Methods of Large-Scale Rhythmic and Tonal Organization as Stylistic Features of Haydn's Instrumental Music

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Historians typically see the value of stylistic analysis in its power to answer the questions of authenticity and transmission that form the core of traditional musicology. From the perspective of music theory, there is a potentially broader value of a successful investigation of compositional style. Regardless of what answers the investigation arrives at, wherever it relies on "internal evidence" it has the potential to advance our understanding of fundamental issues of the nature of musical style and practice and thereby carve out new territory of proven fertility in the ever-expanding universe of music concepts.

The approach to stylistic analysis explored in the present study considers methods of large-scale hierarchic organization. Such a proposal is not new; the theories of Heinrich Schenker readily suggest something of the sort. However, no objective study of compositional style on the basis of internal evidence has ever been earnestly pursued by Schenkerians. This is for good reason. Schenker's ideas are too ambiguous and thinly sketched to be operationalized for the purpose of objective research without taking interpretation to the point of essentially constructing an independent theory, a practice more inspired by Schenker than representative of his thought.

We find circumstantial evidence of this, for example, in a collaborative study convened by Barry S. Brook of the authenticity of trios attributed to Franz Joseph Haydn based on different types of stylistic analysis.[1] One of the participants was a young David Gagné, now a highly regarded Schenker scholar, who proposed a method based on "linear analysis."[2] While many of the participants developed interesting and successful lists of stylistic traits that could help distinguish Haydn's trios from those of contemporaneous composers, Gagné's project does not seem to have advanced far beyond the conception phase, which is hardly surprising. As powerful and evocative as the concept of "linear analysis" is, it is equally indeterminate. Consider, for example,

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[1]Barry S. Brooks, "Determining Authenticity through Stylistic Analysis: A Multifaceted Approach (with special reference to Haydn's string trios)," in *International Joseph Haydn Kongress 1982*, ed. Eva Badura-Skoda (Munich: Henle, 1986), 551–6.

[2]Ibid.

codifications of Schenker-type analysis proposed by John Rahn and Stephen Smoliar.[3] These differ radically in their representation of the notion of musical lines (or voices) that we associate with Schenker when using the phrase "linear analysis," even though they both present a consistent and reasonable interpretation of Schenker's analytical method.[4] Moreover, these studies take the first of what would be many necessary steps towards an operationalization of linear analysis for the purpose of stylistic analysis, which would include objectifying the procedure of arriving at an analysis as well as identifying aspects of style that could be extracted from an analysis.

It is unproductive, therefore, to take faithfulness to Schenker as a restriction in developing an approach to understanding a composer's personal approach to hierarchic organization. New models of rhythmic and tonal hierarchy, inspired by Schenker's ideas without being chained to them, are promising candidates for stylistic analysis—objective or otherwise. Below I will illustrate these in a comparison of the styles of Carl Philipp Emanuel Bach and Franz Josef Haydn.

Bach and Haydn each played critical roles in the founding of what we know now as the classical style, but the historical relationship between their musical styles is imperfectly understood. There has long been a general consensus among scholars that C. P. E. Bach exerted a crucial influence on Haydn, yet there is much dispute over the extent to which Bach's music impacted Haydn's artistic development. Nonetheless, the question is generally not whether Bach's music was important to Haydn, but when, how, and to what degree it guided the evolution of his unique compositional style.

In his biography of Bach, Hans Günter Ottenberg compellingly locates the influence of the north German composer on Haydn in the much-heralded compositional art of thematic unity.[5] Indeed, thematic unity, broadly painted, characterizes Haydn's later work and distinguishes him from Viennese contemporaries. But the idea of dating the introduction of such a general and somewhat ill-defined compositional procedure into Haydn's style is problematic.

Haydn's Keyboard Sonata in G Minor (Hob. XVI: 44) of 1765 is a wonderful early example of motivic work and thematic unity. In its first movement, the second theme

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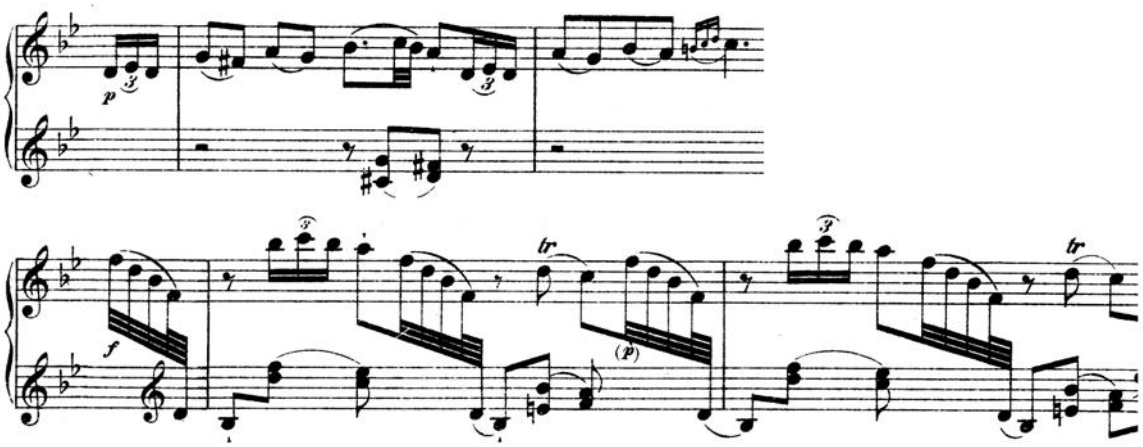
[3]John Rahn, "Logic, Set Theory, Music Theory," *College Music Symposium* 19, no.1 (1979), 114–27 and Stephen Smoliar, "A Computer Aid for Schenkerian Analysis," *Computer Music Journal* 4, no. 2 (1980), 41–59.

[4] See part three of Jason Yust, "Formal Models of Prolongation" (PhD Diss., University of Washington, 2006) for a more in-depth discussion of these and other possible codifications.

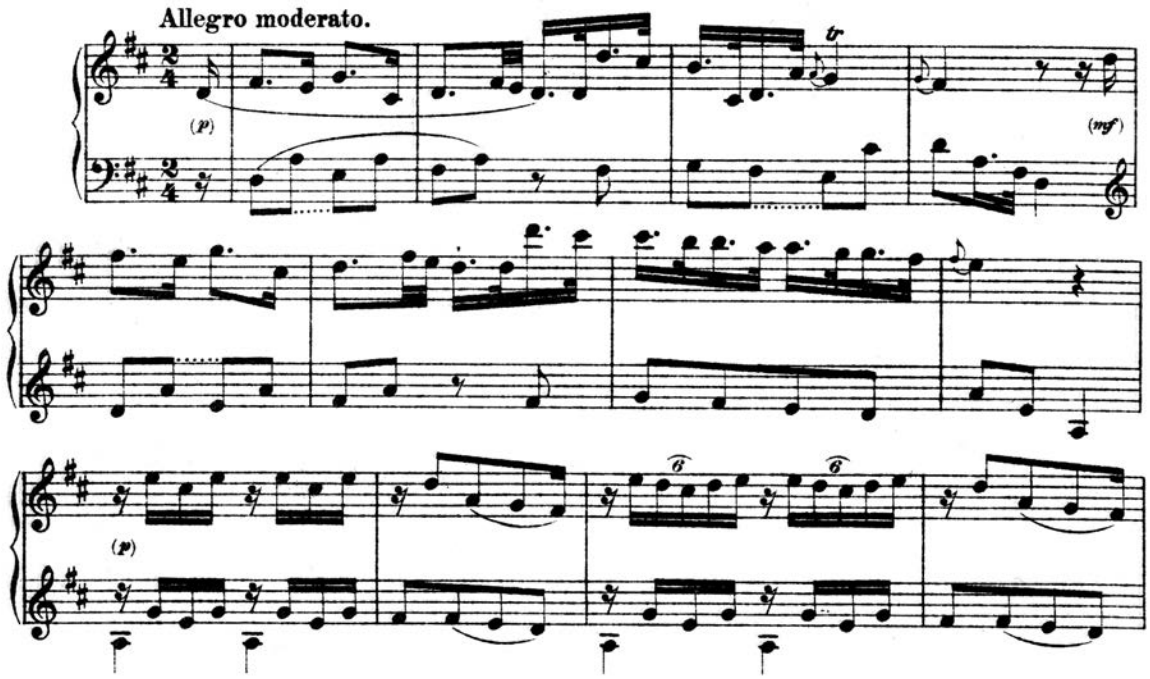
[5]Hans Günter Ottenberg, *Carl Philipp Emanuel Bach*, trans. by Philip T. Whitmore (Oxford: Oxford University Press, 1987).

recombines two identifiable motives from the first. Example 1 presents the beginning of the consequent phrase of the first theme, where a triplet figure is used as a melodic anacrusis and a distinctive rhythm and contour characterize the left-hand accompaniment. The beginning of the second theme changes the harmonic sense of the left-hand accompaniment pattern and realigns the triplet figure with it, changing the role of this figure and recontextualizing it from part of a lyric melody to a melodic fragment in a splintered texture. Haydn further manipulates these motives, as well as the rapid arpeggio introduced in the second theme, as the exposition continues.



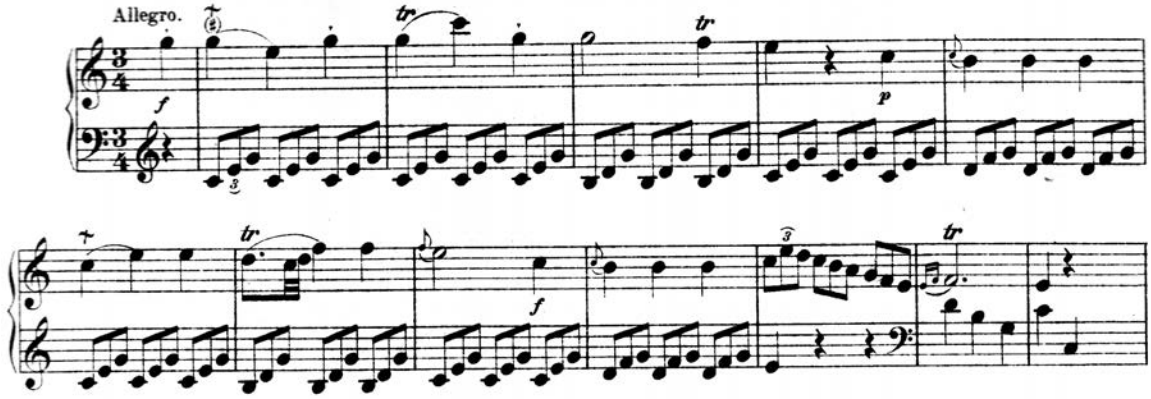
Example 1. Haydn, Keyboard Sonata in G Minor (Hob XVI: 44), first movement, measures 5–6, 12–13

If it is true that this technique evolved from Haydn's interaction with the keyboard sonatas of Bach then the practice must emerge in Haydn's work somewhere in the early 1760's. At first glance, this proposition seems reasonable. Consider in Example 2, the first twelve measures of an early sonata (Hob. XVI: 14), which has many of the familiar hallmarks of Haydn's style. It begins with a distinct four-measure singable phrase followed by an answer an octave higher. But the second eight-measure period that follows bears no discernable thematic relation to the preceding music. As the exposition progresses, Haydn lays down more eight-measure ideas as if building a wall out of a series of bricks, each with the proper size and shape, but made of a unique material with its own pattern and texture. The exposition of this movement seems more cobbled together than woven out.



Example 2. Haydn, Keyboard Partita in D Major (Hob. XVI: 14), first movement, measures 1–12

But this is only one example. In contrast to Hob. XVI: 14, the first movement of the Keyboard Divertimento (Hob XVI: 3), another early sonata that Haydn almost certainly composed before he came to know Bach's music, is nevertheless clearly thematically unified and demonstrates motivic variation to some extent as a method of achieving compositional unity. Haydn consciously advances through the phrases of the exposition by varying the initial melodic idea. The first and second phrases (measures 1–12 and measures 13–26) make an antecedent-consequent pair. The concluding third phrase (measures 27–36) preserves the rhythmic profile of these, including the cadential triplets in the melody, while varying other parameters such as melodic contour and harmonic rhythm (see Example 3).

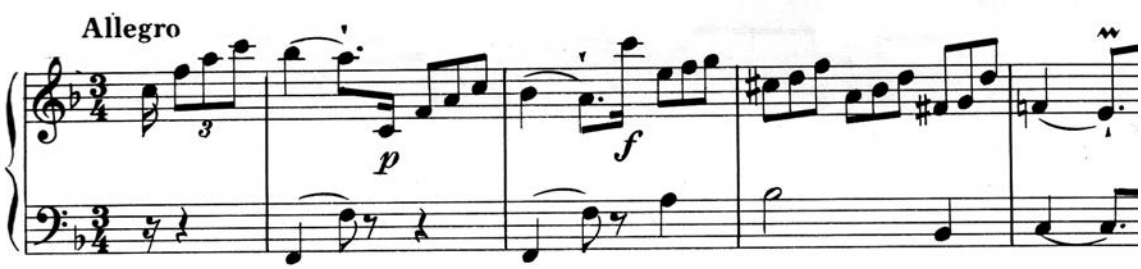


Example 3. Haydn, Keyboard Divertimento in C major (Hob. XVI: 3), first movement, measures 1–12

While this movement fails to demonstrate the contrapuntal elegance of motivic variation that one finds in Bach's work or in later sonatas of Haydn, and other factors, such as the monotony of the incessant triplet accompaniment, consign it to the catalogue of Haydn's immature efforts, one cannot say that it is distinguished from later works by the simple absence of any sense of thematic unity.

It seems that the problem, at its root, is that the evocative idea of *thematische Arbeit* and thematic unity has not really been defined well enough for one to draw any definite conclusions about it. Why then is Ottenberg's thesis so compelling? First, of course, it lies at that alluring nexus at which the study of history promises to reveal something basic and timeless about music itself—to witness the agency of a musical fact that transcends time and individual, for which the composer is a medium rather than an author. This is one of the overwhelming enticements offered by accounts of influence. But another fatal charm of Ottenberg's theory is its invocation of musical unity. It is not only a mode of influence, but one that strikes at the heart of the identity of a musical work, a compositional procedure that discovers the singularity of the work by tracing it to a singular source, the motive.

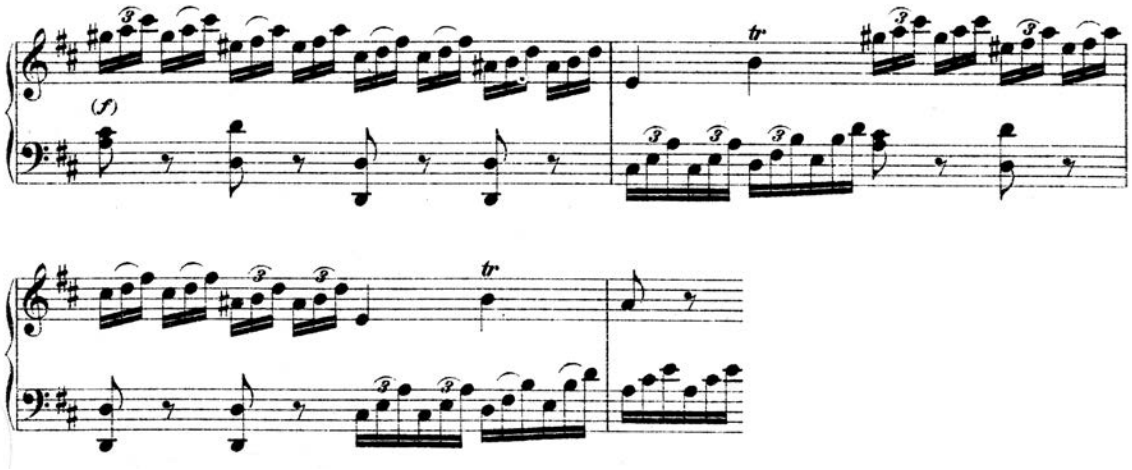
One might compare the idea of *thematische Arbeit* to a different account of influence, one that might be more objectively persuasive, but somehow is not more compelling. Example 4 shows the initial phrase of the third movement of a Keyboard Sonata in F Major by Bach (Wq. 51 no. 5). According to Peter Brown, it is likely that this set of six sonatas (Wq. 51) would have been available to Haydn as early as 1761.[6] In the third measure, at the approach to the cadence, Bach deploys a distinctive figure to decorate the cadential supertonic sixth-chord: triplets consisting of an accented chromatic lower neighbor followed by an arpeggiation of the chord.



Example 4. C. P. E. Bach, Keyboard Sonata in F major (Wq. 51 no. 5), third movement, measures 1–4

[6] A. Peter Brown, *Joseph Haydn's Keyboard Music: Sources and Style* (Bloomington: Indiana University Press, 1986), 218.

An equivalent figure begins to appear in Haydn's sonatas in the late 1760's. Thus, for example, an extended version of Bach's figure appears near the end of the exposition in the opening movement of Haydn's Keyboard Divertimento in D Major (Hob. XVI: 19) composed in 1767. Not only are the rhythm and intervals the same, but also the chromatic lower appoggiaturas decorate exactly the same chord, a supertonic in first inversion, and the chord has precisely the same pre-cadential function (see Example 5).



Example 5. Haydn, Keyboard Divertimento in D major (Hob. XVI: 19), first movement, measures 38–40

Such stylistic assessments might ultimately allow us to make a convincing case about the historical facts of what Haydn knew of Bach's keyboard works. However, if in the process we have dismantled the grand claims of something like Ottenberg's thesis on the transmission of thematic unity, one is bound to wonder what we have ultimately gained. If a particular case of influence truly consists of nothing more substantial than the transmission of characteristic, but superficial, "licks," why should anyone care about such influence in the first place?

For this reason, it is critical that stylistic analysis invoke significant and far-reaching aspects of compositional practice in addition to whatever more mundane evidence might be the most expedient for establishing historical fact. The techniques by which the composition is hierarchically integrated, both in terms of rhythm and harmony and the coordination of the two, are alluring candidates because they are hidden beneath the surface. To detect them requires considerable work in advancing the sophistication of our way of conceptualizing music. And, unlike a stylistic trait that might fall out of a statistical analysis that is hidden simply because it is an unconscious habit of the composer, methods of hierarchic organization are of indubitable importance to the enduring quality of a piece of music.

In order to discuss hierarchy as a stylistic trait, I depart here from the question of influence and consider more generally the distinctive style exhibited in Haydn's sonatas, using Bach's works as a foil. I will present formal approaches to two types of hierarchy—rhythmic and tonal—and show how these evince important and distinctive traits of Haydn's techniques of large-scale organization. These techniques are crucial in determining the character of Haydn's music, but difficult to pin down with traditional music theory.

Haydn's sonatas have a unique sense of rhythmic dynamism and playfulness, both of which are generally absent from the sonatas of Bach. What is it about them that gives this impression? Perhaps, relying on the most commonplace concepts available, one might observe that Haydn constantly varies phrase lengths in his works. But Bach's phrasing is not entirely uniform, so to make the point more precise one would have to make the statement statistical: Haydn's phrase lengths are more variable on average. In fact, this is not quite sufficient because it does not hold true on a piece-by-piece basis. Here one might consider the recitative from the first of Bach's Prussian sonatas, where phrase lengths vary almost arbitrarily. This movement still does not express the vitality of even Haydn's most rhythmically uniform pieces. We could continue to qualify the point on an *ad hoc* basis, but going down such a road will inevitably convince us that the poetry of the original observation only suffers from rigor and objectivity, and that would be a severe mistake because beauty does not suffer from rigor, rather it suffers from the refusal to take the creative axe to stale music concepts. Let me renew this inquiry starting from an important insight from David Lewin, who noted that distances between timespans should not be measured in terms of any absolute unit of time, but relative to their *length*. Thus, in Lewin's system of measurement, the distance between two quarter notes is the number of quarter notes between them, while the distance between two *measures* is the number of *measures* between them.[7]

An extension of this system, where the length and unit of measurement are allowed to vary independently, is useful for describing rhythmic hierarchy. I will call the unit of measurement a "tempo" and use it to denote the hierarchical position of a timespan. For instance, a low-level rhythmic relationship might be measured in eighth notes, while a more large-scale relationship might be counted in units of measures, and a yet higher relationship in four-measure units. The difference between this "relativist"

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[7] David Lewin, *Generalized Musical Intervals and Transformations*, 2nd edition (New York: Oxford University Press, 2007).

form of measurement and the usual "absolutist" one may seem slight, but in fact it has profound consequences.

The relationships between tempos can be constructed in terms of a regular hierarchy. For instance, Figure 1 gives a regular hierarchy with tempo levels in uniform powers of two, from the two- to the four- to the eight-measure level. Such a hierarchy might be sufficient for the description of rhythmic relationships if meter and hypermeter were always perfectly consistent. However, since this is not so—especially in the case of hypermeter—a procedure for deforming regular hierarchies is needed. Expansion and syncopation are two such methods.

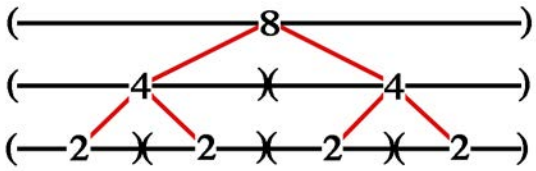


Figure 1. A simple regular hierarchy

An expansion adds time at some point in the structure, changing the length of all timespans above it in the structure. For instance, Figure 2 illustrates an expansion of a measure in our hypothetical binary hierarchy. Note that the eight-measure phrase becomes a nine-measure phrase, even though its tempo does not change. This is why the length of timespans needs to be able to vary independently of the unit of measurement. Note also that the positioning of the expansion is significant to its overall effect on the structure. For instance, the one-measure expansion shown in Figure 3 has a different effect.

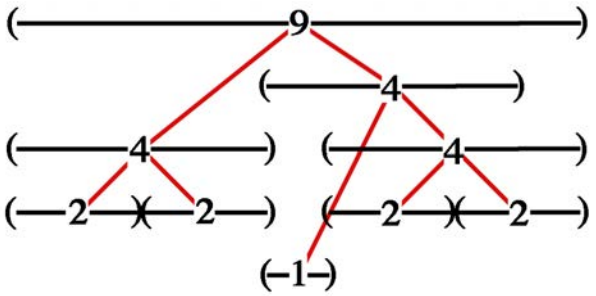


Figure 2. An expansion of a simple regular hierarchy

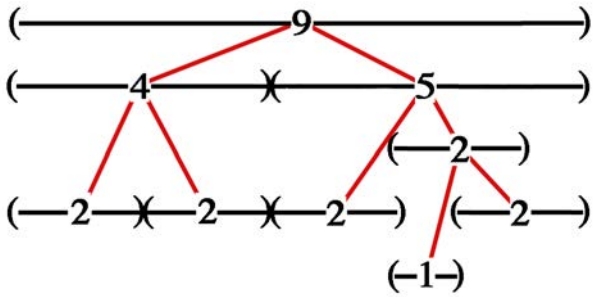


Figure 3. A more disruptive expansion of a simple regular hierarchy

The other deformation, syncopation, is a localized displacement of a timespan with respect to the hierarchy. In Figure 4, a four-measure phrase moves back two measures, swallowing the latter half of the previous four-measure phrase. However, the length of the overall eight-measure timespan is preserved by a two-measure leftover timespan that takes over the space vacated by the syncopated phrase. Syncopations have different characters depending on the vertical distance between the timespan and the unit of syncopation. For instance, in Figure 5 the four-measure phrase moves back by one measure instead of two.

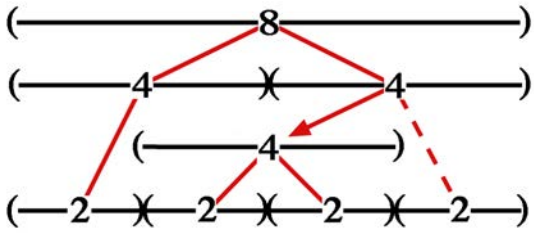


Figure 4. A syncopation of four measures in a simple regular hierarchy at the two-measure level

The difference between Haydn's and Bach's sense of phrasing is, simply put, one of expansion versus syncopation. Bach sometimes fits his music into completely regular structures, and when he varies phrase lengths it is generally through expansion. Haydn, on the other hand, delights in phrase syncopation while also employing the technique of expansion.

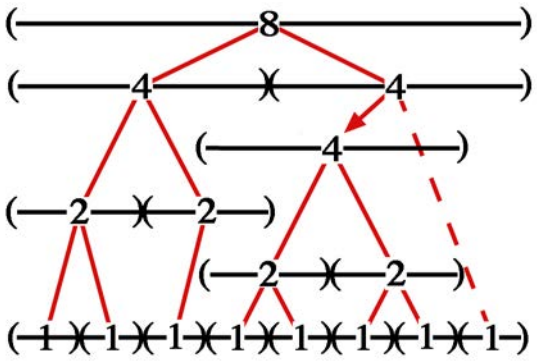
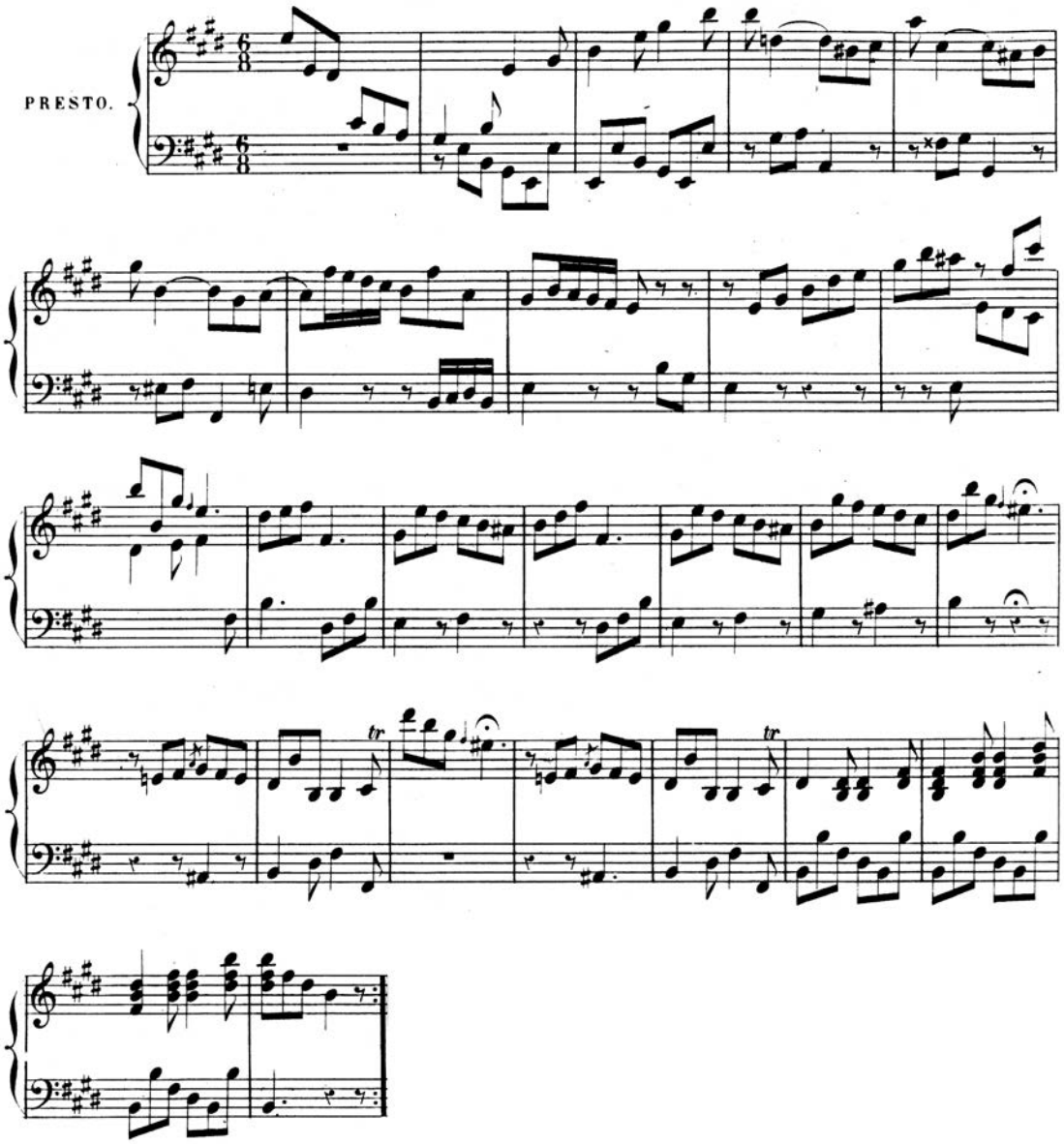


Figure 5. A syncopation of four measures in a simple regular hierarchy at the one-measure level

Example 6, taken from the exposition of the third movement of the third sonata in the "Prussian" set, begins with a clear definition of normative phrasing with an eight-measure phrase composed of two distinct parts (measures 1–8). Conventionally, one might say that this establishes a two-, four-, and eight-measure hypermeter for the listener. We will nuance this by stating that it establishes two-, four-, and eight-measure tempos—a seemingly slight reconceptualization that will have significant consequences.

Bach continues with another eight-measure phrase (measures 9–16). But after this second phrase, a single measure (17) with a fermata momentarily interrupts the regular hypermetrical pulse. With the conventional understanding of hypermeter, the music that follows this interruption is uniformly "off" the already-defined hypermetrical pulse by one measure (even ignoring the irregularity resulting from the undetermined length of the fermata). Reconceptualizing the hypermetrical pulse as an abstract tempo (essentially a unit of measurement) allows us to recognize that the listener can continue to use the two-, four- , and eight-measure yardsticks even when the pulse is lost and reestablished in a different place. When Bach's music resumes in measure 18, the first two-measure unit is followed by another one-measure insertion, resembling the earlier insertion. After this, another two-measure span completes the cadence to B major, and another four measures not only confirms the arrival, but—more importantly—completes the last eight-measure phrase (which is actually nine measures due to the expansion within it). Figure 6 presents a hypothetical regular hierarchy that represents the structure of Bach's exposition without the one-measure expansions, while Figure 7 modifies the lengths of sections according to where expansions occur. This is not, however, quite a complete description because the one-measure expansions are orphaned. The more complete description in Figure 8 shows the timespans both before

and after they shift to accommodate the expansions. The expansions are incorporated into the hierarchy through a relation to the pre-shifted timespans that they displace.



Example 6. C. P. E. Bach, "Prussian" Keyboard Sonata in E Major (Wq. 48, no. 3), third movement, exposition

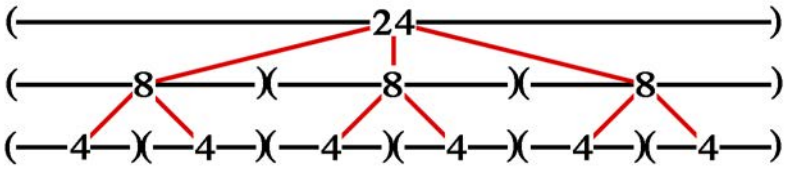


Figure 6. A regular hierachy for Bach's exposition

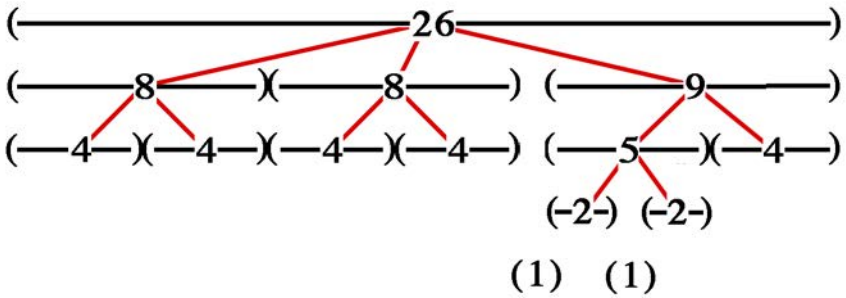


Figure 7. One-measure expansions in Bach's exposition

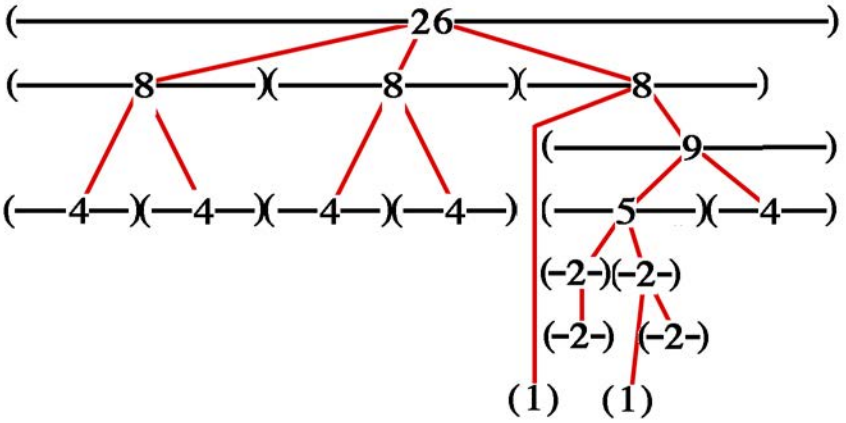
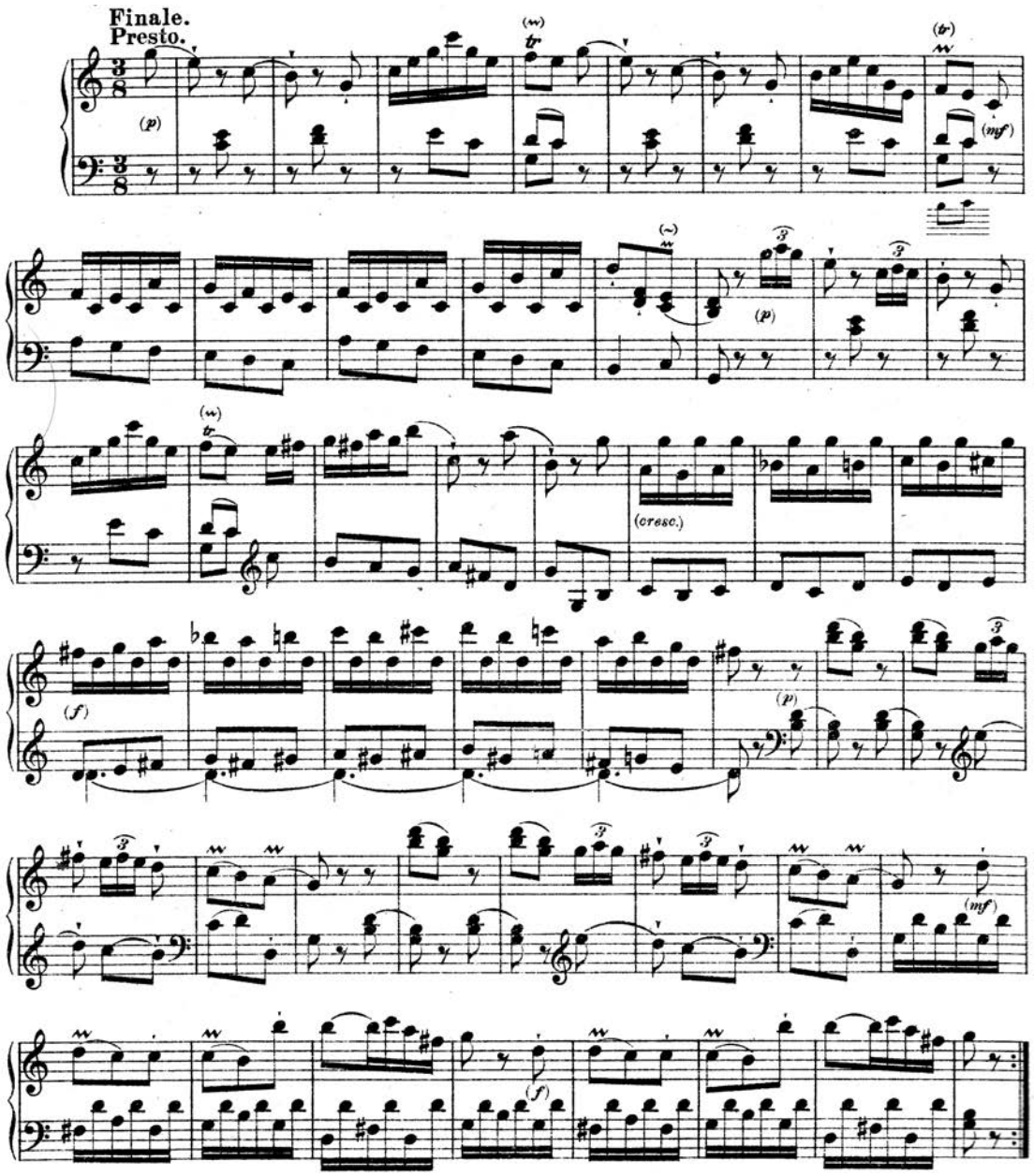


Figure 8. A rhythmic hierarchy for Bach's exposition

Expansions are the phrase-level versions of fermatas. Like fermatas, they sound more normal and customary at larger divisions of the form, where they are less disruptive and serve to emphasize a significant boundary by yielding space to it. They are more striking when placed at points of less global significance. In Bach's sonata exposition cited in Example 6, the second expansion (measure 20) is more disruptive than the first (measure 17).

Expansions differ from syncopations in that syncopations have a localized effect—the larger timespans breathe like a flexible diaphragm to accommodate expansions. Syncopations generate energy through the tension they create between stubbornly fixed large-scale timespans and the smaller timespans displaced within them.

Haydn's phrasing is distinguished from Bach's by his adept use of syncopation to create rhythmic liveliness and excitement. The exposition of the third movement of the first of the Esterházy sonatas, Hob. XVI: 21 (see Example 7), provides a good illustration.



Example 7. Haydn, Keyboard Sonata in C Major (Hob. XVI: 21), third movement, exposition

Like Bach, Haydn clearly states normative phrase length at the beginning of this movement, with an antecedent-consequent pair of four-measure phrases that could hardly be more forthright. He then extends the following phrase by a repetition of its initial two-measure part thereby offsetting the subsequent four-measure restatement by two measures. At this point, the four-measure tempo is reestablished in a new place, and momentarily the effect for the listener is no different from that of an expansion. The next four-measure phrase (measures 19–22) begins a new period in a new key (G major), drawing on the thematic material from measures 9–14. It should conclude in

measure 22 with a half cadence, but instead spins out for another two measures (measures 23–24), creating a point of articulation at the downbeat of measure 25. At this moment the listener can link this point of articulation with the initial eight-measure phrase with the four- and eight-measure units of measurement, suggesting a larger-scale significance to the hypermetrical pulse-streams established at the beginning of the piece.

The newly-reinforced four-measure yardstick leads us to expect this expansion of the dominant of G major to finish in measure 28, but Haydn extends it for two additional measures. A varied repeat of the original theme in the dominant key at measure 31 announces a new period, the last of the exposition. This variation is extended to five measures and is repeated at measure 36. The expansion of these phrases to five measure results in the final pair of phrases (measures 41–48) lining up once again with the initial four- and eight-measure hypermeters, and the reestablishment of four-measure regularity reaffirms the sense of an overall rhythmic order being restored.

This phenomenological description of the phrasing in this exposition is complex, but it is not hard to understand in light of the hierarchy that is created by the consistencies in Haydn's phrasing and the repetition of thematic material. The eight-measure units at the beginning and end of the exposition are linked in a regular hierarchy (see Figure 9). The normative period length of sixteen measures is never stated explicitly, but reflects the length of the first period when the two-measure expansion (measures 9–10) is removed, and, more generally, the reorganization of units at the eight-measure level into three groups of two.

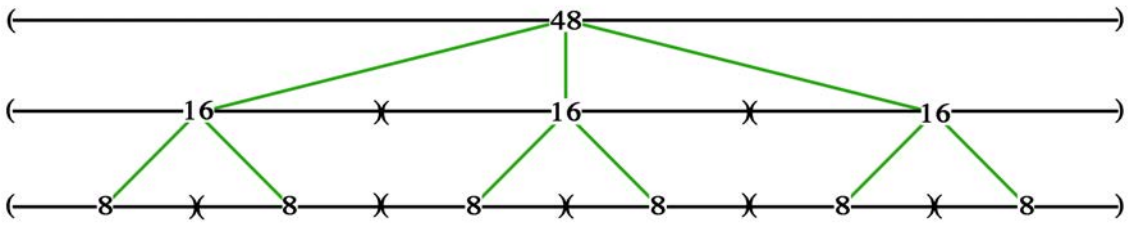


Figure 9. Regular hierarchy for Haydn's exposition

Figure 10 modifies this structure with two syncopations, changing the regular six eight-measure units into an irregular series of six-, eight-, and ten-measure units by means of a syncopation that shifts the beginning of the second period forward two measures and the beginning of the third period back by two measures. Syncopation is similar to expansion in that the shifted spans retain the hierarchical division into smaller units. For instance, the second eight-measure unit is shifted ahead by two

measures, but still divides into two four-measure phrases in the same way as the first eight-measure unit. However, it differs from expansion in that the extra timespan created by the shift is made up for somewhere else (in this case, the truncation of a second phrase that would otherwise occur in the third eight-measure unit). Thus, there is a moment at which the regular hierarchy represented by the stable timespans higher up in the hierarchy is reinforced, creating a salient tension between the lower divisions of the regular hierarchy and those of the shifted timespan. The larger the timespan with respect to the level at which it is shifted, the more "dissonant" this relationship becomes. Figure 10 only presents syncopation at the two-measure level. Haydn incorporates another syncopation at the one-measure level in the third period, pushing the second four-measure phrase back one measure (creating a pair of five-measure phrases). This syncopation within a syncopated span layers the rhythmic tension and creates a sense of heightened destabilization that resolves at the structural cadence of measure 40, thus reconciling tonal and rhythmic instability simultaneously to great effect.

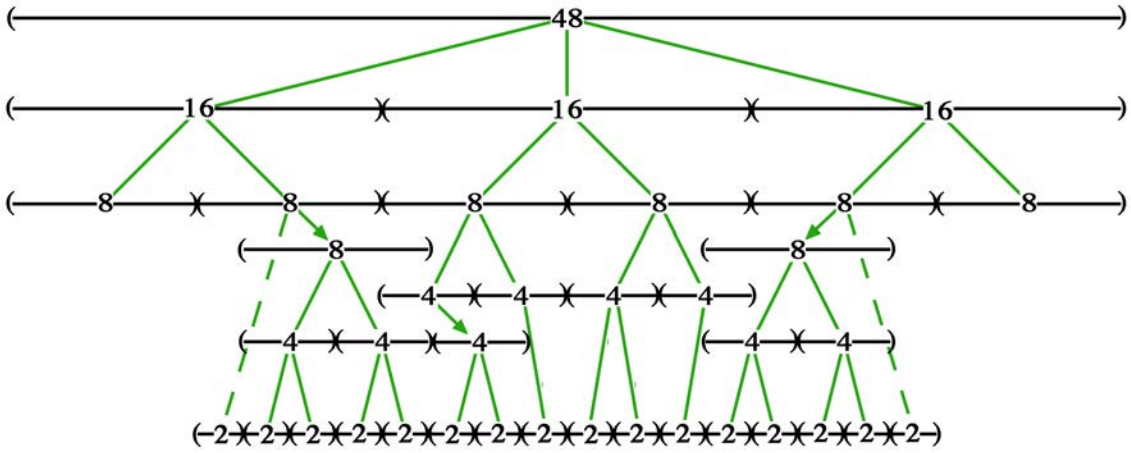


Figure 10. Syncopations at the two-measure level in Haydn's exposition

Haydn's technique of phrase syncopation is an ingenious way of establishing and reinforcing a rhythmic structure and violating it at the same time, producing a vibrant sense of rhythmic play. A similar amount of variation in phrase length by expansion would obscure the regular structure and destroy the overall sense of organization. Syncopation, unlike expansion, gives life to rhythm in the tension created by timespans displaced from a clearly perceived normative structure. This movement is particularly artful in maintaining the clarity of a structure generated by a complex series of syncopations. Haydn achieves this partly by forswearing expansions, although he certainly uses expansion to good effect in other pieces.

Another type of hierarchic organization that can reflect hidden stylistic traits is tonal structure. While Schenkian theory can elucidate tonal structure to some extent, it usually is not precise enough to allow one to draw unbiased conclusions. The hypotheses about the stylistic differences between Bach and Haydn explored below on the basis of a theory of tonal structure has no special regard for Schenkerian orthodoxy (however "orthodox Schenkerism" may be construed).

As a motivation, consider the following flaw of musical notation: a musical note indicates both a timespan and a pitch, giving us coordinated rhythmic and tonal information. However, the musical note coordinates the *wrong* types of rhythmic and tonal objects. A pitch is a *static* tonal object, a point in pitch space. A timespan, on the other hand, is a *dynamic* rhythmic object. It is not a point in time, but a motion from one point in time to another. This unfortunate aspect of music notation has misled most attempts at rigor in the theory of tonal structure. Hierarchies are made up of dynamic objects such as timespans, so tonal hierarchies comparable to the rhythmic ones just illustrated are made up of *tonal motions* (intervals) rather than isolated points in pitch space.

It is possible to illustrate hierarchies of pitch-motions in terms of individual pitches through a mathematical object called the Maximal Outerplanar Graph (MOP).[8] Figure 11 illustrates the MOP for a simple prolongational structure, a dominant prolonging its tonic. The tonic triad (here F major) can be understood as a fifth split symmetrically into two thirds. The three intervals of the triad are drawn as lines between points that stand for pitches. They form a triangle, with the hierarchically prior line drawn above the other two. Note that the symmetry of this relationship depends on thinking of the notes in terms of diatonic step rather than chromatic size—that is, as thirds and fifths rather than major thirds, minor thirds, and perfect fifths. Pitch is also considered irrespective of register, as step-classes rather that steps proper.

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[8] The mathematical explanation for this term is not particularly relevant to the following discussion, but, in brief, the term indicates that (a) the graph can be drawn in a plane in such a way that no edges cross and no nodes are enclosed by edges (outerplanarity) and (b) no edge can be added to the graph without ruining property (a). The following discussion defines the graph class in a different, more relevant, but mathematically equivalent way. For a proof of the equivalence of these and other definitions of this graph class, see Yust, "Formal Models of Prolongation," parts 4 and 5.

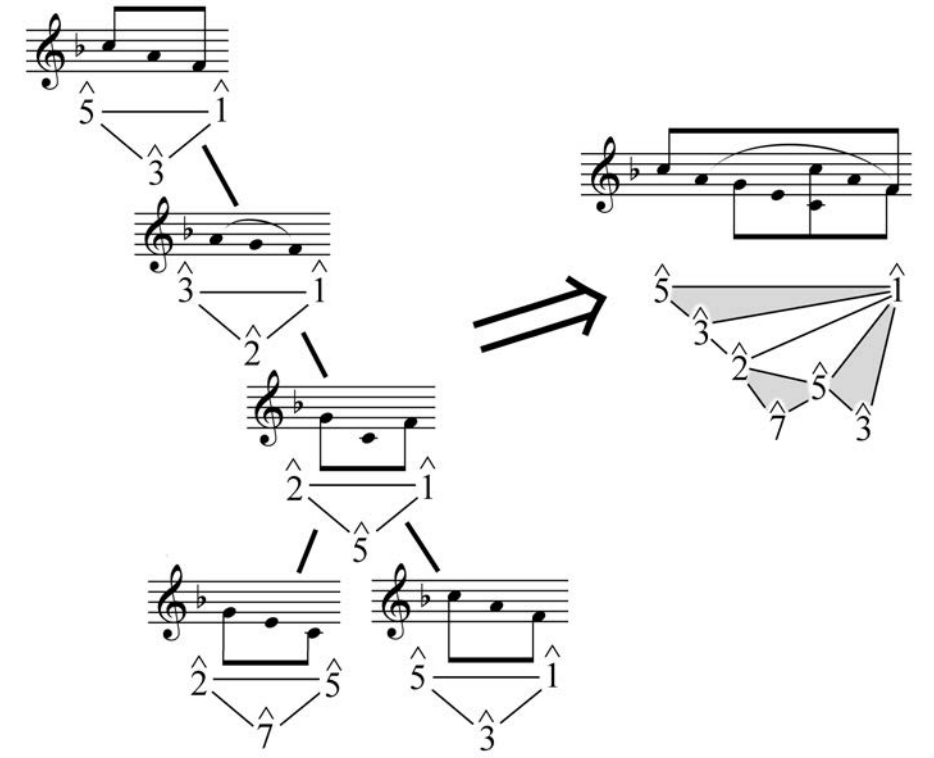

Figure 11. The construction of a MOP representing a dominant prolonging its tonic

Other step-class intervals can be divided in a similar fashion. For example, the lower third of this triad divides into steps, producing a passing motion, a–g–f. Similarly, the step, g-f, splits symmetrically into two fifths, g-c and c-f. Each of these fifths outlines another triad, the dominant and tonic respectively. Notice how three divisions on the same side return us to the same object, a tonic triad. A tree of triads, passing motions, and fifth progressions like this combines to make a single MOP. The triangles of the MOP that correspond to triads are shaded as a notational convenience.

This model of tonal prolongation by symmetrical division is particularly appropriate to the music of Emmanuel Bach. The fifth of the *Pröbestücke* that accompany Bach's *Versuch über die wahre Art das Clavier zu spielen* provides a good example.[9] The exposition is made up of two twelve-measure periods, each moving from the tonic (E major) to the dominant (B major). The MOP in Figure 12 represents the background of the exposition.

[9] Lothar Hoffmann-Erbrecht, ed. (Leipzig: Breitkopf & Härtel, 1957; originally published Berlin: Christian Friedrich Henning, 1753).

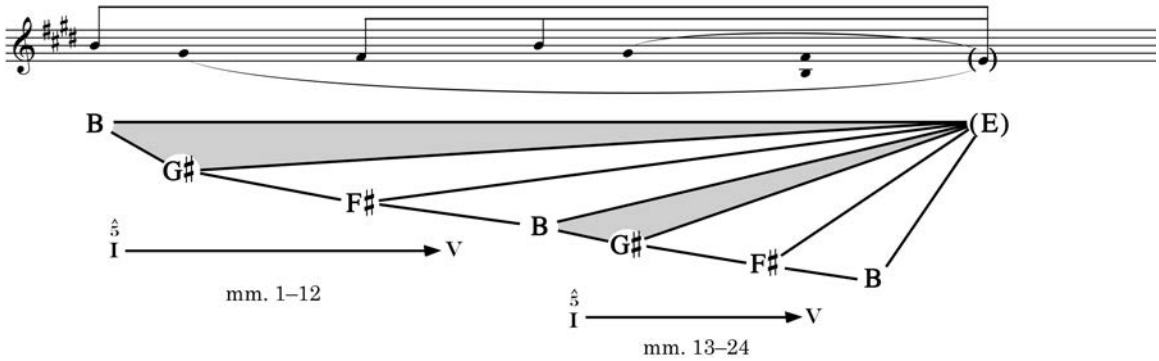

Figure 12. The background of the exposition of C. P. E. Bach's *Pröbestück*, (Wq. 63 no. 5)

This background structure is a typical antecedent motion from tonic to dominant and the expected resolution back to tonic (shown in parentheses). Bach builds a period out of two repetitions of this motion. In the hierarchy, this appears as an embedded repetition, in which the second repetition occurs within the yet-unresolved motion of the first. Note the fan-like graph created by such repetitions. The structure could be expanded arbitrarily without adding any new pitch classes, simply by adding more repetitions of the structure b, g-sharp, f-sharp, (e). This is possible because this set exemplifies a special type of step-class set that includes exactly one set of three step-classes for each type of basic prolongation: a triad (b, g-sharp, e), a passing motion (g-sharp,f-sharp,e), and a fifth progression (f-sharp, b, e). Because the triad in this case is E-major, I call this an "E-major complex."

As we look at the next-lower rungs of this hierarchy, we see some of the distinctive character of Bach's tonal procedure. Figures 13 and 14 add more detail to the basic structure of Example 8 for measures 1–12 and measures 13–24 respectively. In measures 1–3 Bach complements the E-major complex with a step-class inversion that shares the same triad, the E-major co-complex (b, a, g-sharp, e) balancing this right-weighted set with a similarly-structured left-weighted set. In measures 4–9 Bach expands an interval in the middle of the E-major complex, generating some harmonic variety. This basic structure receives further symmetrical elaboration at the surface through a tonal sequence. The period ends with an expansion of the dominant. Notice the elaborated large-scale progression by fifths that takes up most of the passage and evenly divides the time from around measure 3 to measure 12. The music from measure 13 to measure 24 embeds even more substantial contrasting tonal material in the background E-major complex. The complete F-sharp major complex that occurs in measures 14–17 fleetingly suggests a distant key. At the end of the section a lengthy

expansion in B major, balanced between its left and right complexes, gives the impression of a modulation.

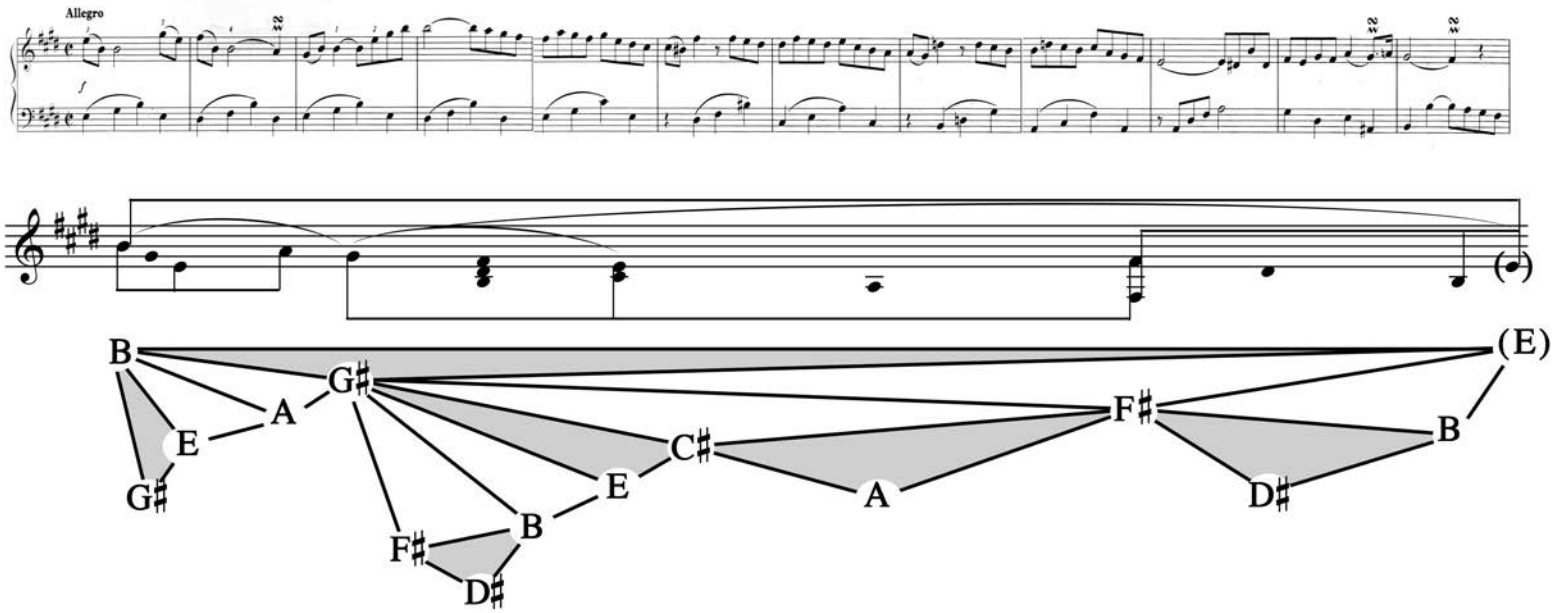

Figure 13. A MOP analysis of measures 1–12 of the *Pröbestück*

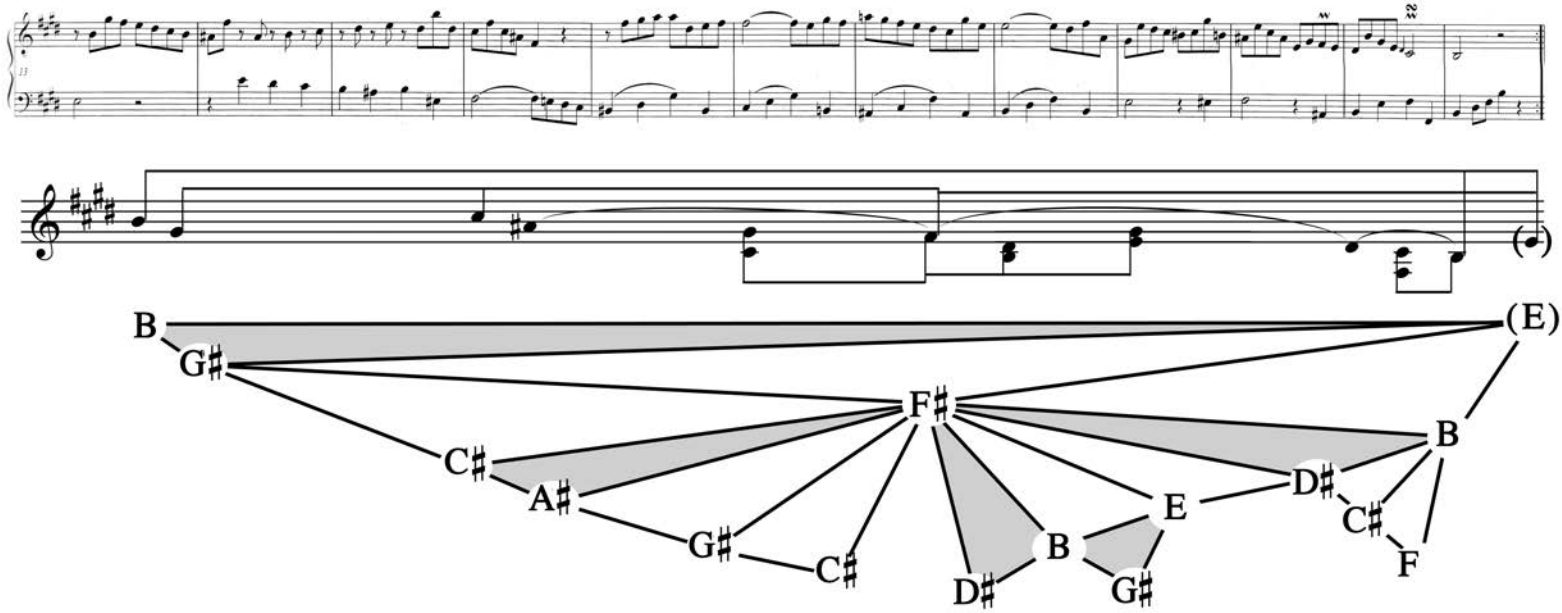

Figure 14. A MOP analysis of measures 13-24 of the *Pröbestück*

Bach's tonal structures exhibit variety and intervallic democracy in their middleground elaborations, giving balanced prolongations of all the intervals of the background structure. As a result, the music visits a number of tonal areas over the course of a section. Bach's middleground elaborations thus resemble the foreground sequences of which he is so fond. A true sequence is a tonal expansion that is perfectly symmetrical over time. Bach's middlegrounds, with a high degree of symmetry, display a similar character. Haydn's deployment of tonal structure could hardly be more different. The antipode to the symmetry of the sequence is the asymmetry of embedded repetition. We saw one example of an embedded repetition in the background of Bach's exposition. The technique creates a fan-like structure in the MOP. Haydn tends to build his material—especially in expositions—with repetition rather than sequence. The first eighteen measures of the third movement of Haydn's Keyboard Sonata in C major (Hob. XVI: 21), analyzed above as an example of Haydn's characteristic use of rhythmic structure, is also a good example of Haydn's characteristic tonal structures (see Figure 15).

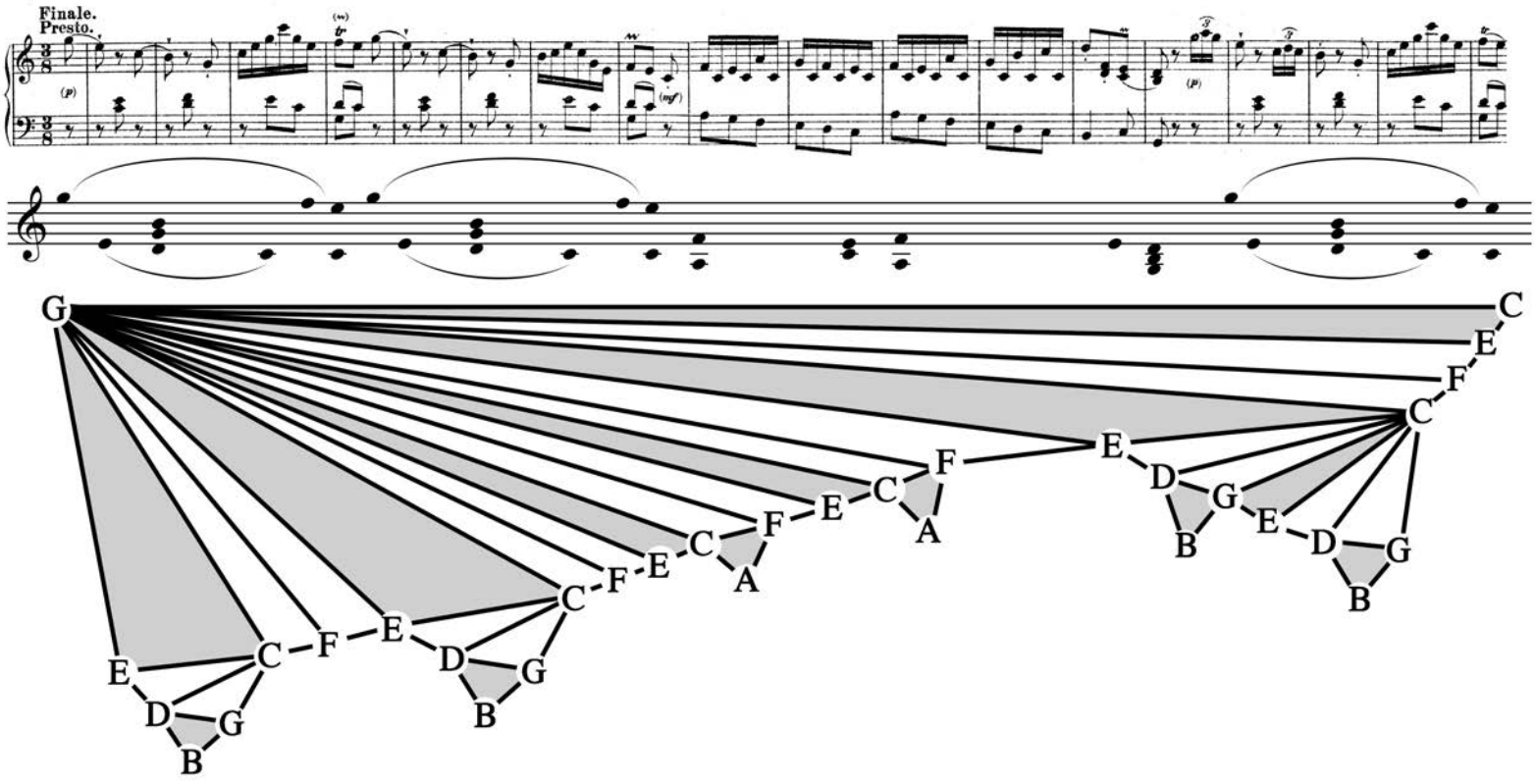

Figure 15. A MOP analysis of the exposition of Haydn's Keyboard Sonata in C Major (Hob. XVI: 21), third movement

The first four measures expand the tonic with a C-major co-complex, elaborated by the dominant of C major. This is then repeated in the next four measures, shown as an embedded repetition in the MOP. The following phrase repeats more of the tonic-to-subdominant motions that create left-weighted co-complexes, adding more folds to the fan. This phrase ends on a half cadence implying a continuation to the tonic. This is a relatively foreground half cadence receiving closure in the following four measure phrase.

In general, the harmony of the period creates an overwhelming orientation to the left. The only respite is a brief right-oriented section where the half cadence occurs. This is a C-major complex, however, so there is no exploration of contrasting tonal areas. This type of construction—with expansive right as well as left orientation—is typical of Haydn's music. He demonstrates a great concern for interesting and dynamic rhythmic structures, and tends to build these tonally out of repetition, whether through explicit repetition or repetition of harmonic patterns. This strongly contrasts with Bach's concern for harmonic variety and relative lack of concern for rhythmic variety.

While these observations might seem obvious and intuitive, formalized concepts are necessary to make them precise. It is only through such rigor and explicitness that we can bring objectivity to the notions of hierarchic structure so admired of Schenkerian analysis, and thereby give stylistic analysis and other domains of inquiry full access to them.