

Music Theory in Practice (a sequel to “On Music and Musical Perception”)
Vishnu Bachani, 18 October 2017

Q: We have established that music (necessarily) projects order. How does the language (grammar, syntax, etc.) of this order work, though?

A: As Eric Wen writes in *Structurally Sound: Seven Musical Masterworks Deconstructed*¹,

“Music is perhaps the most enigmatic of all the arts. How is it that a sequence of sounds, formulated as distinct pitches and organized in different units of time, can communicate the most intense and complex emotions? In literature, words have distinct meanings, and a writer uses them to communicate a wide variety of ideas and depict real or imagined situations. In the visual arts, a painter or sculptor uses colors and shapes to portray events and people with striking realism or to convey an abstract impression.

But music makes no reference to the external world; pitches that we call C-sharp or A-flat have no intrinsic meaning by themselves. Yet when a composer puts such notes together, they can elicit powerful emotional responses...Music can affect an amateur music lover as profoundly as it does a seasoned professional musician; for those of us who are responsive to sounds, music offers a meaningful experience that enriches our lives. It seems uncanny that music has the power to touch us so deeply. In fact, many people who are deeply passionate about music cannot read musical notation, let alone have any idea how a piece is put together. Since one can experience and appreciate music fully without knowing anything about it, why analyze it? Music analysis sets out to explore how music works. Although it may not increase our enjoyment or love of music, it aims to bring us closer to understanding the remarkable language of pitches organized in time, and help explain its uncanny but irresistible effect on us.”

Although Wen does not answer the question of how the language works in that fragment, the analyses that follow it gradually reveal the mechanics of the musical works examined. The “language” works in a variety of ways, building upon some pre-established principles and often adding idiosyncratic syntactical quirks. Given the scope and intended audience of this article, it is perhaps wisest to examine the fundamental grammar that underlies a remarkably large corpus of Western music from the last half-millennium.

Q: Can you sketch out the basic syntax of “common practice period (Bach to Mahler, or ≈1650 to ≈1900)” music so that we have a framework with which to understand the mechanics of these ordering principles?

A: Absolutely. One could fill multiple volumes with such a grounding, and the dedicated student may wish to seek such volumes for a more rigorous understanding.² But here is my attempt at a concise explanation.

Tonal music, which we shall use to refer to music of the common practice period, is based on the principle of note *centricity*, i.e., one note being hierarchically superior to others and serving as an anchor. When pieces have names like “...in C major” or “...in A minor,” these labels refer to the pitch center in question and also denote the **scale** (a series of ordered pitches spanning an octave) in use, e.g., the C major scale, the A minor scale, etc. There are many syntaxes within the tonal system, i.e., a tonal piece can express meaning through rhythm³, through melody⁴, through form⁵, or through harmony, to name a few. **Functional harmony** is arguably the most studied parameter of modern music theory, so it deserves some coverage here.

Assume, for the sake of example, that we are in a composition in C major. Then the note C (and the chord built on C) is known as the **tonic**, functioning as the pitch center. The other notes (and chords built on these notes) of the C major scale have specific **functions** to earmark the key of C major. For example, the G major chord in the context of C major functions as a **dominant**, a name indicating a harmony that prepares the tonic. The F major chord in the context of C major functions as a **pre-dominant**, indicating that it prepares the dominant. There can also be chords that function as **pivots** to establish a new pitch center (e.g., going from C major to G major). Precisely how and why these functions work is part psychoacoustics, part physics, part culture/linguistics, and many studies have been devoted to this subject.⁶

One result of this hierarchical-functional syntax is that the precise manipulation of functionally charged chords in this seemingly simple playground has the potential to create semantic effects. For example, say a hypothetical piece has the following chord progression⁷:

tonic - tonic - pre-dominant - pre-dominant - dominant - non-tonic!

The first five sonorities would set up the listener with a strong expectation to hear the tonic stated again, but the deliberate deviation from it on the last chord could create a variety of possible effects ranging from a jarring feeling to a feeling of failed resolution to anger or sadness. Other parameters of music (e.g., rhythm, large-scale form, etc.) could contribute to making this semantic effect more specific.

Take another hypothetical progression:

tonic - pivot - new tonic - pre-dominant (of new tonic) - dominant (of new tonic) - old tonic

(Notice that the tonic typically begins a tonal piece or phrase within in a tonal piece, as it conveniently provides the listener with an anchor from which to contextualize successive sonorities.) A number of expressions can be gleaned from this progression, depending on how a listener hears it: on the surface, it is a failure to achieve tonal closure in a new key, but is it indicative of an inability to be comfortable outside of home? A stubborn refusal to change? An insistent beckoning of a familiar entity despite being in a new environment? Analyzing and interpreting the meaning of music can be a messy task—the purpose of this brief exposition is merely to suggest the semiotic potential of the tonal system.

Q: So it appears that the manipulation of notes and chords (harmonic entities, if you will) in a functional context provide one avenue of expressing meaning and establishing a system of order (beyond the axiomatic ‘lingua franca’ of tonality). Can you provide an example of an interesting trope in a given tonal piece (or group of pieces) that makes use of this functional syntax?

A: Certainly. The above two examples were hypothetical, so consider the opening of Ludwig van Beethoven’s (1770-1827) Piano Sonata No. 27 in E minor, Opus 90. First, let us consider the “available” chords of the key/scale of E minor, along with their functions.

Chord:	E minor	F# diminished	G augmented	A minor	B major	C major	D# diminished
Notes:	E-G-B	F#-A-C	G-B-D#	A-C-E	B-D#-F#	C-E-G	D#-F-A
Function:	tonic	pre-dominant	(weak) dominant	pre-dominant	dominant	(weak) tonic	dominant
Roman numeral:	i	ii ^o	III ⁺	iv	V	VI	vii ^o

The Roman numerals in the bottom row provide a convenient way to encode the note of the scale upon which the chord is built (by means of the number, viz., V is built on the *fifth* note of the E minor scale) as well as the **quality** (i.e., major, minor, diminished, or augmented, labels which indicate the intervallic construction and constituent sonority of a given three-note chord) of the chord by means of lower-case = minor, capital = major, + = augmented, and ^o = diminished.

Although it is irrelevant for this example, the reason why, say, A minor is an available chord in E minor while A major is not has to do with the intervallic construction of the minor scale.⁸

Now consider the first three chords of the sonata:

E minor – D major – G major

If one were to stop a recording after the first chord, it would appear normative: the piece has opened with a tonic chord as expected. However, the second chord subverts this expectation. The listener is momentarily confused until the D major chord resolves to G major in a **dominant to tonic** gesture (known as a **perfect cadence**), retroactively rendering the opening E minor chord **not** as a tonic (i.e., i in Roman numeral notation) chord of E minor but as a vi chord in G major!

So then is the piece really in E minor? If it earmarks the key of G major from the onset, then shouldn't it be called "...in G major"? Consider the following three chords:

G major – F# major – B minor

The vi-V-I trope is repeated, except with i (for B minor) instead of I (for G major). So now the music has traversed the keys of G major and B minor. Considering that three-note chords comprise the cells of tonal music, the listener now ponders whether the music will proceed to confirm the key of D, adumbrating a large-scale G-B-D (i.e., G major) chord, or instead confirm the key of E minor, outlining a large-scale G-B-E (or E-G-B, i.e., E minor) chord. Without knowing the name of the sonata, either possibility is logically possible. But indeed, E minor comes next.

The interesting factor here is that Beethoven at once adheres to the classical expectation of hearing a tonic at the beginning of a tonal piece but slyly subverts it by (retroactively) refunctioning it as something *other* than a tonic. It is not until the sixteenth measure of the piece that we finally hear a dominant chord of E minor, confirming the home key; this search for tonal stability is what drives much of Beethoven's music.⁹

Q: Interesting, but there's no way I could have conceptualized all that on my own just by listening to the piece. Does that mean the effect doesn't work unless one learns it intellectually?

A: Au contraire. As I said in “On Music and Musical Perception,” there is a distinction between knowledge of **how something works** and knowledge of **what something means**. My opinion (one that seems to be supported by psychoacoustic studies¹⁰) is that even ordinary listeners who do not intellectualize the grammar of music in an analytical fashion experience the effects of its construction. History has proven the popularity of Beethoven’s music for centuries after his death; of course, it would be a scientific nightmare to try and precisely ascertain data for why people like his music and what precisely they find compelling about it, but an analysis of the grammar and syntax of it sheds light on interesting features of its construction that most likely play a part in the music’s effectiveness.

Q: So, one of Beethoven’s tropes was to introduce the tonic at the beginning of a tonal piece but in the context of a non-tonic key. Can you provide an example of an interesting trope from another composer?

A: Certainly. Richard Wagner (1813-1883) made some very fascinating innovations in the development of tonal music.

As we saw in the Beethoven example, a key (e.g., E minor) can be projected through traversing the keys of the notes of its tonic chord (e.g., E-G-B). This concept can be formalized by establishing a hierarchical distinction between a **key** and a **tonality**.¹¹ A tonal passage which contains chords available in E minor can be said to be “in the **key** of E minor” while a larger passage that shifts its pitch center from E to G to B can be said to be governed by the large-scale “**tonality** of E minor.” Wagner’s preferred genre was the opera (which he himself called *Musikdrama*, or music drama), and while he is often remembered for his use of **leitmotifs** (characteristic musical motifs that referenced certain characters, feelings, or plot elements), far more interesting was the way he integrated these leitmotifs into the fabric of the tonal system.

For example, in Wagner’s opera *Tristan und Isolde*, the “Tristan chord” (F-B-D#-G# in its first appearance, although it appears in different transpositions throughout the opera) quickly makes itself known as a signifier of fraught relations, unconsummated love, etc. in the very first few bars.² Its appearance as a chord on the surface level of the music is (arguably) orthodox—composers before Wagner used ambiguous chords as such before. But Wagner’s innovation was in employing the expressive potential of *shifting* motifs up and down the tonal hierarchy. In the opening to Act I, Scene v of *Tristan und Isolde*, the music modulates (i.e., changes its pitch center) sixteen times while virtually nothing occurs on stage: a rather strange occurrence indeed for an opera where the music is so tightly interwoven with the drama.

What is going on then? An analysis of the music¹² reveals that the Tristan chord has been traversed twice (in two different transpositions) as a series of keys, i.e., its heretofore status as a chord has now been elevated to a tonality. This *shifting* of the Tristan chord from a surface-level chord up the tonal hierarchy to the background level of tonality carries specific expressive significance as Scene v of Act I is precisely when Tristan comes to confront Isolde. Merely sounding the Tristan chord on the surface level of the music (perhaps with more emphatic orchestration for added effect) would

have been appropriate, but Wagner's sophistication is much deeper—the music itself tells the story here.

Q: The previous examples are all centered on harmony. What about the other parameters of music (tonal or non-tonal): do these have expressive potential as well?

A: Naturally, and different musical cultures parse them differently to achieve different purposes.

Take the example of meter (i.e., rhythm) in Western music, where music is divided into **measures** (also known as **bars**) of fixed length wherein each measure has a given number of **beats**, each of which has a given duration relative to a tempo. For example, music in **common time** has four beats, each one a **quarter note**, per bar. This system of metrical structure is often expressed on higher levels than the local measure—phrases are often segmented in four or eight bars, an x-bar “question” phrase is often answered with an x-bar “answer” phrase, etc.

To use an example from Wagner again¹³, consider the lead-in to Isolde's Liebestod at the end of *Tristan und Isolde*:

- Dialogue, 12 measures
- Isolde, 2 measures (out of tempo, talking to herself)
- Dialogue, 12 measures
- Isolde, 2 measures (out of tempo again)
- Dialogue, 6 measures
- Liebestod begins

The macrostructural rhythmic dissonance causes the Liebestod to enter on a syncopation at the phrase level. Dramatically, it is extremely apt as Isolde's Liebestod is a shocking event and even begins as a shock to the phrase structure before a single note is sung.

Q: The previous examples are useful in highlighting the expressive capacities and capabilities of the tonal system and perhaps explaining one reason (cultural and political ones aside) for its widespread popularity and influence, especially on other genres like jazz, pop, etc. But are such complicated tropes found in, say, pop music?

A: Of course! An entire subfield of music theory is dedicated to the theory and analysis of popular music.

The first four notes of Radiohead's “Everything in Its Right Place,” a descending C–Ab–G–C, imply the key of C minor, but instead a C *major* chord follows this monophonic introduction, creating the first deviation from expectation. The chord that follows is a Db major seventh chord, foreign to either C minor or C major except possibly as a Neapolitan (a standard predominant chord), creating yet another distortion. But the third chord rejects this possibility, returning to the darkness of C minor. Tonal distortions as such are virtually de rigueur in Radiohead's music and are well-documented in analytical scholarship.¹⁴

Q: The tonal system appears to have very fertile possibilities for expressive significance. Does this mean that other systems of musical organization have similar analogues?

A: The short answer is yes. The field of (ethno)musicology sometimes investigates such systems and their expressive significance in non-Western cultures.

In Western music, the system of tonality had become stretched and distorted so far by the time of Gustav Mahler's (1860-1911) death that it seemed impossible to innovate beyond his style without breaking the deepest axiomatic rules of tonality (most fundamentally, pitch centrality). While Richard Strauss (1864-1949) and Jean Sibelius (1865-1957) continued to write tonal music in their own style, Arnold Schönberg (1874-1951) and his pupils charted new territories with **atonal** music that employed different (non-tonal) principles of musical organization. A full exposition of atonal organizational principles is beyond the scope of this introduction, but some of them include:

- **Symmetry** (rather than tonal unity) as a form-defining structure¹⁵
- Emphasis on musical **transformations** (operations that take one sonority to another) rather than the sonorities themselves (the typical object of study in tonal harmony)¹⁶
- The manipulation and permutation of **tone rows**, linear arrays of pitches that transcend major/minor keys and operate as their own arbiters of musical logic

Q: That was a lot of exegesis. Can you provide some pieces of music to listen to where I might be able to discern (or perceive without discernment) some of these tropes?

A: Perhaps another article addressing this question alone is in order! But in brief:

Richard Wagner's late operas (*Tristan und Isolde*, the *Ring* cycle, and *Parsifal*) are replete with meticulous musical structures that often tell the story.¹⁷ A special mention is due to [Bruno Walter's recording of Act I of *Die Walküre*](#), widely regarded as the greatest Wagner recording ever made. Wagner's tonal syntax builds off of Beethoven's late string quartets, which are perhaps easier to digest, not being 4+ hours each!¹⁸

Anton Bruckner (1824-1896) was arguably the most erudite composer in Western history, studying for decades before penning a symphony, and his symphonies are accordingly assiduous. The author's own ongoing work on Bruckner's codas¹⁹ may provide some motivation for listening.

Gustav Mahler (1860-1911), another prominent symphonist of the late Romantic era, has a number of interesting characteristic gestures and innovations in his music.²⁰ The Second Symphony is especially lively while later symphonies (e.g., the Tenth) are more introspective.

The above suggestions are inevitably biased toward the author's own preferences and should in no way be considered as an authoritative overview of "interesting" music, whatever that may entail. Nonetheless, with a heightened awareness and appreciation for structural features of musical construction, one ought to be able to find objects of interest in a very large corpus of music indeed.

Footnotes/Sources

- 1) Wen, Eric. [Structurally Sound: Seven Musical Masterworks Deconstructed](#). Dover Publications, 2017. p. xi
- 2) Gareth Loy's [Musimathics](#) (MIT Press, 2 volumes, 2006-2007) provides a foundation for the physical basis of (tonal) music, especially Volume I. Ernst Levy's [A Theory of Harmony](#) (State University of New York Press, 1985) is an attempt at creating a "natural-base" theory of harmony, as is Hans Kayser's [Textbook of Harmonics](#) (Sacred Science Institute, trans. Ariel Godwin, 2006). For a non-epistemological treatment of practicable (i.e., as if to learn it as a music student) harmony, Yitzhak Sadai's [Harmony in its Systemic and Phenomenological Aspects](#) (Yanetz, trans. J. Davis and M. Shlesinger, 1980) is a good resource.
- 3) A brief example: listen to the "[The Augurs of Spring](#)" from Igor Stravinsky's [Le Sacre du printemps](#) and try to count two beats per bar. The orchestral accented notes are deliberately placed on unexpected beats to create apparent chaos. Further explication can be found on [Wikipedia](#).
- 4) Another brief example: listen to Charles Ives' [The Unanswered Question](#), where the eminently non-tonal melody grates harshly against the hushed strings as if asking a difficult question persistently. Leonard Bernstein, in his [Norton Lectures](#), posits that the question being asked is "whither music?"
- 5) Examples abound in tonal music of certain well-established forms being *deformed* for expressive purposes—James Hepokoski's and Warren Darcy's tome [Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata](#) rigorously establishes this theory. For a brief example, consider Beethoven's [Sonata No. 26 in Eb major](#) (nicknamed *Les Adieux*) which opens with a musical gesture (namely, a horn fifth) typically used to signify closure and ending, as if the piece is resigning before it can even begin.
- 6) Richard Parncutt's [Harmony: A Psychoacoustical Approach](#) (Springer-Verlag, 1989) provides a good introduction with references to much more relevant literature.
- 7) Sourced from the author, response to [How does instrumental music cause emotional responses?](#) Quora, 2017.
- 8) The harmonic minor scale can be generated by starting on any of the twelve pitches recognized by the Western tonal system and applying the ascending sequence

whole step – half step – whole step – whole step – half step – whole-and-a-half step – half step

And since "available" chords of a key are built using available notes of the scale, the **qualities** of the chords built on each note of the scale are constant irrespective of the key in question, viz., the chord built on the fourth note of any minor scale is minor, etc.

- 9) The [Piano Sonata No. 21 in C major, Op. 53](#) (nicknamed *Waldstein*) is another prime example, where the opening C major chord appears to be a tonic but turns out to be functioning as IV in G major. Numerous other examples abound, e.g., the [First Symphony](#), the [Piano Sonata No. 17, Op. 31 No. 2](#), etc.
- 10) Carol Krumhansl's [Cognitive Foundations of Musical Pitch](#) (Oxford University Press, 1990) provides a synoptic overview of relevant studies and scholarship.
- 11) Pages 21ff of Marshall Tuttle's [Musical Structures in Wagnerian Opera](#) (The Edwin Mellen Press, 2000) provide a more rigorous definition.
- 12) *Ibid.*, pp. 58-77.
- 13) Originally sourced from personal correspondence with Marshall Tuttle, and reproduced on Quora: "[What are the key features of Wagner's music?](#)" 2017.
- 14) Two valuable monographs are Brad Osborn's [Everything in its Right Place: Analyzing Radiohead](#) (Oxford University Press, 2016) and Christopher Doll's [Hearing Harmony: Toward a Tonal Theory for the Rock Era](#) (University of Michigan Press, 2017). Also noteworthy is Michael Spitzer's 2017 [article on Arcade Fire's Funeral](#).
- 15) The author's [paper on Béla Bartók's Fourth String Quartet](#) expounds a flavor of this argument.
- 16) David Lewin's [Generalized Musical Intervals and Transformations](#) (Yale University Press, 1993) is generally regarded as the pioneering monograph of this subfield of music theory.
- 17) Marshall Tuttle's [Musical Structures in Wagnerian Opera](#) (The Edwin Mellen Press, 2000) and Jonathan Petty's [Wagner's Lexical Tonality](#) (The Edwin Mellen Press, 2005) provide excellent analyses to complement the music.
- 18) Chapter 6 of Marshall Tuttle's [Modal Ethos and Semiotics in Tonal Music](#) (The Edwin Mellen Press, 2017) elucidates some of the harmonic logic of the slow movement of Beethoven's Op. 132.
- 19) Continually accessible from the author's [Music](#) webpage.
- 20) *Ibid.*, Chapter 5, analyzes the Adagietto from Mahler's Fifth Symphony, Robert Hopkins' [Closure and Mahler's Music: The Role of Secondary Parameters](#) (University of Pennsylvania Press, 1990) provides a more synoptic overview, Seth Monahan's [Mahler's Symphonic Sonatas](#) (Oxford University Press, 2015) applies narrative theory to selected symphonies, and [Rethinking Mahler](#) (ed. Jeremy Barham, Oxford University Press, 2017) collects various recent analytical essays.