globally interpreted as a move to the dominant, ultimately setting up the return to D major in the verse. An alternative hearing, suggested by Osborn, places the emphasis on A major. For him, "The *irrefutable proof* for an overarching A-major tonal center does not arrive until the E-major harmony at 4:54, which undergirds Yorke's wordless melismas as he lands squarely on the $G♯_4$ leading tone for the song's first cadence" (2017a, 148, em-

phasis added). This cadence, which is also the final one of the song, resolves to an F♯-minor sonority in the acoustic guitar for the remainder of the track. Osborn's hearing thus employs a functional perspective, relying on an implied dominant-tonic root motion in order to identify a pitch center.

Regardless of which method of center-finding we employ or which stratum we choose to focus on, "How to Disappear Completely" exemplifies the multi-centric complex through three different perceptible pitch centers: D, F♯, and A. There are several considerations that prevent us from settling comfortably on any one pitch center. First is the autonomy of musical strata—electric bass as bass stratum; acoustic guitar as harmonic; and vocals, ondes Martenot, and electric guitar as melodic—which makes available different centers as the track progresses. Second is the high register drone pitch that shifts vaguely between A♯ and B♮ throughout the track. The A♯/B♭ pitch class does not occur in any other instrumental part and is anomalous to each of the D-, A-, and F♯-centric collections. Finally, there is the possibility of tonal doubt associated with the deceptive progression (E–F♯m) at the end of the track. We can hear this as a functional progression as Osborn does, still implying A major, as a modal progression in F♯m (VII–i), or, given the slow harmonic rhythm, we may not ascribe any center-identifying role to the sonority.

The availability of centers and our freedom, as listeners, to switch between them throughout the track creates a nuanced complement to the lyrics of "How to Disappear Completely." Letts considers the notion of a "vanishing subject" presented in the recorded persona throughout *Kid A*: "The first half of *Kid A* can be understood . . . as a fracturing of the musical structure that builds to a crisis point at which the singer [subject] is purged from the texture; the album then attempts to build a new structure, which the subject either fails to negotiate successfully or intentionally abandons" (2010, 21). In Letts's reading, the lyrics in "How to Disappear Completely"—the fourth track on *Kid A*—contribute to the subject's sense of paranoia ("I'm not here, this isn't happening"), as they become subsumed into the texture of the track's musical structure. However, the lyrics may also be contextually understood, rather than intertextually, and thus interpreted in the context of the multi-centric complex. If we consider the verse lyrics "That there, that's not me / I go, where I please," there is a natural connection between the recorded persona's identity and the accessibility of the detectable pitch centers. In other words, the "that there" refers to the available centers, suggesting that the one we focus on is negated by the claim "that's not me." Heard in this way, the lyrics project an inherent subject/object binary between "that" and "me," which parallels the notion of appreciable centers as a form of identity.[40] However, the binary is further complicated by the presence of the listener as an external witness. While we attempt to identify and isolate the subject from a set of objects (where subject and object can be considered as the available pitch centers), the subject itself, in the form of the recorded persona, evades a definitive description through the lyrics. The constant proclamations of negation and ephemerality of the subject— "I walk through walls, I go where I please," and "in a little while I'll be gone, the moment's already passed"—prevent us from categorically identifying the subject, much in the way the musical material prevents us from identifying a clear pitch center.

3. Centricity Reconsidered

I first came across these examples of multi-centric complexes while I was learning these songs—first as a guitarist, then as a vocalist, and then transcribing them. Indeed, the act of transcribing pop-rock tracks requires positional listening, focusing on one performer or instrument at a time. "Isn't It a Lovely Night" exemplifies a case of multiple available centers (see Example 3). The chords in the acoustic guitar quite clearly emphasize G major: it starts on the drone tonic, moves to the dominant at the end refrain, resolves deceptively to E minor, and finally returns to G major. Even the incongruous A-major sonority (G: II) has precedence in other pop-rock tracks.[41] However, when I was transcribing the melody, also with guitar in hand, it seemed to suggest a completely different center and collection. It was not until I had considered the guitar and vocals separately—both through performance and through notation—that I was able to return to the track and switch my attention between the different centers. I then wondered how often this phenomenon occurs in pop-rock music and began an ongoing process of listening and transcribing tracks, several of which have been considered in this article.

[40] Osborn points out a similar interaction between the recorded persona's identity and the ambiguity of center. However, Osborn's interpretation is in favor of an A-major hearing, noting that the initial melodic A_3–$F♯_3$ ("that there") acts initially as a *sol–mi* gesture in D major, but the persona "dismisses this identification, singing 'that's not me,' melismatically intoning his true identity, 'me—' on $C♯_4$–B_3–A_3. He is, in a sense, pointing out the opening D-major tonic only to express his true identity as something 'other,' namely a clear *mi–re–do* in A major" (2017a, 148).

[41] The verse section of David Bowie's "Five Years," also in G major, repeats a I–vi–II–IV progression. Similarly, the opening progression of the Beatles's "She Loves You" presents a vi–II–IV–I progression in G major. A more ambiguous example, Grizzly Bear's "I Live With You," opens with a repeated I–II shuttle, discussed in Heetderks (2015).

The nine tracks I have considered in detail share some fundamental properties worth mentioning. First, the most common type of multi-centric complex involves simultaneous available pitch centers related by perfect fifth, as we saw in "Jimmy Olsen's Blues," "Isn't It a Lovely Night," "Cups," and "How to Disappear Completely" (guitar and bass). Next most common are those related by major third: "Dreams," "Nightbird" and "How to Disappear Completely" (guitar and melody), and least common are those related by major second as in "Rock With You." With the exception of the bass (A) and melody (F♯) in "How to Disappear Completely," none of these examples fit into Bailey's notion of the double-tonic complex, which focuses on minor third relations or relative major/minor pitch centers.[42] Second, the relation between pitch-class collections and available centers can be described as diatonic collections whose centers represent closely related keys. In other words, the melodic two-sharp collection in "Isn't It a Lovely Night" fits into reading the D center as a tonal center, and is a closely related key to the G center's key of one sharp. Similarly, the E♭-minor tonic and D♭-major tonic in "Rock With You" share a discrepancy of one flat between their key signatures. "How to Disappear Completely" also shares this feature; both F♯-minor and A major being three-sharp keys, with the D major in the guitar as a two-sharp signature. Multi-centric complexes and the methodologies employed provides the tools to account for cases that exhibit "the unfolding and deployment of the two [or more available] centers responsible for . . . the combined tonal structure that these two [or more available] centers create," a scenario that Harrison describes as "under-theorized" (1997, 394).[43]

Central to this article is the role performance plays both as a way of recognizing and hearing different available pitch centers. John Covach's work on positional listening provides further insight into how a performer's perspective can have an impact on the listener; he writes, "it is quite common for guitarists to listen to a particular track with particular attention on the guitar part; the same might apply to drummers, keyboard players, bassists, and perhaps most especially singers" (2016). The methodology presented here may lead to further study in how pop-rock performers effectively embody strata of melody, harmony, or bass, and how they may therefore emphasize (intentionally or not) different centers within or throughout a track. For example, in "Jimmy Olsen's Blues" the guitar solo is clearly in G major, suggesting that the Spin Doctors' guitarist, Erik Schenkmen, is hearing the song in G rather than centered on D.[44] In addition, I have sought to show how we as listeners are able to attend to the different available centers through positional listening, a mode of engagement that may lend hermeneutic value to the act of interpretation. By acknowledging that pop-rock music does not always present a clear hierarchical structure of monotonality, a more dynamic musical grammar may be felt to emerge, one that recognizes multiple listening practices in the act of analysis.

[42] Bailey (1985) defines the double tonic complex as "the pairing of two tonalities a minor 3rd apart" (121).

[43] In this passage, Harrison is referring to the notion of "bitonality," particularly in the music of Darius Milhaud. I have to this point refrained from employing either *polytonality* or *bitonality* as descriptors for examples of multi-centric complexes because of the ambiguity surrounding their precise definitions. In both terms the suffix "-tonality" causes the most dispute as discussed by Benjamin Boretz (1972) and Peter van den Toorn (1975). However, by framing the concept of multi-centric complexes as pitch centers with the possibility of, but not necessity of, tonal significance, we bypass the issue of conflicting pitch-class collections and are able to focus instead on collections with multiple available centers.

[44] A similar situation occurs in "Sweet Home Alabama," where the guitar solo is centered on G, despite the vocal emphasis on D (Doll 2017, 222–229).

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