Interactions between Harmony and Form in a Corpus of Rock Music

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Abstract In this article I present empirical work that investigates what, if any, harmonic characteristics are found to typically associate with standard form categories in rock music. Specifically, I use statistical analysis to compare and contrast the harmonic traits of verse, chorus, and bridge sections in a corpus of two hundred rock songs. I begin with an overview of the corpus itself, followed by a discussion of my methodology. I then present the results of my study, which quantifies harmony via two main approaches: the proportion of time spent on a chord root and the average duration of a chord root. I also consider which chord roots tend to open or close a section, as well as the distribution of chord qualities across sections. It is found that verse and chorus sections differ most strongly with respect to the length and proportion of tonic harmony, whereas verse and bridge sections differ with regard to the proportion of tonic, the average duration of nontonic chords, and the typical opening and closing chords. Fewer significant differences are found between chorus and bridge sections, the exception being the closing harmony.

Keywords rock music, popular music, harmony, form, corpus study

THE ANALYSIS OF A ROCK SONG, as with any piece of music, requires that we consider its form, that is, how the song divides into sections and how those sections function in relation to the whole.[1] Although a variety of terms for these sections can be found in song analyses and discussions of rock form, such as *interverse* (Endrinal 2011) and *terminal climax* (Osborn 2013), music theorists typically limit themselves to a rather small palette of standard section labels, such as verse, chorus, and bridge. The common currency of a shared set of form labels has been of great benefit to analysts, as it allows us to show similarities and connections among song forms across relatively disparate musical styles.[2]

1 I use the term *rock* in this article in the broad sense, to refer to commercial Anglo-American popular music from the 1950s to the present day. As such, it encompasses a wide range of musical styles, including (but not limited to) country, rhythm and blues, soul, hard rock, pop, blues, folk, rap, and heavy metal. Although more narrow definitions of rock can be found in the music literature (e.g., Temperley 2011), the broader meaning has gained currency as the best available term to describe recorded popular music that targets primarily a youth audience (e.g., Covach and Flory 2015; Stephenson 2002).

2 For example, John Covach (2005) shows that "Smoke on the Water" by Deep Purple (hard rock), "Be My Baby" by the Ronettes (early rhythm and blues), and "Penny Lane" by the Beatles (British psychedelia) have a common formal structure.

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Because form labels are so ubiquitous in music-analytic work, one goal for music theorists has been to explain what these terms mean and what features typically associate with them. Published descriptions of chorus sections, for example, identify a number of both general and specific characteristics. A chorus is said to be the focus of the song (Covach 2005, 71), more memorable (Harris 2006, 63) and more energetic than other song sections (Stephan-Robinson 2009, 94). Prior authors note that a chorus usually has a thicker texture than a verse (Everett 2009, 145), often through the addition of background singers (Stephenson 2002, 135). The lyrics of a chorus are said to normally deliver a general message (Burns 2005, 138), include the title of the song (Stephenson 2002, 136), and repeat on future iterations (Moore 2001, 223). It has also been noted that chorus melodies are often less pentatonic and more coordinated with the chord changes than are verse melodies (Temperley 2007, 335–39), typically with slower vocal rhythms overall (Stephenson 2002, 129).

Descriptions such as these strongly suggest that form in rock music involves a variety of musical domains, including rhythm, phrasing, melody, harmony, instrumentation, texture, and lyrics. Each musical domain, in other words, contributes to our overall sense that a passage in a song functions as an instance of a particular section type (e.g., verse, chorus, or bridge). It is doubtful that any single parameter is wholly responsible for this feeling; our perception of form is presumably complex and multifaceted, something that inherently resists codification through simple definitions.[3] That said, harmony is often considered one of the most important factors in delineating formal areas in rock music.[4] Whether this is true or not, it seems undeniable that harmony has at least the potential to influence our hearing of form in rock. How, then, does harmony do so?

To date, descriptions of how harmony and form interact in rock music have been somewhat scattershot, often involving fairly loose theoretical language. Walter Everett (2009, 145), for example, writes that the harmonies of a chorus section are usually "relatively stable" while often more "dramatic" than those of a verse. The harmony of a bridge, in contrast, may be more "complex," particularly if the chord changes in the verse are "simple" (147). Although these insights may be accurate, it is not entirely clear what constitutes stable, dramatic, or complex harmonic progressions, especially in the

3 Murphy 2002 provides an overview of the scientific evidence against definition-based explanations for cognitive categories. For a more in-depth analysis of how conflicting perceptual information in multiple domains complicates the analysis of form in rock music, see de Clercq 2012.

4 On the relative importance of harmony with regard to establishing formal areas in rock music, consider some of the following evidence from prior authors. Ken Stephenson (2002, 131) states directly that "although melodic contrasts do not help delineate form in rock music, harmonic contrasts do." Allan Moore (2001, 52–55) emphasizes the relationship between harmony and form with a section titled "Harmonic Patterns and Formal Structures." Covach (2005) highlights the importance of harmony in formal designations via his distinction between "simple verse-chorus" and "contrasting verse-chorus" forms on the basis of harmonic structure. And Everett (2008, 111) is known for his general stance that "pitch relationships are of central importance" in the analysis of rock music.

Table 1. Percentage of verse and chorus sections that begin or end on tonic in a corpus of rock songs (Summach 2012, example 5.18)

	Starts on tonic		*Ends on tonic*	
Era	*Verse*	*Chorus*	*Verse*	*Chorus*
1955–59	92%	84%	84%	100%
1960–64	94%	60%	70%	80%
1965–69	88%	75%	43%	58%
1970–74	78%	70%	52%	67%
1975–79	79%	78%	37%	60%
1980–84	82%	73%	43%	61%
1985–89	91%	74%	29%	55%

context of rock music.[5] The role of tonic may be important in this regard. Jocelyn Neal (2007, 45), for instance, posits that bridge sections typically explore nontonic areas, such as the subdominant or flat-side keys. (Everett's attribute of "complex" harmony in a bridge may thus relate to a lack of tonic.) With regard to verse and chorus sections, Everett (2001, 48–49) notes that they both typically prolong the tonic harmony, which presumably relates to the "stability" of these sections, although the meaning of tonic prolongation in the context of rock music is a somewhat thorny issue.[6] Similarly, Christopher Endrinal (2008, 69) and Anna Stephan-Robinson (2009, 94) state that chorus sections "emphasize" or "reinforce" tonic, although neither author further elaborates how this effect is achieved (or how the role of tonic in a chorus might differ from its role in other sections). The opening and closing chords of a section may be a relevant factor. Ken Stephenson (2002, 132), for example, notes that verse sections typically begin with a tonic chord, while other sections—assuming the verse begins on tonic—will normally start off-tonic. Neal (2007, 45) and Everett (2009, 145) both write that chorus sections typically end on tonic. (From these statements, verse sections seem to more frequently begin on tonic, while chorus sections seem to more frequently end on tonic.) Jay Summach (2012) provides some statistical information on this issue, which I have reproduced in Table 1. According to Summach's analyses, verse sections begin on tonic more often than do chorus sections, although verse and chorus sections both tend to start on tonic more often than not. In terms of closing harmonies, Summach's analyses show that chorus sections tend to end on tonic more often than do verse sections, although in a number of eras most verse sections end on tonic as well.

To investigate the relationship between harmony and form further, I present in this article a corpus study on the harmony and form of two hundred rock songs. A corpus study seems particularly suited to uncover charac-

5 Harmony in rock music does not seem to operate entirely along common-practice principles, as discussed in Moore 2001, Everett 2004, and de Clercq and Temperley 2011.

6 See Burns 2008 and Capuzzo 2009 for deeper discussions of sectional and nonunified tonal design in rock music.

teristic harmonic attributes of formal sections in rock, since both harmony and form can be quantified and statistically analyzed.[7] A statistical approach seems especially appropriate, furthermore, as research in the field of cognitive science has shown that human perception can be shaped by statistical regularities in the environment (e.g., Aslin, Saffran, and Newport 1998). Thus, while harmony may be only one factor in the perception of form in rock music, it seems reasonable to hypothesize that a listener's understanding of a particular section role will be influenced—whether consciously or unconsciously—by the characteristics that commonly associate with passages judged to be in that role.

I see a corpus study on harmony and form in rock music to be of benefit to music theorists and analysts in several ways. For one, it offers a chance to empirically test theoretical claims such as those exemplified above. In particular, it may be able to clarify, in a technical way, some of the more general observations made about the role harmony plays in delineating or structuring specific formal areas. Of course, any corpus is inherently a limited sample of the larger population, and so we cannot expect to find evidence for all aspects about which we seek knowledge. That said, a corpus study has the potential to uncover new relationships that the process of intuition alone may not reveal. If we know more about the typical organizational schemes used in rock music, we should be better equipped to appreciate those songs that depart or deviate from these norms in interesting and unique ways.

In the following pages I provide an overview of the corpus itself, including the methods by which songs were selected and encoded. I then provide statistics as to what harmonic traits can be observed to consistently distinguish the typical formal areas of a rock song. I limit my investigation here to the three section types of verse, chorus, and bridge, since these are the most widely used section labels in rock analyses.[8] For each of these three section types, I investigate proportional chord durations, average chord durations, opening and closing harmonies, and chord qualities, each of which comprises a specific way of looking at the relationship between harmony and form in this music.

The RS 200 corpus

The corpus used for this study was originally compiled as a one-hundred-song set to investigate harmony in rock music, as reported in de Clercq and

7 Although a good deal of work has been published on harmony in rock music more generally (e.g., Moore 1992; Stephenson 2002; Everett 2004; de Clercq and Temperley 2011), the bulk of this extensive work explores harmony from a global perspective rather than specific to any particular section of a song.

8 The section labels of verse, chorus, and bridge are all found in the discussions of form by Moore (2001), Stephenson (2002), Covach (2005), and Everett (2009). The term *refrain* is the only other term shared by these four authors, although it is usually used to describe a subsection rather than a stand-alone section itself. For example, Stephenson (2002, 135) writes that a refrain "normally ends a verse" or "begins a chorus."

Temperley 2011. This earlier article looked at harmony in a general way, without any consideration of which part of a song the harmony may have been in. The corpus was later expanded to a two-hundred-song set, primarily to study melody in rock music and its interaction with harmony, as reported in Temperley and de Clercq 2013. Again, melody and harmony were examined in a relatively general manner, with no consideration of song form. The present article builds on this earlier work, considering harmony in relation to analyses of form that are also encoded in the corpus. Although these earlier articles discuss the nature of the corpus and its encoding format, I review some of the more relevant aspects here along with some other new, pertinent information.

The songs in the corpus are drawn from *Rolling Stone*'s (2004) list of the "500 greatest songs of all time." Because this list was created by polling 172 "rock stars and leading authorities," it seemed like one of the best available resources to represent rock in a comprehensive and intersubjective way. Indeed, the songs on the list span a rather broad selection of popular styles from the latter half of the twentieth century, including early rock 'n' roll ("Johnny B. Goode"), classic rock ("Born to Run"), country ("I Walk the Line"), metal ("Enter Sandman"), rap ("California Love"), and alternative rock ("Paranoid Android"). But while the range of styles on the complete five-hundred-song list is relatively wide, it is somewhat weighted toward the 1960s and 1970s.[9] To balance the corpus somewhat with regard to release date, the top twenty songs from each decade (the 1950s through the 1990s) were combined with the remaining highest-ranked songs to create a final corpus of two hundred songs.[10] No further adjustments were made on any criterion—such as gender, race, or nationality—so as to be as faithful as possible to the makeup of the original list. I refer to this two-hundred-song set as the RS 200 corpus. (A catalog of all two hundred songs can be found at rockcorpus.midside.com.)

The complete harmonic and formal structure for each song in the RS 200 corpus was analyzed and encoded by David Temperley and me. We individually and independently created these analyses by ear; every song thus has two separate harmonic analyses, each of which represents our own personal hearing and interpretation of the song. To encode these songs, we developed and used a custom music notation so that our analyses could be easily parsed by a computer. Figure 1 shows my encoding for the song "Da Doo Ron Ron" by the Crystals (1963). Much of this encoding format should be familiar to music theorists. For example, we use roman numerals to notate harmony,

9 The average date of songs on the list is 1970, even though the list spans from 1949 ("I'm So Lonesome I Could Cry" by Hank Williams) to 2003 ("Hey Ya!" by Outkast).

10 The two-hundred-song corpus could not be completely balanced by decade, since the list contains only twenty-two songs from the 1990s. Also, one song from the 1980s ("Bring the Noise" by Public Enemy) was excluded from the corpus, as it was judged to contain no harmony. The next highest song on the list was included to create a corpus of two hundred songs, all of which contain harmony.

```
% Da Doo Ron Ron

A: I | IV | V | I |

In: I |*4
Vr: $A*2 I | IV | I | V | $A I |*2
So: $A*2
Ou: $A*4

S: [Eb] [12/8] $In $Vr*2 $So $Vr $Ou
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Figure 1. "Da Doo Ron Ron" (Crystals, 1963), as analyzed and encoded in the RS 200 corpus by the author

with all chords referenced to the major scale as is standard practice for harmony in popular music.[11] Figured-bass notation indicates extensions and chord inversions (e.g., 6 indicates a first-inversion chord, and 7 indicates a chordal seventh), and slashes indicate applied chords (e.g., V/ii indicates the dominant of the supertonic). The tonal center is indicated by a note name within a bracket ([Eb] in Figure 1), with no distinction between major or minor keys. The time signature is also notated using brackets ([12/8] in Figure 1).

The form of the song is encoded via a context-free grammar, which allows the analyst to partition the song into any hierarchical organization. In our implementation, every new line (ignoring comments, indicated by a percent sign [%]) contains the name of a variable, followed by a colon (:), and then the definition of that variable. The definition of the variable may include other variables—indicated via a dollar sign prefix ($) and necessarily defined on another line in the encoded song—or terminals, such as chord symbols (e.g., V) and bar lines (indicated by a pipe symbol [|]). The variable S, located at the end of the file, is used to denote the highest level of the song form. An asterisk (*) followed by a number indicates multiple iterations of whatever precedes it. Admittedly, this encoding format does not facilitate ease of reading for someone new to the system; it does, however, facilitate a very efficient representation of the song structure, which often includes many repeated chord patterns. In Figure 1, for example, I have encoded the form of "Da Doo Ron Ron" as having a four-bar intro ($In), followed by two iterations of the verse ($Vr*2), a solo ($So), another verse, and then an outro ($Ou). The four-

11 For example, a C major chord in A minor would be ♭III, since we take A major to be the reference scale. This is, generally speaking, the modern approach to notating harmony in contemporary popular music. See, for example, Wyatt and Schroeder 1998.

bar chord progression I–IV–V–I occurs frequently throughout the song, and I have used the letter A to more succinctly represent this recurring progression. (The letter A is an arbitrary variable name and does not hold any meaning beyond its local definition in the song.) Further details on our encoding format, as well as the analyses themselves and computer programs to parse these analyses, can be found at rockcorpus.midside.com.

An important part of creating the corpus was to minimize transcription and analytic errors. To this end, we resolved metrical differences so that our two analyses of a song had the same number of bars. We did not, however, resolve any differences of opinion with regard to harmony or form. Overall, we tended to agree on the harmonic content of a song. For example, our agreement with regard to the chromatic relative root and key (e.g., whether a chord was a tonic in D major or a dominant in G major) was 93.3 percent. Thus, while the harmonic analysis of a rock song is inherently a subjective endeavor, it appears that rock harmony may be, broadly speaking, relatively unambiguous from analyst to analyst (at least as measured in terms of key areas and chord roots).

The level of agreement between our section labels turned out to be not nearly as high. It is somewhat difficult to give an exact figure for this, since we did not establish a standard vocabulary of form labels before encoding the songs; we were free to use any abbreviations for sections that we saw fit. For instance, Vr, Verse, Vr2, and Ver3 are all labels we used for verse material. Nonetheless, the abbreviations we used are based on standard form terms used in the analysis of rock, so their meaning is almost always self-evident. To approximate our level of agreement on the form of these songs, I went through our analyses by hand and grouped section label abbreviations according to more general categories such as verse, chorus, and bridge. With this approach, my best estimate for our agreement on song form is about 67 percent. In other words, there is roughly a 67 percent chance, given any particular moment in one of these two hundred songs, that our section labels are the same.

Based on this result, the analysis of form in rock music appears to be rather subjective—apparently much more so than harmonic analysis, and perhaps much more so than many readers may have otherwise presumed.[12] To better understand this issue, I combed through the instances of section label disagreements and found them to generally result from three distinct scenarios. First, many songs in the corpus—such as "Bohemian Rhapsody" by Queen (1975) and "Stairway to Heaven" by Led Zeppelin (1971)—have famously nonstandard formal structures. In such cases, one or both of us often resorted to nonstandard form labels (such as "part 1" or "part 2"). Second, songs that were structured in AABA forms (as are many from the 1950s and early 1960s)

12 Neal (2007, 44), for example, writes that "the mere act of labeling sections of a song is little more than a rote exercise, one that is easily and frequently taught to undergraduate students of popular music."

also proved somewhat problematic, in that one analyst might call the sections A or B, while the other might use verse and bridge labels. Third, issues of formal hierarchy also created disagreements between our analyses. One analyst, for example, might label a passage as a refrain, while the other might label it simply as a part of the verse. In such cases, our labels would technically disagree, even though we might essentially agree on the basic structure of the song. (The refrain, for example, could be considered a subsection of the verse.)

The lack of strong agreement with regard to section labels may at first seem rather problematic for the goals of this study. Yet this level of subjectivity may be the nature of empirical work that deals with form in rock music, if not musical form in general (see Bergé 2009). Thus, in contrast to prior corpus studies that have dealt with form in rock music (e.g., Endrinal 2008; Summach 2012; Tough 2013), in which statistics were calculated based on the analyses of only a single person, the RS 200 corpus offers the opportunity to see how well any findings are reflected in the analyses of two listeners. Accordingly, I do not pool my analyses with those of Temperley when conducting statistical tests (unless otherwise appropriate). Instead, I report findings from each set of analyses individually. Where those findings agree, and they often do, there is a stronger case for the meaningfulness of the results.

Readers should be aware that not every section type appears in all songs analyzed in the corpus. As Table 2 shows, Temperley and I both viewed almost all songs as having verse material, but we judged only about two-thirds of the songs to have chorus material and only about one-third to have bridge material. (Note that even though our moment-to-moment agreement for section labels was not high, Temperley and I share fairly similar opinions on the overall incidence of sections in this corpus.) The distribution in Table 2 should not be too surprising to readers familiar with rock form, since several large-scale organizational schemes can be found in the genre. John Covach (2005), for example, identifies four common form types for a rock song: "simple verse" (verse sections only), "AABA" (verse and bridge sections only), "verse-chorus" (verse and chorus sections only), and "compound AABA" (verse, chorus, and bridge sections). It is possible that the harmonic characteristics of a particular section type, such as a verse, differ based on the large-scale form in which it participates. For instance, the typical harmonic attributes of a verse section may differ in a simple-verse song versus a verse-chorus song. For this reason, I use a comparative methodology in much of the statistical analyses reported below, whereby I examine one section type in the context of a second section type. For example, I look at how harmonic attributes in verse and chorus sections compare, given songs that contain both verse and chorus sections. That said, I also examine some global attributes of section types, since the use of the same section label (e.g., verse) across form types implies that there may be shared characteristics irrespective of the large-scale structure.

Table 2. Songs in the RS 200 corpus judged to include at least one instance of a verse, chorus, or bridge label

Section	*Analyst*[a]	*Songs*	*% overall*
Verse	DT	198	99
	TdC	179	90
Chorus	DT	135	68
	TdC	118	59
Bridge	DT	62	31
	TdC	76	38

[a] DT, David Temperley; TdC, Trevor de Clercq.

Finally, section labels besides verse, chorus, and bridge are too rare in our analyses to give any significant data. For example, only about 6 percent of the songs were analyzed as having a prechorus section.[13]

Proportions of chords

De Clercq and Temperley 2011 reported statistics on the instances of each chromatic root overall.[14] As we defined it, a new "instance" of a chordal root occurs when the chordal root changes. As shown in Table 3, we found, for example, that ♭VII—in contrast to its relatively low incidence in common-practice music—appears to be a relatively common chordal root in rock music. De Clercq and Temperley 2011 was based on the RS 5×20 corpus, one hundred songs drawn from the top twenty songs in each decade. If we look at the statistics for chromatic roots in the RS 200 corpus (Table 4), the overall distribution does not appear to change much. For example, ♭VII is still the most common chordal root after I, IV, and V.

Although chord instances were the primary feature used to assay harmony in my previous work with Temperley, it may not be the best tool here to compare the harmonic traits of song sections. To understand why, consider the hypothetical verse and chorus sections shown in Figure 2. If I use instances as my assessment tool, I would say that the verse has one instance of tonic and one instance of dominant, whereas the chorus has four instances of tonic and four instances of dominant. In both cases, half of the instances are tonic and half are dominant. But the verse is obviously more tonic heavy, even though there are technically more instances of tonic in the chorus. A better assessment tool, arguably, would be the proportion of time spent on each

13 The relative rarity of the prechorus section should not be entirely unexpected since, as Summach (2011) discusses, the prechorus was not a prevalent section type until the late 1980s.

14 We focused on root labels because (a) chord quality, such as whether a chord is major or minor, is often ambiguous in rock music, and (b) the use of roman numerals implies that parallel-key progressions (e.g., I–IV–V and i–iv–V) are similar because of the root labels.

Table 3. Distribution of chromatic roots in the RS 5×20 corpus overall, based on number of instances

Root	*No. instances*	*% total*	*% songs*
I	3,059	32.8	99
♭II	46	0.5	5
II	338	3.6	39
♭III	240	2.6	18
III	174	1.9	23
IV	2,104	22.6	90
♯IV	23	0.2	4
V	1,516	16.2	88
♭VI	372	4.0	21
VI	675	7.2	39
♭VII	748	8.0	37
VII	36	0.4	7

Note: The RS 5×20 corpus is a one-hundred-song corpus drawn from the top twenty songs in each decade (de Clercq and Temperley 2011). Temperley's and de Clercq's analyses are averaged for each statistic.

Table 4. Distribution of chromatic roots in the RS 200 corpus overall, based on number of instances

Root	*No. instances*	*% total*	*% songs*
I	6,077	33.2	100
♭II	56	0.3	5
II	864	4.7	40
♭III	410	2.2	19
III	398	2.2	26
IV	4,143	22.7	92
♯IV	43	0.2	4
V	3,121	17.1	88
♭VI	662	3.6	20
VI	1,116	6.1	39
♭VII	1,347	7.4	36
VII	52	0.3	5

Note: Temperley's and de Clercq's analyses are averaged for each statistic.

Hypothetical Verse

| I | . | . | . |

| . | . | V | . |

Hypothetical Chorus

| I | V | I | V |

| I | V | I | V |

Figure 2. Harmonic structure for a hypothetical verse and chorus section. Pipe symbols show bar lines; dots continue the chord from the prior measure.

chord root. With this rubric, I would say that the verse is 75 percent tonic and 25 percent dominant, whereas the chorus would be split 50/50.

Temperley and I did not report proportional or durational information in our previous articles, but these features are central to the present study. For example, consider the distribution of chromatic roots in the RS 200 corpus based on duration (Table 5). Although tonic accounted for only about a third of the instances of all chromatic roots (see Table 4), for example, it accounts for almost half of the time spent on any chord overall. Other interesting differences in relative distribution can be found when looking at other chromatic roots. For example, while ♭VII is much more common than II in terms of instances (Table 4), the difference is much smaller in terms of duration (Table 5). (Based on this finding, I infer that on average a ♭VII chord in the corpus lasts for less time than a II chord.) Chord duration information thus inherently provides a somewhat different perspective on harmony than do chord instances.

As both Table 4 and Table 5 show, some chords in the corpus are, not surprisingly, much less common that others. Chords built on ♯IV or VII, for example, are rather rare. As the corpus is divided into smaller parts, such as verse or chorus sections, the incidence of these more rare chords becomes even smaller. Consequently, we should not expect statistically significant results with regard to the behavior of uncommon chords, simply because there are not enough data points in the corpus. The results reported in this article thus examine only half of the possible chromatic roots: I, II, IV, V, VI, and ♭VII, the six most typical chromatic roots. The exclusion of other chromatic roots (such as III) is not meant to imply that these other chords do not potentially play into our perception of form. Rather, this corpus is simply not

Table 5. Distribution of chromatic roots in the RS 200 corpus overall, based on duration

Root	*Measures*	*% total*	*% songs*
I	10,348	48.5	100
♭II	43	0.2	5
II	756	3.5	40
♭III	287	1.3	19
III	304	1.4	26
IV	3,898	18.3	92
♯IV	26	0.1	4
V	3,181	14.9	88
♭VI	483	2.3	20
VI	1,048	4.9	39
♭VII	952	4.5	36
VII	25	0.1	5

Note: David Temperley's and Trevor de Clercq's analyses are averaged for each statistic.

large enough to provide any statistically meaningful evidence about the behavior of these less common harmonic entities.

Before I investigate the harmonic characteristics of individual song sections, some readers may benefit from a brief explanation of the *t*-test, the primary statistical device used here to assess the results. The *t*-test measures whether the observed difference between the average of two sample sets is meaningful (i.e., statistically significant). I employ two-tailed paired *t*-tests because the first sample (e.g., data from the verse) and the second sample (e.g., data from the chorus) are always taken from the same song. For instance, consider the hypothetical data shown in Table 6. For the sake of this explanation, let us assume that the data in this table represent bar lengths. Given these six hypothetical songs, the average length of a verse is 3.50 bars, whereas the average length of a chorus is 5.50 bars. Based on this result, we might be tempted to say that chorus sections are usually longer than verse sections. This statement would not be supported by the underlying data, however, since half of the verse sections are longer than their corresponding chorus sections, while the other half are shorter. The observed difference in means (3.50 versus 5.50) is not, therefore, sufficient evidence of a statistically significant difference. This lack of evidence is reflected in the high *p*-value. (A *p*-value ranges from 0 to 1, with higher values suggesting that the observed differences are due to random variation; by convention, only *p*-values less than .05 are considered statistically significant.) In contrast, consider the hypothetical data shown in Table 7. Here we find the same observed average bar lengths (3.50 bars for a verse, 5.50 bars for a chorus) but with a statistically significant result ($p < .001$). Looking at the sample data, we can see why this sample set

Table 6. Example of a *t*-test of hypothetical data showing no evidence of a statistically significant difference

	Verse	*Chorus*
Song 1	1	3
Song 2	2	1
Song 3	3	9
Song 4	4	2
Song 5	5	15
Song 6	6	3
Mean	3.50	5.50
$t(5) = 0.96, p = .38$		

Table 7. Example of a *t*-test of hypothetical data with evidence of a statistically significant difference

	Verse	*Chorus*
Song 1	1	2
Song 2	2	4
Song 3	3	6
Song 4	4	6
Song 5	5	7
Song 6	6	8
Mean	3.50	5.50
$t(5) = 7.75, p < .001$		

achieves statistical significance: each chorus section tends to be about two bars longer than its corresponding verse section. So even though the observed means in Tables 6 and 7 are identical, only the difference in Table 7 reflects a relatively consistent pattern in the underlying data.

Let us turn now to some specific results from the corpus. Table 8 shows the average percentage of time spent on each of the six most common chromatic roots for songs with both verse and chorus sections.[15] The percentage of time is averaged per song, and thus longer songs do not have any more weight than shorter songs with regard to the observed means. As we can see, the most significant difference involves the percent of time spent on tonic.

15 The number of songs with both verse and chorus sections is smaller than either the number of songs with verse sections or the number of songs with chorus sections, since it comprises the intersection of these two sets.

Table 8. Average percentage of time (measured in bars) per song for chromatic roots in the RS 200 corpus, for songs with verse and chorus sections

Root	*Analyst*[a]	*% verse*	*% chorus*	*Effect*[b]
I	DT	47.3	38.8	$t(134) = -3.98$, $p < .001$
	TdC	47.2	39.1	$t(107) = -3.35$, $p = .001$
II	DT	3.3	5.0	NS
	TdC	3.1	4.2	NS
IV	DT	19.9	19.5	NS
	TdC	19.7	20.1	NS
V	DT	14.5	17.5	NS
	TdC	14.4	18.4	$t(107) = 2.54$, $p = .01$
VI	DT	5.0	7.2	$t(134) = 2.40$, $p = .02$
	TdC	5.4	6.0	NS
♭VII	DT	4.3	5.1	NS
	TdC	2.8	5.0	NS

[a] DT, David Temperley; TdC, Trevor de Clercq.
[b] NS, not statistically significant ($p > .05$).

Chorus sections in the corpus, generally speaking, tend to spend less time on tonic than do verse sections. Both my analyses and Temperley's offer strong evidence of this trend. As time shifts away from tonic in chorus sections, other chords naturally increase in relative duration. The V chord seems to be the greatest recipient of this harmonic shift (Temperley's observed means for V verge on statistical significance, with $t[134] = 1.91$, $p = .058$), but there is not strong evidence for this effect. Otherwise, there does not appear to be any obvious difference between verse and chorus sections in terms of the time spent on other chord roots.

Table 9 compares verse and bridge sections in terms of the percentage of time spent on the six most common chord roots. Again, the strongest evidence involves the amount of time spent on tonic. Specifically, bridge sections spend on average a significantly smaller proportion of time on tonic than do verse sections.[16] The greatest recipient of this harmonic shift appears to be chords built on II, although the evidence is not very strong.

When comparing chorus and bridge sections, there does not appear to be evidence of any consistent differences in terms of amount of time spent per song on each chromatic root (Table 10). Given the results shown in Tables 8 and 9, this lack of any significant results may not be surprising, since both

16 The reason that the average percentage of time spent per chord root for verse sections shown in Table 9 differs from that shown in Table 8 is that each mean draws on a different subset of songs. (The set of songs that includes verse and chorus sections is different from the set containing verse and bridge sections.)

Table 9. Average percentage of time (measured in bars) per song for chromatic roots in the RS 200 corpus, for songs with verse and bridge sections

Root	*Analyst*[a]	*% verse*	*% bridge*	*Effect*[b]
I	DT	44.9	32.0	$t(61) = -3.59$, $p < .001$
	TdC	45.2	31.6	$t(69) = -3.84$, $p < .001$
II	DT	5.1	9.1	$t(61) = 2.27$, $p = .03$
	TdC	3.3	6.6	$t(69) = 2.08$, $p = .04$
IV	DT	18.4	20.1	NS
	TdC	17.2	24.3	$t(69) = 2.41$, $p = .02$
V	DT	15.4	21.1	$t(61) = 2.07$, $p = .04$
	TdC	16.2	19.9	NS
VI	DT	7.4	7.1	NS
	TdC	7.7	6.8	NS
♭VII	DT	3.9	2.8	NS
	TdC	4.7	1.5	$t(69) = -2.75$, $p < .01$

[a] DT, David Temperley; TdC, Trevor de Clercq.
[b] NS, not statistically significant ($p > .05$).

Table 10. Average percentage of time (measured in bars) per song for chromatic roots in the RS 200 corpus, for songs with chorus and bridge sections

Root	*Analyst*[a]	*% chorus*	*% bridge*
I	DT	40.1	33.9
	TdC	40.6	39.1
II	DT	6.7	6.9
	TdC	4.4	3.8
IV	DT	17.4	20.3
	TdC	19.6	24.0
V	DT	13.7	20.8
	TdC	15.0	18.9
VI	DT	9.6	7.7
	TdC	8.4	6.3
♭VII	DT	4.5	4.0
	TdC	3.3	0.7

Note: Data not significant ($p > .05$).
[a] DT, David Temperley; TdC, Trevor de Clercq.

bridge and chorus sections spend a significantly smaller proportion of time on tonic than do verse sections. (This is not to say that bridge and chorus sections are necessarily similar in terms of harmonic proportions, simply that no evidence can be found in this corpus.)

To make these findings more tangible, it may help to examine some specific song examples. Consider, for instance, the harmonic content for the

Verse

| I | . | vi | . |

| IV | V | I | . |

Bridge

| IV | bIII | I | . |

| V/V | . | V | . |

Figure 3. Harmonic structure for verse and bridge material in "Every Breath You Take" (Police, 1983)

Verse

| I | . | . | . |

| IV | . | I | . |

Chorus

| V | IV | I | . |

| V | IV | I | . |

Figure 4. Harmonic structure for verse and chorus material in "I Still Haven't Found What I'm Looking For" (U2, 1987)

verse and bridge material of "Every Breath You Take" (Police, 1983), shown in Figure 3. Tonic constitutes half of the verse but only 25 percent of the bridge. This difference in the proportion of tonic may contribute to a feeling that the verse is more harmonically stable than the bridge. (The bridge thus acts to transition between one stable section and another.) Of course, the hypermetric locations of tonic, subdominant, and dominant also factor into the harmonic stability of these sections (more on that below); the proportion of tonic is simply one aspect of this phenomenon. As another example, consider the verse and chorus section harmonies of "I Still Haven't Found What I'm Looking For" (U2, 1987), shown in Figure 4. In this song, the verse is 75 percent tonic, whereas the chorus is only 50 percent tonic. Because so much

Hypothetical Verse

I	.	.	.
IV	.	V	.

Hypothetical Chorus

I	.	IV	.
I	.	V	.

Figure 5. Harmonic structure for a hypothetical verse and chorus section

time is spent on tonic in the verse, the verse has fewer chord changes than does the chorus that follows. We could also say that the chorus draws our attention because the pacing of the harmonic rhythm increases overall. That is another possible factor, which suggests another way of looking at the harmony of song sections.

Average chord durations

The harmonic content of a passage can be quantified in terms of the percentage of time spent on each chord, as considered above; it may also be quantified in terms of chord durations. For example, consider the hypothetical verse and chorus sections shown in Figure 5. Both eight-bar sections have four bars of tonic total, so each constitutes 50 percent tonic. But there are fewer chord changes in the verse: the first four bars are simply one long span of tonic, whereas in the chorus the chords change every two bars. This perspective takes into consideration the average duration for each chord, which is calculated by taking the total number of measures for each chord root and dividing by the total number of instances for that chord root. In the verse of Figure 5, the average duration of tonic is four bars; in the chorus, two bars. Generally speaking, average chord durations provide a way to investigate harmonic rhythm more closely.

Before examining the average duration of chord roots in particular song sections, it is worth looking at this factor in the corpus as a whole. (To my knowledge, no prior author has provided statistics on average chord durations in rock music.) Table 11 shows the statistics for the corpus overall, with each song constituting a single data point.[17] (The means in this table are

17 The statistics in Table 11 are an average of my analyses and Temperley's, since form labels are not a factor.

Table 11. Average chord durations overall per song (in bars) in the RS 200 corpus

Chords	*Mean*	*Trimmed mean*[a]	*Median*	*Mode*
All chords	4.90	1.42	1.23	1.00
Tonic	6.19	2.03	1.59	1.00
Nontonic	1.14	1.03	1.00	1.00

Note: David Temperley's and Trevor de Clercq's durations are pooled together.
[a]Excludes top and bottom 10 percent of values (i.e., represents middle 80 percent of data).

"grand means," reporting the mean of the mean chord duration for each song, so that longer songs do not outweigh shorter songs.) The overall mean chord length—4.90 bars—is somewhat misleading, since many songs have extremely long spans of tonic. Some songs, like "Sabotage" (Beastie Boys, 1994), are tonic throughout.[18] As a result, I list tonic and nontonic chords as two separate categories; I also show a trimmed mean, which is calculated by excluding those songs whose mean chord durations are in the top or bottom 10 percent of values. With outliers removed, the mean duration of tonic chords is about twice that of nontonic chords. Nonetheless, the most frequently occurring duration for any chord is one bar (as shown by the mode statistic). In the following paragraphs, I examine if and how these average chord durations change given the section label.

Table 12 shows the average length of chords (as measured in bars) for verse and chorus sections. (Again, these are grand means, calculated by taking the mean of the mean chord durations for each song.) In both my analyses and Temperley's, chord durations in chorus sections are significantly shorter on average than in verse sections; that is, the harmonic rhythm of a chorus tends to be faster than that of a verse. However, this effect seems primarily due to differences in the average duration of tonic chords; verse and chorus sections do not significantly differ in average duration of nontonic chords. In other words, our perception of an increased harmonic pacing in chorus sections may be mostly the result of a decrease in the length of the tonic chord.

A contrasting situation is found when comparing verse and bridge sections. As shown in Table 13, the average duration of tonic chords in bridge sections is longer than in verse sections, but there is no clear evidence that this difference is significant. Instead, we find evidence only that nontonic chords typically last longer in bridges.

Because tonic chords appear on average to be shorter in chorus sections than in verse sections, while nontonic chords appear on average to be

18 In songs without any change of harmony, key centers are clarified through a variety of factors. In "Sabotage," for example, the bass riff and guitar part strongly indicate the key center of the song.

Table 12. Average chord durations per song (in bars) for songs with verses and chorus sections in the RS 200 corpus

Chords	*Analyst*[a]	*Verse*	*Chorus*	*Effect*[b]
Overall	DT	2.08	1.55	$t(134) = -2.55$, $p = .01$
	TdC	2.26	1.70	$t(107) = -2.06$, $p = .04$
Tonic	DT	2.25	1.57	$t(134) = -3.11$, $p < .01$
	TdC	2.48	1.75	$t(107) = -2.37$, $p = .02$
Nontonic	DT	0.99	1.10	NS
	TdC	1.10	1.09	NS

[a]DT, David Temperley; TdC, Trevor de Clercq.
[b]NS, not statistically significant (p-value > .05).

Table 13. Average chord durations (in bars) for songs with verses and bridge sections in the RS 200 corpus

Chords	*Analyst*[a]	*Verse*	*Bridge*	*Effect*[b]
Overall	DT	1.80	2.58	NS
	TdC	1.58	2.20	NS
Tonic	DT	2.02	2.41	NS
	TdC	1.77	1.83	NS
Nontonic	DT	0.90	1.48	$t(61) = 2.69$, $p < .01$
	TdC	0.96	1.47	$t(69) = 3.14$, $p < .01$

[a]DT, David Temperley; TdC, Trevor de Clercq.
[b]NS, not statistically significant (p-value > .05).

longer in bridge sections than in verse sections, we might expect significant differences in average chord durations between chorus and bridge sections. Indeed, the average durations of both tonic and nontonic chords are shorter in chorus sections than in bridge sections (Table 14), but none of these observed differences is statistically significant. On closer examination of the data, I found that the lack of significant results stems (at least in part) from the fact that in roughly equal numbers of cases chord durations in the chorus are longer or shorter than in the bridge. Further investigation of this characteristic using a different corpus seems warranted to determine whether the sizable differences in average chord durations between chorus and bridge sections found here is a random error or indicative of a real trend.

Again, it may be beneficial to consider these findings in the context of some song examples. The Beatles song "I Saw Her Standing There" (1963), shown in Figure 6, exemplifies a type of song with an average nontonic chord duration longer in the bridge than in the verse. The bridge avoids tonic entirely, in fact, which is surely one factor that makes it seem much less like verse material. (The proportion of tonic overall is thus smaller in the bridge.) At the same time, the lack of tonic is further emphasized by the long spans of nontonic harmonies. Spending an extended period of time on a nontonic

Table 14. Average chord durations (in bars) for songs with chorus and bridge sections in the RS 200 corpus

Chords	*Analyst*[a]	*Bridge*	*Chorus*
Overall	DT	3.08	1.64
	TdC	2.66	1.58
Tonic	DT	2.96	1.71
	TdC	2.37	1.67
Nontonic	DT	1.54	0.94
	TdC	1.37	1.01

Note: Data not significant ($p > .05$).
[a] DT, David Temperley; TdC, Trevor de Clercq.

Verse

| I | I6 | IV | bVI |

| I | V | I | . |

Bridge

| IV | . | . | . |

| IV | . | V | . |

| IV | . |

Figure 6. Harmonic structure for verse and bridge material in "I Saw Her Standing There" (Beatles, 1963)

chord, in other words, may build more tension and expectation for tonic than if the nontonic harmonies were moving more quickly. As another example, consider the verse and chorus sections of the song "Me and Bobby McGee" (Janis Joplin, 1971), shown in Figure 7. Both sections have roughly the same proportion of tonic harmony (about 44 percent in the verse, 40 percent in the chorus), but the tonic chords in the chorus are on average much shorter than those in the verse. Admittedly, the overall harmonic pacing in the chorus is generally faster, but the consistent appearance and disappearance of tonic in the chorus may be the catalyst for this increased harmonic pace. As such, it may be primarily the shorter spans of tonic that convey to the listener (at least within the domain of harmony) that this is the chorus section of the song.

Verse

I	.	.	V
V	.	.	I
I	.	V7/IV	IV
IV	I	V	.

Chorus

IV	I	V	I
IV	I	V	.
V	I		

Figure 7. Harmonic structure for verse and chorus material in "Me and Bobby McGee" (Janis Joplin, 1971)

Other patterns in the data

Given the verse and chorus harmonies of "Me and Bobby McGee" (Figure 7), we might also surmise that verse and chorus quality is expressed, at least in part, by the opening and closing harmonies. Note that tonic opens but does not close the verse section, whereas tonic closes but does not open the chorus. As the reader may recall, theorists often point to the opening or closing harmonies of a section as an important parameter in rock form. It seems worthwhile, therefore, to investigate this trait here.

Table 15 shows the three most common chromatic roots that start or end verse, chorus, and bridge sections. Tonic is by far the most common chord to begin a verse, and about half of the verse sections in both sets of analyses end on tonic. In passages that Temperley and I labeled as chorus sections, tonic is somewhat less frequent as an opening chord than in verse sections, although most chorus sections still begin with tonic. The statistics for the most common final chords found in chorus sections look almost identical to those in verse sections. For bridge sections, both IV and I are common opening chords, although neither accounts for the bulk of cases. In terms of the final chord, most bridge sections end with a dominant. Overall, verse and chorus sections seem to be rather similar in terms of the distribution of opening and closing chords, whereas bridge sections show a relatively different distribution.

Table 15. Most common chromatic roots (percentage of total instances) as beginning or ending chords to sections in the RS 200 corpus

Section	*Location*	*Analyst*[a]	*Most common*		*Second most common*		*Third most common*	
Verse	Start	DT	I	88%	IV	6%	V	3%
		TdC	I	89%	IV	4%	V	3%
	End	DT	I	47%	V	24%	IV	14%
		TdC	I	48%	V	24%	IV	12%
Chorus	Start	DT	I	56%	IV	20%	V	9%
		TdC	I	63%	IV	19%	V	7%
	End	DT	I	46%	V	25%	IV	14%
		TdC	I	44%	V	31%	IV	14%
Bridge	Start	DT	I	40%	IV	26%	II	13%
		TdC	IV	38%	I	36%	VI	10%
	End	DT	V	58%	I	23%	IV	11%
		TdC	V	58%	I	22%	IV	12%

[a] DT, David Temperley; TdC, Trevor de Clercq.

Thus far I have examined only the behavior of particular chord roots. One might also wonder whether any patterns can be observed in the distribution of chords more generally. For example, are inverted chords used more often in verse or chorus sections, or do diminished chords occur more frequently in bridge sections? To address these sorts of questions, I have tabulated the relative proportions for chord qualities across verse, chorus, and bridge sections (Table 16). The first two rows of data show the total number of bars overall for each section type in the corpus. The following rows show the percentages of total bars that contain various chord qualities. Two interesting trends in these statistics stand out. In both sets of analyses, bridge sections in the corpus contain a greater proportion of minor chords and a smaller proportion of major chords than do verse or chorus sections. Furthermore, inverted chords in both sets of analyses are more frequent in verse sections than in other section types.

The global differences shown in Table 16, however, do not turn out to be consistent on a song-by-song basis. As with the hypothetical data in Table 6, *t*-tests fail to show strong evidence of statistical significance in the differences between any of these categories. Thus, for example, while bridge sections overall comprise more minor and less major harmonic content than do verse or chorus sections overall, it would be unwarranted to say at this stage that we could expect any given bridge to have more minor and less major harmonic content than its verse or chorus counterpart. The lack of significant results may not be entirely surprising, though. Table 16 reports statistics for the corpus as a whole; all bridge sections, for example, are included in the "bridge" column. With the paired *t*-tests, the data are inherently limited to only those songs that have the two section types under comparison. The sample pool for the *t*-tests is thus smaller. More important, it may be unreasonable

Table 16. Distribution of chord qualities and inversions in the RS 200 corpus, as proportion of chord durations

Chord type	*Analyst*[a]	*Overall*	*Verse*	*Chorus*	*Bridge*
Total chord durations (in bars)					
Total	DT	21,353	9,158	4,838	1,282
	TdC	21,353	7,713	4,088	1,464
% total chord durations					
Major	DT	76.3	80.2	78.1	74.1
	TdC	77.0	81.0	83.0	74.7
Minor	DT	23.3	19.3	21.7	25.4
	TdC	22.6	18.8	16.8	24.7
Diminished	DT	0.4	0.5	0.3	0.5
	TdC	0.2	0.2	0.1	0.4
Augmented	DT	0.0	0.0	0.0	0.0
	TdC	0.2	0.1	0.0	0.2
Inverted	DT	2.8	3.1	2.7	2.5
	TdC	4.7	5.7	3.9	3.2

[a] DT, David Temperley; TdC, Trevor de Clercq.

to expect that bridge sections, for example, will consistently contain a higher proportion of minor chords than their verse or chorus counterparts, given the variety of ways that these section types can be constructed harmonically. (A bridge might just toggle between IV and V, as in Figure 6.) For now, Table 16 serves more as a guide to future research than as a definitive result in and of itself.

Discussion and conclusions

When comparing verse and chorus sections, this corpus shows strong evidence that verses spend a greater proportion of time on tonic. This finding may help explain, in a more technical way, the perception of harmonic "stability" in a verse—and why chorus sections are perhaps only "relatively stable" (Everett 2009, 145)—in that more time is typically spent in a verse on the most stable harmony of all, the tonic. This corpus also shows evidence that tonic chords typically span fewer bars per instance in chorus sections than in verse sections. This result adds detail to Everett's comment that a chorus may have more "dramatic" harmonies than a verse (145), in that shorter durations of tonic in a chorus possibly contribute to a feeling of tonal drama. Given similar proportions of tonic in a verse and chorus, shorter durations of tonic in the chorus translate to more arrivals on tonic, which may explain why previous authors state that chorus sections tend to "emphasize" tonic (Endrinal 2008, 69) or "reinforce" it (Stephan-Robinson 2009, 94). In line with Summach's work (Table 1), this corpus also shows that verse sections are more likely than chorus sections to begin with a tonic chord, although most chorus sections begin with tonic as well. In contrast to Summach's findings, most verse and

chorus sections in this corpus do not end with tonic, although tonic is the most common closing harmony in both cases, with verse and chorus sections showing relatively similar distributions with regard to opening and closing harmonies.

Looking at verse and bridge sections, there is strong evidence that bridge sections spend a smaller proportion of time on tonic. This finding supports Neal's (2007, 45) statement that bridge sections typically explore nontonic areas. As well, nontonic chords were found to typically span more bars per instance in bridges than in verses. In contrast to verse sections, bridge sections most often begin off-tonic, with most ending on dominant. These findings both confirm and add detail to Everett's (2009, 147) statement that the harmonies of a bridge section are typically more "complex" than those of a verse.

No significant differences were found between chorus and bridge sections in terms of the proportion of chord roots or average chord durations. (This is not to say that these differences do not exist, only that this study revealed no evidence of them.) There is, however, evidence of differences between chorus and bridge sections in terms of the distribution of opening and closing harmonies. Most notably, bridge sections are more likely than chorus sections to end on a dominant chord.

A few caveats are worth keeping in mind when interpreting these results. For one, my analyses and those by Temperley are not identical. We had a relatively high level of agreement in terms of local key areas, for example, but it was not 100 percent. A third analyst might hear local key areas in a different way, which would possibly produce yet another set of results. In terms of form labels, moreover, Temperley and I had only a moderate level of agreement. That said, we did have a relatively high level of agreement with regard to the general distribution of form labels in the corpus (see Table 2), implying that our disagreements may have involved mostly details of form rather than big-picture issues. Here again, different analysts might have different readings of the form in these songs, and an analysis of those readings could yield different results. Unavoidably, the statistics reported here are based on the subjective hearings of two individual analysts. Despite this inherent subjectivity, the main findings reported here were reflected in both of our analyses, suggesting that these findings may be somewhat immune to the particular idiosyncrasies of any one analyst. Nevertheless, it would be useful to conduct a similar study using a "cleaner" corpus, one in which there is a higher level of agreement between analysts on the form and local key areas of the included songs. Whether it is possible to achieve 100 percent agreement on key areas and form labels between two analysts given a set of two hundred songs is an open question, however.

Second, the RS 200 corpus is somewhat skewed toward the 1960s and 1970s. A corpus of more modern songs might show different associations between form and harmony. Prior authors (e.g., Covach 2005; Summach 2011)

have discussed how songwriting strategies have changed over time. For example, the AABA form was common during the 1950s and 1960s but became much less common in the 1970s and thereafter. While Temperley and I used the term *bridge* somewhat indiscriminately with regard to the large-scale form of a song, it is possible that the typical harmonic structure of bridge sections in AABA songs differs significantly from that in verse-chorus songs. Similarly, it is possible that a single section label may encompass various subtypes, each of which has its own particular harmonic strategy or structure.[19]

That said, the findings presented here may shed some light on historical issues of this kind. For example, this corpus shows no evidence of a difference between bridge and chorus sections in terms of proportional or average chord durations, such that the general harmonic structures of these two section types may often be quite similar. In contrast, the closing harmonies of chorus and bridge sections were found to typically be different. These observations suggest one possible explanation for the mechanisms of the shift from AABA to verse-chorus forms during the early decades of rock, as described by Covach (2006). If the closing harmony of a bridge in an AABA form (the B section) is changed from a dominant (more typical of a bridge) to a tonic (more typical of a chorus), the passage may begin to sound less like a bridge and more like a chorus; consequently, the AABA pattern may begin to sound less like an alternation of verse and bridge sections (A and B, respectively) and more like an alternation of verse and chorus sections.

Many songs in the history of rock, in fact, exemplify just how permeable or ambiguous this distinction between bridge and chorus quality can be. Consider, for example, the song "Can't Buy Me Love" (Beatles, 1964), as represented in Figure 8. This song has been categorized as a standard AABA form (Fitzgerald 1996; Nurmesjärvi 1998), implying that the B material acts as a bridge. Other authors (Covach 2006; Everett 2001), however, refer to this passage as the chorus of the song. There is undeniably something unclear about the role the B material plays in this song, assuming we had to choose a single section label. To my ears, the final dominant chord is one central factor that lends this passage a palpable feeling of bridge quality. If we were to recompose the last two bars such that the final chord is tonic (e.g., | ii V | I |), which I leave to the reader's imagination, the feeling of "bridgeness" is significantly diminished, replaced by an even stronger sense that these eight bars act as the chorus of the song. The porous boundary between bridge and chorus labels, perhaps especially in songs from the early years of rock, may thus be an important factor in the changing landscape of rock form.

As a final thought, it is worth restating that harmony is only one of many domains that potentially influence our perception of form in rock. A

19 Nobile 2014, for example, distinguishes between sectional verse-chorus forms, in which each section is more harmonically self-contained, and continuous verse-chorus forms, in which neither main section completes a functional circuit, such that the chorus will begin on a predominant harmony.

A (Verse)

| I | . | . | . |

| IV | . | I | . |

| V | IV | . | I |

B (Bridge or Chorus?)

| iii | vi | I V | I |

| iii | vi | ii | V |

Figure 8. Harmonic structure for A and B material in "Can't Buy Me Love" (Beatles, 1964)

great number of songs have clear and discrete verse, chorus, and bridge sections composed of identical harmonic content, such as Covach's (2005) simple verse-chorus form category. In these cases, other domains, such as melody, texture, rhythm, and lyrics, will communicate the song form. And while harmony may convey certain implications as to the form of the song, other domains may convey contradictory information. For example, while the harmonic content in the B material of "Can't Buy Me Love" seems to imply a bridge role, the melodic and lyric content seems to imply a chorus role. If some passage of a song stays on tonic for an extended period of time, we do not have to automatically categorize it as a verse; rather, we should recognize this feature simply as a quality that typically associates with verse material. The findings I report here are thus not meant to act as an analytic system but instead to help us understand in a more explicit way some of our analytic intuitions. Ultimately, the factors that inform our expectations and perceptions about form in rock music are perhaps mostly unconscious and difficult to fully explain, which may be why this music continues to fascinate us and demand our analytic attention.

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