SOME INHERENT AND INHERITED PROPERTIES OF A REFERENTIAL TWELVE-NOTE CONSTRUCT IN THE FIRST MOVEMENT OF BÉLA BARTÓK'S SONATA NO. 1 FOR VIOLIN AND PIANO (1921)

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by

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ABSTRACT

A thorough analysis of Bartók's *Sonata no.1 for Violin and Piano* (1921) will demonstrate how pc hierarchies and regions of relative tonal stability are created despite the work being ultimately controlled by a special inversionally symmetric registral ordering of the aggregate, referred to throughout the essay as ***X***. The various relationships between the aggregate's symmetrical arrangement and other modes of organization, including various transpositionally symmetric (TS) collections, will be explored.

While the possibilities of partitioning ***X*** are numerous, only two will be discussed extensively, as they are featured most prominently throughout the work. These include: i) the use of complementary hexachords, SC(013469) dividing ***X*** in half, and ii) overlapping, interlocking minor-third interval cycles (ic-3 cycles), SC(0369).

Following an introductory chapter that surveys past analyses of this work, chapters two and three put forward the theoretical concepts behind the present analysis. While chapter two contains a discussion of the abstract, inherent properties of the complementary hexachords and some of the ways they are deployed as referential elements, chapter three will discuss those properties of ***X*** that lend themselves to traditional concepts of tonality. Chapter four comprises the analysis portion of the essay, drawing together the various concepts addressed in the previous chapters, showing the formations that result when these concepts are applied, and discussing how these formations contribute to, or contradict various manifestations of tonality in the course of the movement.

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CHAPTER 1

INTRODUCTION

That many of the principles of conventional tonality are operative in Bartók's music is generally undisputed. However, because of Bartók's highly contextual treatment of tonality, discussions focusing on this issue (as with much of the music written around this period) remain unsettled and continue to generate further discussion. Despite continuing efforts made by scholars to research this topic—resulting in a literature of ever expanding proportions—the same few works are repeatedly studied: generally, later works, the exception being the six quartets, which span his entire career. The present analysis approaches this issue with reference to a relatively early (and comparatively neglected) work, the *Sonata no.1 for Violin and Piano* (1921), dating from what has been considered Bartók's Expressionistic period.

While various works dating from this phase (1918–22) demonstrate Bartók's engagement with many of the non-traditional types of pitch centricity that later become emblematic of his music, the influence of his nineteenth-century predecessors remains clearly audible. It is interesting to consider that this work was composed only one year following the publication of his *Melos* article, "Das Problem der neuen Musik," in which he outlines and proposes many ideas and solutions for writing in an *atonal* idiom.[1]

The few scholars who have studied and commented on this work include Malcolm Gillies (2001), János Kárpáti (1982, 1994), Lazlo Somfai (1980), and Paul Wilson (1993). With the possible exception of those offered by Kárpáti, the various analyses are fragmentary and consist, largely, of the briefest of formal descriptions. Wilson, for

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[1] See Béla Bartók, "Problem of New Music," *Essays*. ed. Benjamin Suchoff (London: Faber & Faber, 1976), 455–459.

example, noting Bartók's indebtedness to Liszt (specifically his Sonata in B minor) in the use of thematic transformation, merely regards the first movement as a large ternary form: A, A', A''.[2] The thematic relationships, as will be shown, are considerably more sophisticated.

Second, any discussion of tonality has merely scratched the surface. Bartók's own avowal of a C♯ minor tonality, which is noted by Malcolm Gillies,[3] has perhaps deterred most scholars from exploring any further tonal relationships. Those who have, however, are frequently mistaken. For example, after acknowledging the "seemingly polytonal opposition" between C and C♯ at the very beginning of the movement, Somfai suggests the key of "A minor emerges to temporary dominance at the end of the movement."[4] While A is definitely one of many focal pcs at this point, to assert the key of A minor seems to me unfounded. Paul Wilson, meanwhile, notes the significance of a "complex chord," yet suggests that it only appears at "three crucial junctions in the movement."[5] In fact, the chord identified by Wilson—SC(013469), the same set-class I will also assert as referential—inundates the entire movement on multiple levels. Whereas Wilson's chord is pitch-class specific, comprising only C♯, E, F, G, G♯, and A♯ (and their enharmonic equivalents), the referential set-class discussed in the following essay will appear in all of its transpositions and inversions. Actually, Wilson's referential hexachord turns out to be a transposition of the form I take to be T_0. Where Wilson arrives at his set in an apparently ad hoc fashion, I will demonstrate how this set-class originates as part of a specific registral ordering of all 12 notes of the aggregate.

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[2] Paul Wilson, "Violin Sonatas," in *Bartók Companion,* ed. Malcolm Gillies (London: Faber & Faber, 1993), 247.
[3] Malcolm Gillies, (2001) "Bartók, Béla." *GroveMusic.com* [Online], available: http://www.grovemusic.com/shared/views/article.html; accessed May 19, 2006.
[4] Lázsló Somfai, "Years of Extension, 1922–24," *New Grove Modern Masters: Bartók, Stravinsky, Hindemith* (New York, London: Norton, 1984), 55.
[5] Wilson, "Violin Sonatas," 245.

Finally, while symmetrical constructions are certainly evident throughout the work, only the immediately perceivable occurrences of inversional symmetries have been noted, in other words, only those which participate as merely local phenomena, those not functioning on any deeper structural level.

Kárpáti takes as the basis for his first analysis (1982) Bartók's assertion that traditional tertian structures need not be eliminated entirely from non-traditional contexts.[6] Kárpáti points out that instead of "a quantitative intensification of superimposed thirds," a typical means employed by composers of the nineteenth century, Bartók enriched his vocabulary of tertian harmonies by modifying them "internally," that is, chromatically altering either the root, third and/or fifth, and subsequently destabilizing the perceived acoustic balance of the older sonorities.[7] In the present context, the reliance on tertian structures proves fundamental, according to Kárpáti.

Kárpáti's analysis of the opening measures of the sonata interprets the alternating chords of the piano as a single entity, comprising what he refers to as a "coherent"[8] chain of thirds starting on C♯. While this may seem a completely reasonable assessment, there are some problems with it. Figure 1.1, a representation of the thirds-chain, is taken from Kárpáti, "Tonal Divergences."

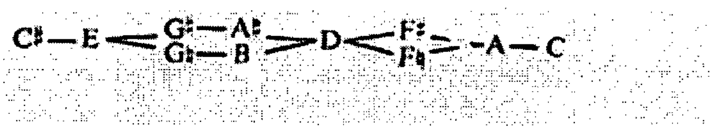

Figure 1.1. Kárpáti's thirds-chain

[6] See János Kárpáti, "Tonal Divergences of Melody and Harmony: A Characteristic Device in Bartók's Musical Language," *Studia Musicologica Academiae Scientiarum Hungaricae* 24 (1982), 373–380.
[7] Ibid., 373.
[8] Ibid.

Kárpáti does not specify the qualities of the stacked thirds that define the chain, only hinting, instead, that various notes—again, not specifying which ones—may be chromatically adjusted to produce major, minor, and even diminished thirds. (note the enharmonic spelling of B♭ as A♯) Hence, Kárpáti refers to certain notes as "dual degrees."[9] Kárpáti's theories on "mistuning" no doubt play a crucial role in his understanding of this passage.[10] When the violin enters in m. 3 on the note C, Kárpáti concludes this as a mere continuation and the "logical successor"[11] along the thirds-chain. The note C is justified as merely a chromatic adjustment of the C♯ "root." Similarly, the violin's grace-note E♭ in m. 4 is interpreted as a chromatic adjustment of E.

A closer look at Kárpáti's thirds-chain reveals a particular symmetry. Pairing the outermost pcs and continuing inwards, the dyads C♯/C, E/A, G/F♯, G♯/F, B/D all share the same pc center of inversion (i.e., C/C♯). Consequently, each dyad may be expressed using the same index of inversion, I1. However, the pc A♯, having no partner, remains unaccounted for. If this chain of thirds is to represent a particular referential collection (Kárpáti avoids using this term), it is highly suspect that it is one note shy of the full aggregate; in other words, an 11-note pc collection! Integral to Bartók's aesthetic—and that of other advanced composers of the time—was the idea of the aggregate as a unit of syntactic completion. Certainly the missing E♭ has its place somewhere in this arrangement; however, where Kárpáti places it—that is beyond the two "extreme points of the chain of thirds"[12]—the symmetrical deployment of the aggregate is destroyed.

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[9] Ibid., 374.

[10] See János Kárpáti, "Tonality and Polytonality – The Phenomenon of Mistuning," in *Bartók's Chamber Music* (Stuyvesant, New York: Pendragon Press, 1994), 185–235.

[11] Kárpáti, "Tonal Divergences," 374.

[12] Ibid., 375.

While Kárpáti makes several astute and highly intuitive observations, his analysis of the first movement, regrettably, does not extend beyond the first three measures of the work.[13]

The analysis offered by Yoko Hirota (1997), more ambitious only in that it attempts to examine the complete movement, is inadequate in treating the musical surface. Hirota contends that the first nine (!) notes of the introductory arpeggio figure define two "distinct harmonic cells,"[14] labelled x and y; x = {C♯, E, G♯, A♯}, y = {G, B, D, F, F♯}. The notes of this collection, identified simply as "a folk mode,"[15] when arranged in scalar order, result in an inversionally symmetric collection around the pc F♯! But, there is no reason to take this mode seriously—after all, already on beat 3 of m. 1, the piano introduces a prominent A5, not accounted for by this mode. I will later refer back to this analysis and point out some minor discrepancies with my formal analysis.

The deficiencies of the analyses mentioned above have provided the motivation for the following essay. By adjusting Kárpáti's analysis, I will show that this work is dominated by a specific ordering of the aggregate, one that is inversionally symmetric. Such inversionally symmetric constructions are essentially stable entities. However, the specific properties of the aggregate as registrally ordered in this movement (to be discussed in a later chapter), allude to harmonic functions typical of common-practice music (i.e., dominant-tonic relationships), thus lending a dynamic to this otherwise static pc construct. These properties, analogous to tonal relationships practiced in more traditional music, promote a hierarchy of specific pitch-classes and may be used to establish regions of tonal stability in an otherwise *atonal* environment.

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[13] Kárpáti includes a second analysis of this work in *Bartók Chamber Music* (293–307), in which he alludes to inversional symmetries. This analysis is also very brief.
[14] Yoko Hirota, "Past and Present Analytical Perspectives on Bartók's 'Sonata for Violin and Piano, No. 1' (1922): Intervallic Profiles in the Works of Experimentalism," *Acta Musicologica* 69/2 (1997), 114.
[15] Ibid.

No doubt, straightforward identification and labelling of pitch symmetries, typically local phenomena, tells little of a work and may hinder one's efforts at developing further insight. The following discussion therefore explores various partitionings of the ordered aggregate, either as sources of tonal meaning (i.e., of pc hierachization) or as the basis for more tonally neutral motivic structuring.

Chapter two presents these partitionings. The first examines the hexachord identified earlier by Paul Wilson, SC(013469), showing in fact that as a registrally ordered set, this same hexachord constitutes the two halves (top and bottom) of the registrally ordered aggregate, each being the inversional complement of the other. A second partitioning involves interlocking diminished seventh chords, thus relating the aggregate to octatonic collections.

While principally conceived as a vertical construct of simultaneous pcs, the referential deployment may also be considered temporally. Specifically, the voice leading between 3- and 4-note subsets comprised by each hexachord will be examined. In this way, the origins of 6- and 8-note subsets of the referential construct will be explained.

Chapter three addresses the concepts of conventional and non-conventional tonality, specifically discussing such ideas as harmonic function and key, both in general and as they may be applied to this work. An evaluation of the theoretical ideas posited by Ernő Lendvai and Paul Wilson leads to a further discussion on the acquired (historically referential) properties apparent in the referential construct, especially those which explicitly reference traditional harmonic functions.

Several analyses constitute the final chapter. An introductory formal analysis sets the tone, expanding on the analyses offered by Kárpáti and others. Unlike previous analysts, I will determine the boundaries of different sections solely on the basis of harmonic considerations. An in depth, bar-by-bar analysis of the exposition and development will then demonstrate the various ways in which particular partitionings of the referential construct successfully assert or stabilize different pc centres, and discuss the ways in which these pc centres are subsequently prolonged.

CHAPTER 2

INHERENT PROPERTIES

"[T]he attempt was made to avoid arrangement of the twelve tones according to certain scalar systems or to attribute to the individual tones greater or less value in conformity with this arrangement, so that use could be made of the individual tones in any optional combination, horizontally as well as vertically, irretraceable to any scalar system. It is true that certain tones in the combination also gain by this procedure a relative predominance; this difference of importance, however, is not based on a certain scale pattern but is the outcome of the occasional combination ... " [16]

Béla Bartók, 1920

2 A Referential Construct

This chapter will explore the *internal* properties of a referential pc construct—a registrally ordered aggregate—referred to subsequently as ***X***. As Richard Cohn writes, determining *internal* properties "requires appealing to no entities outside of the collection itself."[17] By this, Cohn is suggesting a way of looking at pitch materials that does not refer to the concepts of traditional harmony. I will speak of these properties as *inherent*. While I will give some attention, in due course, to specific *tonal* properties of ***X***—since its internal properties both contribute to and negate a sense of traditional tonality—my primary intention in this chapter is to address the symmetric construction of ***X***, the succession of intervals it comprises, some subsets embedded within it, and some ways it can be partitioned.

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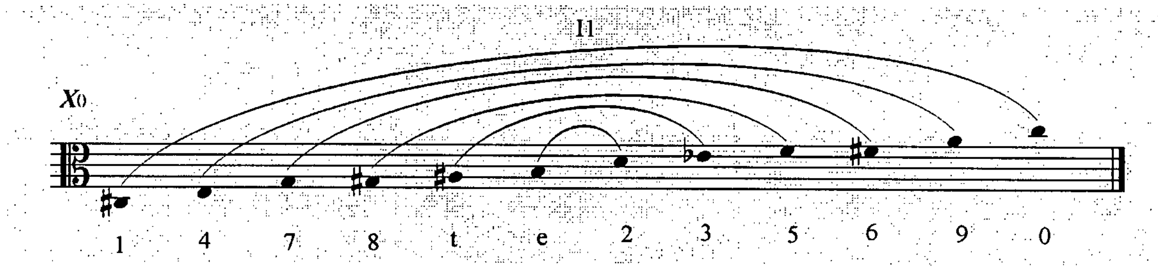
[16] Bela Bartók, "The Problem of the New Music," *Béla Bartók Essays,* ed. B. Suchoff (London: Faber and Faber, 1976), 455–56.
[17] Richard Cohn, "Octatonic Strategies: A Motivic Approach." *Journal of the American Musicological Society* 44/2 (1991): 263.

X, a registral ordering of all 12 pitch-classes (pcs), spans 23 semitones in its most compact form. The ordered interval series of *X* is symmetrical around a central interval of a minor third (in bold), <3 3 1 2 1 **3** 1 2 1 3 3>. Read from low to high (left to right), the pcs comprised by *X* in its referential form are, <C♯, E, G, G♯, A♯, B, D, E♭, F, F♯, A, C>. There are 12 possible transpositions of *X*: T_0 through T_e. For the purposes of the present discussion, the referential form/transposition of *X*—beginning on C♯—will be referred to as X_0; that beginning on D will be X_1, and so on. Any dyad comprising a pc from the bottom half of *X* with its mirror image from the top half will sum to the same index of inversion. As shown in Example 2.1, dyads {C♯/C}, {E/A}, {G/F♯}, {G♯/F}, {A♯/E♭}, and {B/D} all sum to 1 (mod12).



Example 2.1. X_0, inversion around C/C♯, I_1

Because of *X*'s symmetrical construction, there are only six possible indices of inversion (I_1, I_3, I_5, I_7, I_9, I_e). These are all odd integers[18]. Instances throughout the movement where the index of inversion is an even number imply local, surface-level centers of symmetry that do not refer to *X*, the fundamental construct. Any inversion of *X* will result in a transposition, as *X* is itself inversionally symmetrical. For example, the inversion around its lowest pc will transpose *X* up by a minor second.

[18] Odd integers suggest a semitone dyad as the pc centre. Even integers imply inversion around a single pc.

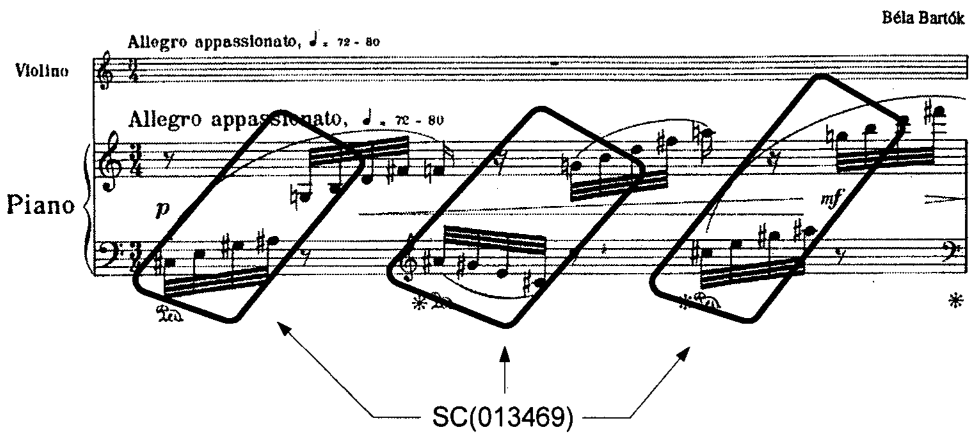
The registral ordering of X, serving as a referential construct, requires that we establish a way of identifying all the positive pitch intervals that are related by octave, especially since the objects of analysis are not interval classes. Therefore, when referring to X_n, I will identify any pairing of two pcs as a pitch-interval class (***p-i c***), which is understood simply as the absolute number of semitones (mod 12) between any two pitches.[19] For example, ***p-i c*** 11 will include pitch intervals 23, 35, and so on. Thus octave multiples of the ***p-i c*** will be implied. If, for example, we take the pitch interval C♯3/B♭3 as it is found in X_0, this will be identified as a ***p-i c*** 9, and not ic-3. Similarly, any pairing of these two pcs, assuming the second pc was registrally higher than the first, will also be identified as a ***p-i c*** 9 (e.g., C♯2/B♭6). In this way, we can make a distinction between {C♯2/B♭6} and {C♯4, B♭3}, in which case the first pair of notes would be understood as a ***p-i c*** 9 and the second pair a ***p-i c*** 3 (in relation to some other X_n).

2.1 Partitioning of X: complementary hexachords SC(013469)

Of the various ways one can partition X, that which corresponds to its symmetrically related halves is most relevant to the present discussion. Two inversionally related, combinatorial hexachords of SC(013469), Forte 6-27, divide X in half. This hexachord features prominently in the music, functioning on various structural levels (often simultaneously). While I assign it special importance as part of X, this hexachord appears in many contexts, variously ordered in time and register. Therefore, I consider it to be a *referential* harmony.[20] As shown in Example 2.2, the first six notes of the movement express this hexachord. It is repeated on every beat of the measure and, as

[19] I would like to acknowledge William E. Benjamin for suggesting this labelling system.
[20] As a referential harmony (013469) is unordered; as part of X, it is registrally ordered.

will be demonstrated, continues to dominate the texture, both horizontally and vertically, throughout the rest of the movement.



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Example 2.2. Sonata for Violin and Piano, m.1

SC(013469) is a subset of a highly potent transpositionally symmetrical (TS) collection: the octatonic collection, SC(0134679A). Further, the two forms of SC(013469) that constitute the bottom and top halves of X come from different octatonic collections. Using the form X_0, Example 2.3 shows how the notes of the lower hexachord (referred to subsequently as **H**) belong to OC2, while those of the lower hexachord (subsequently **h**) belong to OC3.[21] Solid note-heads are shown to complete the respective octatonic collections. Each transposition of X will therefore refer to two of the three octatonic collections much more strongly than the third.

[21] The octatonic collection starting on C/C♯ will be referred to as OC1; that on C♯/D as OC2; and that on D/D♯ as OC3.

Example 2.3. Octatonic subsets, **H** and **h**

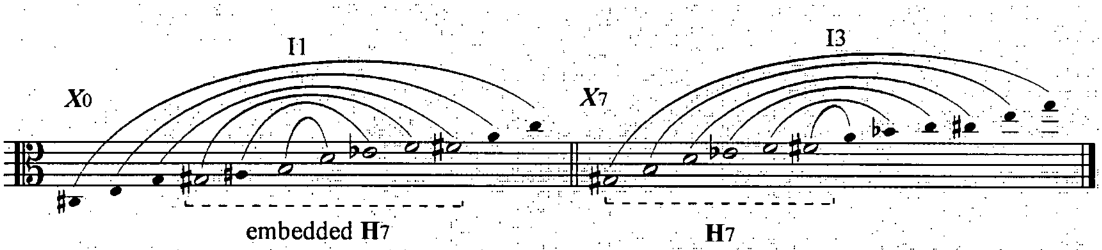
2.1.1 Medial relations and transposition

The pcs needed to complete OC2 and OC3 in the bottom and top halves of X_0 respectively ({D, F} and {B, G♯}), are in each case members of the complementary hexachord. These pcs, however, serve an important function. It is in the nature of ***X*** that the ordered interval series of the lower hexachord (**H**), <3, 3, 1, 2, 1>, is replicated a perfect fifth higher (***p-i c*** 7) in ***X***, beginning on the <G♯, B>-dyad and continuing < D, E♭, F, F♯>. This replication, preserving the registrally ordered intervals, occurs only once in ***X***, since all other transpositions of **H** in ***X*** are unordered relative to **H**'s <3, 3, 1, 2, 1>. Due to the symmetry of ***X***, the ordered interval series of the upper hexachord (**h**), <1, 2, 1, 3, 3>, is replicated a perfect fifth *lower* (***p-i c*** 5) in ***X***, reading as follows, from bottom to top: <G, G♯, A♯, B, D, F>.[22] Thus, <G♯, B> initiates an ordered T_7 of **H**; and < F, D > initiates an ordered T_{-7} (or T_5) of **h**.

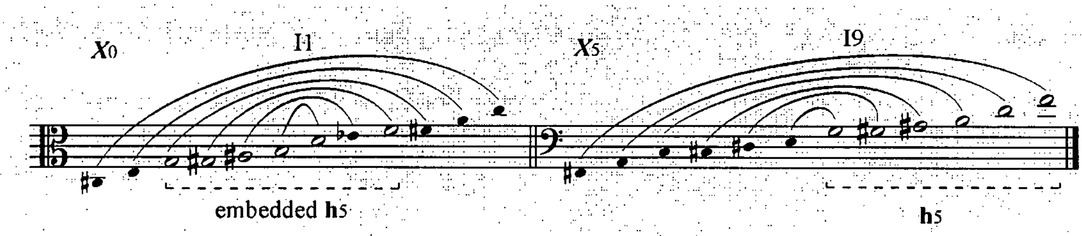
With reference to their position in the middle of ***X***, the T_7 and T_{-7} (or T_5) registrally ordered transpositions of **H** and **h** will be referred to as *medial relatives.* Where contextually relevant, I will refer to these forms as *medial transpositions*. As shown below, the medial relative of **H** (Example 2.4a) may prepare a transposition by T_7 which,

[22] While the lower and upper hexachords (**H** and **h**) are uninterrupted segments of ***X***, their T_7 and T_{-7} equivalents involve one interruption.

in turn, may prepare or anticipate subsequent transpositions of the entire construct by T_7: X_0 prepares X_7, X_7 prepares X_2, and so on (X_n prepares X_{n+7}). Similarly, the medial relative of **H** (Example 2.4b) may prepare a transposition by T_{-7} (T_5) which, in turn, may prepare canonical statements of X at T_{-7}.



Example 2.4a. **H**, embedded within X_0, prepares X_7



Example 2.4b. **h**, embedded within X_0, prepares X_5

An inherent property of X, the medial relation provides an otherwise inert construct with the ability to modulate through all 12 transpositions before returning to its place of origin.

2.2 Partitioning of X: a triple of symmetrically interlocking ic-3 cycles

Having discussed the first way in which to conceive the partitioning of X—that is, through the (inter-)relationship of inversionally symmetric hexachords—we now turn our attention to the second: a triple of symmetrically interlocking interval class (ic) -3 cycles. That all three diminished seventh chords, 0369 tetrachords, may be found within X is of little consequence, given that *X* is an aggregate; however, the registral ordering of each tetrachord within the referential collection is worth considering. (See Figure 2.1, where *X* is represented registrally from left-to-right, angled brackets group hexachords **H** and **h** for comparison) All three diminished seventh chords—indicated by brackets above and below pcs, labelled *i, ii,* and *iii*—appear in close position; the second a perfect fifth higher than the first, and the third a perfect fifth higher than the second. As a result, the lower two notes of the middle tetrachord interlock with the upper two notes of the tetrachord a perfect fifth lower, while the upper two notes of the middle tetrachord interlock with the lower two notes of the tetrachord a perfect fifth higher; each time producing a symmetric 0134 tetrachord.

ii

<C♯, E, G, G♯, A♯, B> <D, E♭, F, F♯, A, C>

i *iii*

Figure 2.1. Partitioning *X* as interlocking ic-3 cycles

This particular arrangement underscores the significance of the interval of the perfect fifth as an important structural determinant (see Chapter ***3.1.2***), and the use of transposition as an important transformation. While the relationship between **H** and **h** can only be understood as inversional, and while that between any **H** or **h** and its medial equivalent is transpositional, the relationship between the 0369 tetrachords may be understood simultaneously as both inversional and transpositional. (The listener, however, may be more inclined to favour hearing these tetrachords as transpositions of one another.) Moreover, **H** and **h** can only suggest or imply the octatonic collections of which they are subsets, while the partitioning of ***X*** into three diminished seventh chords makes the octatonic reference explicit, as a pairing of any two of these results in a complete octatonic collection.

2.3 Near-Invariance of SC(013469)

In addition to medial-hexachord relations, a second method of *modulating* to other centers of inversion is through *nearly-invariant* transposition. A single operation (transposition and/or inversion) on a set-class in which all but one pc of the original set is preserved will be said to possess the *near-invariance* property.[23]

While total pc-invariance under any T_n or I_n operation (except T_0) is not an inherent property of the referential hexachord, certain transpositions preserve the pc content of the original set better than others. Figure 2.2 lists the various transpositions of the referential hexachord, SC(013469). Numbers listed on the second row of the figure indicate the number of common tones retained with each transposition. As is true of all set-classes, the number of pcs held in common under T_n and $T_{12\text{-}n}$ is the same. Under T_1 (and its complement T_e) only two pcs from the original hexachord are preserved, while transposition by T_3 and T_9 preserves 5 out of 6 pcs. The lowest row of the figure lists the degree of *offset*. Numbers in parentheses indicate the number of pcs that disrupt the transpositional invariance property. Therefore, SC(013469) may be regarded as *nearly invariant* under $T_{+/-3}$ with a minimal *offset* of (1), preserving 5 of the original 6 pcs. The high degree of pc-similarity resulting from transposing ***X*** by $T_{+/-3}$ also means that axes of symmetry that differ by a tritone (and inversional indices that differ by 6) will maintain

[23] The terms *"near"* and, later, "offset" are taken from J. Straus (2003). While Straus' *"near-transposition"* and "*near-inversion*" address the issue of parsimonious voice-leading between different set-classes and even sets of different cardinality, *"near-invariance"* is used here simply to describe the product of a single operation (e.g., all voices move by Tn) on a set-class. In the present context, only transposition will be employed.

maximum symmetry between the pc content of their respective $\mathbf{H}_n$ and $\mathbf{h}_n$ hexachords. As well, of course, T_3-related forms of (013469) share membership in the same octatonic collection.

transposition	T1 / Te	T2 / Tt	T3 / T9	T4 / T8	T5 / T7	T6
# of pcs held in common	2	2	5	2	2	4
Offset	(4)	(4)	(1)	(4)	(4)	(2)

Figure 2.2. Near Invariance of hexachord 6-27, SC(013469)

2.4. Voice-leading considerations

The referential construct, ***X***, is inversionally stable with respect to its registral ordering of the full aggregate; ***X*** has not yet been afforded a temporal quality. Recalling, however, that X_n is the union of two inversionally symmetric hexachords ($\mathbf{H}_n$ and $\mathbf{h}_n$), the following discussion will suggest how each hexachord may be conceived as a temporal unfolding of pcs. The first part of this discussion will consider the succession of two transpositionally related tetrachords, while the second part will consider the succession of two trichords of different set-classes.

The voice leading between various subsets within $\mathbf{H}_n$ and $\mathbf{h}_n$ specifically introduces the temporal property necessary to energize ***X***, an inherently static construct. Figure 2.3 represents the voice-leading between the various tetrachords; each tetrachord has been given its own label: ***A, A', B, B'***. (Lines between pcs suggest the voice leading; solid lines with arrows indicate changes of pc; and broken lines indicate common tones.) We may notice that tetrachords ***A*** and ***B*** compose **H**, while tetrachords ***A'*** and ***B'*** compose **h**. We may also note the two eight-note subsets of ***X***, labelled ***M*** and ***N*** respectively.[24]

[24] Please refer to *2.6.2* for the discussion on M and N.

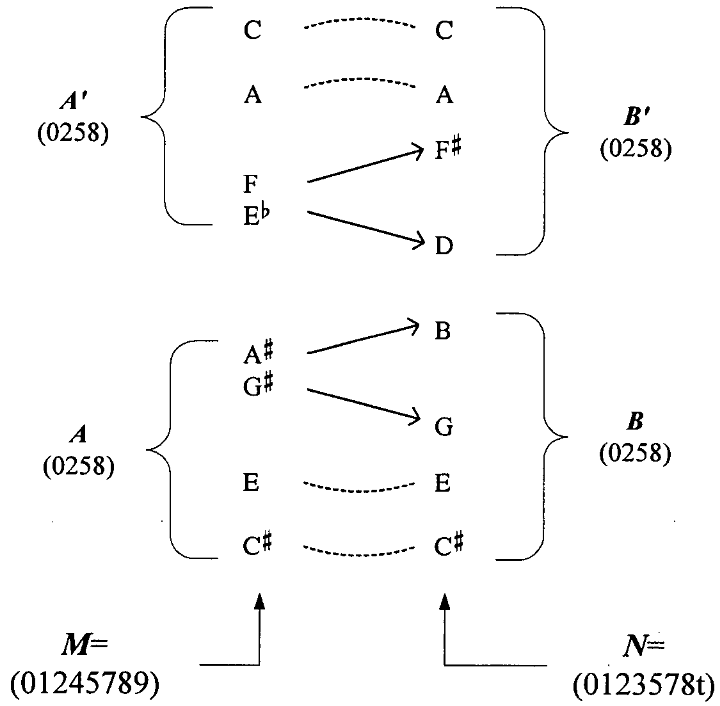


Figure 2.3. Voice-leading graph of transpositionally related SC(0258) subsets, at X_0; 8-note verticalities, M and N

Due to the symmetric construction of ***X***, the voice-leading from ***A*** to ***B*** mirrors the voice-leading from ***A'*** to ***B'***. In both cases, a ***p-i c*** 2 dyad moves in contrary motion to a ***p-i c*** 4 dyad, while the two pcs common to both tetrachords remain in their respective positions. The reader will immediately recognize these tetrachords as traditional dominant sevenths (***A'*** and ***B'***) or half-diminished sevenths (***A*** and ***B***).[25]

Each hexachord can also be conceived temporally as a succession of two trichords. While others are no doubt possible, only two particular successions will be considered, those featured prominently in the score. Figure 2.4 shows the voice-leading between the trichords and also some corresponding six-note subsets of ***X***. As is clearly evident, the voice leading is virtually identical to that which was shown between tetrachords; the only

[25] Please refer to ***3.2.3*** for a discussion on the tonal properties attributed to SC(0258).

exception being that the outermost voices move in contrary motion to one another. Accommodating the changes in cardinality, lower case letters are used to represent trichords. The succession of trichords on the left of the figure, labeled *ab* and *a'b'*, occurs between different set-classes, 025 and 037 respectively. The succession of trichords on the right, labeled *cd* and *c'd'*, occurs between transpositionally related forms of the same set-class, 026.[26] Obviously, transpositions of the same set-class will provide a greater acoustical experience of uniformity than relations between set-classes of a different type. The six-note verticalities implied by these voice leadings between trichords are discussed in section ***2.6.2***.

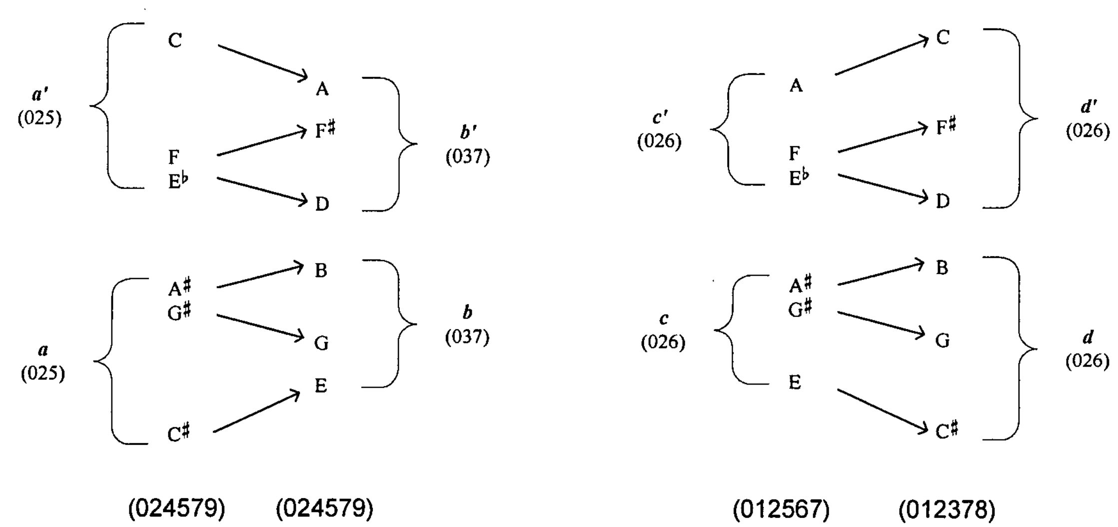


Figure 2.4. Voice-leading graph of trichordal subsets of X_0; 6-note verticalities

The characteristic interval series of X allows one to determine with relative ease which of its transpositions is operative. We may observe any simultaneity (of varying cardinality) with respect to its physical position within X. It must be said that these subsets, being harmonies, may be realized as both registrally ordered and unordered sets;

[26] Section *4.2* will discuss particular instances of SC(026).

those manifesting the original registral ordering will, however, have the most direct association with ***X***. As well, while the subsets I have discussed imply more than one form of ***X*** (and this occurs when modulations to other forms of ***X*** are desired), ambiguities decrease once two or more subsets are considered at the same time.

2.5 Order positions

Before leaving the topic of voice leading entirely, we may observe an expression of the tetrachordal voice leading at a different level of structure. As shown in Figure 2.5*a*, the voice leading from the first to the second tetrachord may be considered in relation to the registral order-positions of $\mathbf{H}_0$. The pcs of (G♯)0258, <C♯ E G♯ A♯>, occupy order positions <<1, 2, 4, 5>> of the hexachord, whereas the pcs of (B)0258, <C♯ E G B>, occupy order positions <<1, 2, 3, 6>>. The pcs specific to each tetrachord are highlighted; order positions 1–6 are marked on the left of the figure. Arrows indicate the voice leading from the {G♯, A♯}-dyad of the first tetrachord to the {G, B}-dyad of the second, while dotted lines connect the common tones shared by the two tetrachords. This voice leading is evident from the very outset of the sonata (see Example 2.2) and remains an important identifier of further statements of ***X*** and its component hexachords.

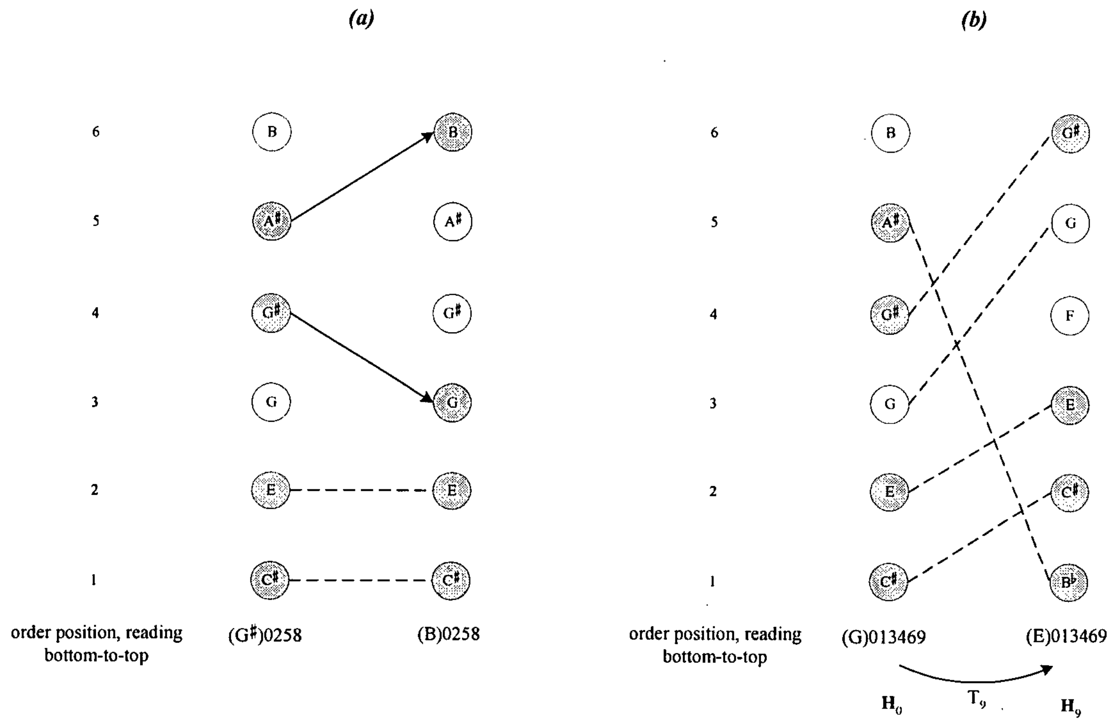
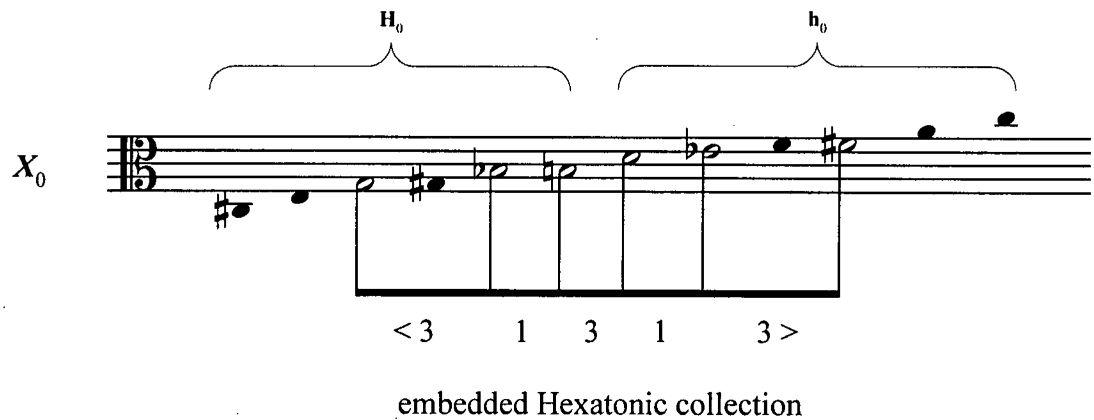


Figure 2.5. Voice leadings and order positions

Reflecting the *near-invariance* property of this hexachord, transposition by $T_{+/-3}$ retains five of the six pcs in the original hexachord. As shown in Figure 2.5*b*, pcs C♯, E, G, G♯, and A♯ are present in both $\mathbf{H}_0$ and $\mathbf{H}_9$. Dotted lines connect each common tone. Interestingly, however, the referential tetrachord {C♯, E, G♯, A♯}, occupying order positions <<1, 2, 4, 5>> in $\mathbf{H}_0$, occupies order positions <<1, 2, 3, 6>> in $\mathbf{H}_9$. These pcs are highlighted by grey fill in Figure 2.5*b*. Thus, the registral ordering of the referential tetrachord in the two forms of $\mathbf{H}_0$ and $\mathbf{H}_9$, reflects a voice leading between the two 0258 tetrachords used within the thematic presentation of $\mathbf{H}_0$.

2.6. The hexatonic collection

In addition to the octatonic collection, the hexatonic collection (HC) also features prominently throughout the work.[27] The *prime* form of the hexatonic collection—that is, as a registrally ordered interval series, <3, 1, 3, 1, 3>—occurs only once in ***X***, order positions <<3, 5, 6, 7, 8, 10>>; all other instances of the hexatonic collection are ordered differently in ***X***, and are much less nearly contiguous. As demonstrated in Example 2.5, this single manifestation is embedded symmetrically within $\boldsymbol{X}_0$: <G, B♭, B, D, E♭, F♯>.[28] This series extracts pcs from both referential hexachords equally: the first three pcs, SC(014),[29] are members of $\mathbf{H}_0$, while the next three are members of $\mathbf{h}_0$. The first note of this series, G, is related to the lowest note of the referential collection, $\boldsymbol{X}_0$, by tritone.



Example 2.5. Embedded Hexatonic Collection (HC) at $\boldsymbol{X}_0$

[27] An extensive discussion on the properties of augmented triads and hexatonic collections is beyond the scope of the present essay, therefore, the reader is directed to three articles by Richard Cohn (1996, 1998 and 2000).

[28] Its symmetric complement, <C♯, E, G♯, F, A, C>, has the registrally ordered interval series: <3, 4, 9, 4, 3>.

[29] This set-class is an inherent property shared by both the octatonic and hexatonic collections. It is also used as the main motive of the work.

2.6.1 Non-octatonic subsets

While the abovementioned symmetrical collections are expressed either explicitly or implicitly within ***X***, other, less familiar symmetrical collections may also be derived. These arise as verticalities resulting from the various voice leadings between tetrachordal and trichordal subsets. Any tetrachord in Figure 2.3, (***A, A', B, B'***), may be paired with any one of the other three. Due to pc duplications among the tetrachords, the cardinality of the resulting subsets will be either 6 or 8 depending on which tetrachords are paired. Only those pairings relevant to the score will be considered.

As we have already observed the pairing of tetrachords ***AB*** and ***A'B'***, yielding $\mathbf{H}_n$ and $\mathbf{h}_n$ respectively, we will now consider the union of tetrachords resulting in the 8-note symmetrical collections ***M*** and ***N***. (See Figure 2.3.)

The first collection to be discussed, SC(01245789), results from the union of tetrachords ***A*** and ***A'***. One way of thinking of this is as an expression and simultaneous enrichment of a major-major seventh chord. For this reason, this collection is assigned the label ***M***; the complement of (01245789) also happens to be (0158), the major-major seventh chord. As a subset of ***X***, the ordered interval series of this collection appears as: <3, 4, 2, 5, 2, 4, 3>. However, for the purposes of this discussion ***M*** is presented in its most compact form. (See Figure 2.6.)

I1

A A' = M   <G♯, A, A♯,C, C♯, E♭, E, F, >

Figure 2.6. ***M*** of X_0, represented in prime form of SC(01245789)

In this representation of ***M***, the union of the boundary pcs {G♯, F} and the axial pcs {C, C♯} compose a form of SC(0158). Within X_0, however, this set appears as <C♯, G♯, F, C>, with an ordered interval series <7, 9, 7>. As an aggregate, X_n comprises all possible forms of 0158; however, we may note three specific registrally ordered transpositions of this set-class in addition to the one just mentioned, <C♯, G♯, F, C>. Each form involves the symmetrical ordering <4, 3, 4>, the roots of which all lie along the chain of minor thirds initiated by C♯. In other words, root position major-major seventh chords appear on the pcs C♯, E, G, and B♭. Thus, along with the ordered set on C♯, the following ordered sets are found in X_0: <E, G♯, B, D♯>, <G, B, D, F♯>, <B♭, D, F, A>. Of these three sets, <G, B, D, F♯> is especially important: First, it too is an interval couple with respect to I_1—{G, F♯}, {B, D}; and second, the pcs comprising this form are the complementary pcs with respect to ***M*** as represented above.

A second 8-note collection, SC(0123578t), presented as Figure 2.7, results from pairing tetrachords ***B*** and ***B'***. We will refer to this subset as ***N***.

I1

G major

B B'* = *N <C♯, D, E, F♯, G, A, B, C> <C♯, D, E, F♯, G, A, B, C>

D major

Figure 2.7. *N* of X_0, superposition of diatonic collections

Leaving aside its registral ordering in X_0, *N* is shown here as a diatonic +1 collection; that is, an 8-member segment of the cycle of fifths. In scalar form, this collection is understood simply as a combination of tones and semitones, in which a different letter name is assigned to each pitch, with the exception (in this instance) of the two versions of C. The boundary pcs {C♯, C} and axial pcs {F♯, G} compose SC(0167).[30] As shown on the right of the example and marked in brackets, this collection is the union of two diatonic scales related by a perfect fifth: G major and D major.[31] Needless to say, a conventional use of diatonicism is clearly absent throughout this work; instead, these observations are intended to alert the reader to the potent fifth relations inherent in these symmetrical collections and which, as will be shown, are used to their advantage at various crucial moments in the sonata movement.

While other pairings are possible—specifically, ***AB'*** and ***BA'***— these do not feature prominently in the music and therefore will not be discussed.

2.6.2 6-note symmetrical collections

Figure 2.4 (p. 18) demonstrated parsimonious voice-leading between trichords. While the trichords constituting ***aa'*** differ from the trichords constituting ***bb'***, the six-note symmetrical collections resulting from their union are identical: SC(024579). Set-class labels are indicated below all such six-note subsets in Figure 2.4. Arranged in scalar formation, the most compact form of the hexachord ***aa'*** is: <G♯, A♯, C, C♯, E♭, F>, the well-known diatonic hexachord. We may regard this collection in one of two ways: first, as an incomplete C♯ major scale missing scale-degree 4 (e.g., <C♯, D♯, E♯, G♯, A♯, B♯>); second, as an incomplete G♯ major scale (note the fifth relation) missing scale-degree 7. The hexachord ***bb'*** may be regarded similarly: as scale-degrees <1, 2, 3, 5, 6, 7> of G major, <G, A, B, D, E, F♯> or <1, 2, 3, 4, 5, 6> of D major. Significantly, the collection ***bb'*** is a T_6 transposition of ***aa'***.

[30] Leo Trietler labels this symmetrical tetrachord cell-Z, following George Perle who assigned the labels X and Y to two other symmetrical tetrachords, (0123) and (0246) respectively.
[31] For a discussion on this eight-note diatonic collection please see refer to Cohn (1991), "Bartók's Octatonic Strategies," 265.

Despite their equivalence as scalar formations, the two hexachords are very different when viewed as ordered sets. Specifically, ***bb'*** is a series of alternating major and minor thirds; its registrally ordered interval series (i.e., its order of ***p-i cs***) reads: <3, 4, 3, 4, 3>, whereas ***aa'*** comprises: <7, 2, 5, 2, 7>.

While ***N*** is the union of two fifth-related diatonic collections, ***bb'*** is the union of two fifth-related pentatonic collections: <C♯, E♭, F, G♯, A♯> and <G♯, A♯, C, E♭, F>.

The second succession of trichords shown in Figure 2.4 yields considerably different 6-note combinations; the unions ***cc'*** and ***dd'*** result in different set-classes, SC(012567) and (012378) respectively. These two set-classes place emphasis, respectively, on clusters of semitones and on the interval of the perfect fifth.

CHAPTER 3

INHERITED PROPERTIES

"There was a time when I thought I was approaching a species of twelve-tone music. Yet even in works of that period the ***absolute tonal foundation*** *is* ***unmistakable****."*[32]

Béla Bartók, 1928

3.1 'Chords of older tonal phrasing'

The previous chapter focused on the internal, *inherent* properties of the referential construct, ***X***: its symmetrical construction, the distribution of intervals within it, and its component hexachords and tetrachords. The present discussion, influenced by the writings of several theorists, will present the various concepts of conventional and non-conventional tonality relevant to the analysis portion of this essay. These include definitions of such concepts as tonic, dominant, harmonic function, and key to name but a few. Special attention will be given to the referential construct, specifically its properties hereinafter referred to as *inherited* (i.e., those that can be seen as referring to the concepts and traditions of the common-practice period).[33] It is through such properties that the "absolute tonal foundation" of which Bartók speaks is made explicit.

Bartók maintained that the mere presence of "chords of older tonal phrasing," (i.e., isolated triads of the diatonic scale) within an atonal context would not automatically define a work as tonal in a traditional sense.[34] But in fact, in this work the frequent use and strategic placement of particular *chords of older tonal phrasing* occur almost

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[32] Bartók, "The Folk Songs of Hungary," *Béla Bartók Essays*, 338–339. Emphasis added.
[33] Richard Cohn uses the term *external* to explain those properties which "depend on a relationship to other entities and concepts that bear prior privileged status in the musical tradition." See Cohn, "Bartók's Octatonic Strategies," 263.
[34] Bartók, *Béla Bartók Essays*, 457–58.

exclusively for the purpose of establishing tonal centres. In effect, traditional harmonies, when they do appear—however obscured by other non-traditional elements—are used in a traditional context, serving an unequivocal tonal function.

However subtly they may occur, the incorporation of inherited properties within an atonal environment creates a certain recognizable tension. Because of their unpredictability and relative infrequency, it is as if the tonal properties become increasingly problematic in an otherwise overriding atonal surrounding. However, our greater familiarity with these tonal properties reverses their respective roles; it is safe to argue that we perceive the tonally stable environment (albeit unpredictable and evanescent) as affected, disrupted by its atonal counterpart. As many scholars have already noted, recognizing and understanding the co-existence and interaction of these radically incongruent (traditional and non-traditional) principles is a vital part of any theory addressing the music of the early twentieth century.

Of the various non-traditional elements at play in this work, the present discussion limits itself to the principle of symmetry. Symmetry (especially in the music of Bartók) is often attributed tonal significance because of its power to direct the listener towards a particular pc or pair of pcs. Elliott Antokoletz has pointed out that, while the use of traditional major and minor scales contributes toward establishing a sense of tonality, symmetrical collections "tend to negate those properties," and instead contribute toward "a new sense of pitch-class priority."[35] Antokoletz thus introduces the concept of a *tonal center* in which: i) a pc is indicated as the primary tone, achieved through any number of contextual, surface level means (e.g., dynamics, articulation, duration, and so on), and/or ii) a given sonic area is established by the symmetrical arrangement of a collection of pcs

[35] Elliott Antokoletz, *The Music of Béla Bartók: A Study of Tonality and Progression in Twentieth-Century Music* (Berkley: University of California Press, 1984), 138.

around such a centre. We may regard Antokoletz's concept of a tonal center as referring to two interacting ways of establishing a *contextual* tonality, redefined with each piece.

While symmetry controls much of the music of this movement, even on various structural levels, traditional properties long associated with music of the common-practice are also evident and, moreover, appear at crucial structural intersections, helping define the formal properties of the sonata. Consequently, two different principles of tonality (one traditional, the other contextual) are simultaneously at work and it is my intention to interrelate and reconcile the actions of these two conflicting principles.

Recognizing the need for a more broadly conceived definition of tonality as it relates to twentieth-century music in general and the music of Bartók in particular, and considering the co-existence of both traditional and non-traditional principles in this music, Charles Morrison defines tonality as, "any principle or set of principles by which a particular PC or PC complex (i.e., a referential element) is established as primary in a given context and whose primacy is maintained at a particular level of structure."[36] I will adopt this definition for the present purposes. I will further demonstrate how the principles used to establish the primacy of a particular pc are still rooted, to a significant degree, in traditional diatonic harmony.

It is generally undisputed that Bartók preserved many of the principles associated with the nineteenth century musical tradition.[37] This is evident in his treatment of referential harmonic resources, which are frequently tertian in structure and often appear in conventional, functional contexts. Morrison, in his analysis of the six quartets, shows how the basic principles of progression and prolongation, fundamental to our

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[36] Charles D. Morrison, "Interactions of Conventional and Nonconventional Tonal Determinants in the String Quartets of Béla Bartók" (Ph.D. diss., University of British Columbia, 1987), 18.
[37] A list of such 19th-century properties would include: irregular resolution, continuous tonal fluctuation, multiple tonal implication, tonal ambiguity, modal mixture, and harmonic substitution. (See Morrison, 193.)

understanding of common-practice music, are comparably applicable when studying the music of Bartók. Here, "progression" may be understood simply to involve contiguous, adjacent events, leading directly from one to another, while "prolongation" involves temporally expanded events, all of which are regarded under a single unified event, the last of which is perceived as the principal event. Incorporating the principles asserted by Heinrich Schenker, Morrison further suggests ways in which tertian structures, as well as other "referential elements,"[38] may be heard and comprehended as prolonged at the foreground and on levels of larger scale, suggesting the simultaneous operation of various levels of harmonic structure. Morrison refers to progressions and prolongations which occur on the surface of the music (and are, therefore, readily perceivable) as foreground events, while he refers to those which are typically non-contiguous and frequently elaborated by intervening pitch and pc events as mid-level events.[39] In his view, while large-scale prolongations provide tonal unity over even longer sections; they have admittedly an "uncertain perceptual identity in the actual experience."[40]

Throughout his analyses, and especially in a later analysis of the Fourth String Quartet (1992),[41] Morrison explores and evaluates Bartók's extensive use of the perfect fifth. Morrison demonstrates how conventional dominant-tonic progressions, imitative thematic entries, linear progressions and unfoldings, and extended progressions along

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[38] Morrison defines a *referential element* as: "The analogue of a conventional tonic triad." (202) In other words, the term is reserved for non-triadic structures, contextually defined sonorities recognized as the principal "point of reference," all other sonorities in relation assuming less significance. Morrison is careful to point out that the "element" may assume various "sonorous qualities." However disparate these qualities may be, they may all easily be associated with or referred back to a common pc or complex of pcs.
[39] Morrison, *Interactions*, 29n.
[40] Ibid., 164.
[41] Charles D. Morrison, "Fifth Progressions in Bartok: Structural Determinants or Mimcry?" *Studia Musicologica Academiae Scientiarum Hungaricae* 34 (1992).

descending circles of fifths, enable the perfect fifth to serve as a "structural determinant."[42]

The present discussion recognizes the significance of the perfect fifth and correspondingly assigns it a similar role. Thus I will demonstrate how fifth relations, understandable as dominant-tonic relations, are frequently employed to articulate formal divisions within in the work, how they are used to establish secondary centers of tonality, and how the succession of established tonal centers alludes to the dynamic relationship between, and hierarchical structuring of, tonal centers in the traditional *sonata-allegro* form.

3.1.1 Fifth relations

As demonstrated earlier, the perfect fifth is an important property of ***X***. This property is underscored when ***X*** is expressed as a sequence of interlocking ic-3 cycles; each 0369 tetrachord is replicated at the interval of a perfect fifth. While ***X*** has been conceived as a construction of simultaneous pcs, we may also regard this temporally. Thus, the perfect fifths that link corresponding members of those ic-3 cycles (e.g., <C♯, G♯, D♯>, <E, B, F♯>, and so on) may be heard either as ascending or descending 3-member segments along the cycle of fifths: descending fifths evoking a V – I root progression, suggesting motion toward a tonic; ascending fifths suggesting motion away from a tonic.

The importance of the perfect fifth was further alluded to in the discussion pertaining to the referential hexachords and their respective medial forms. The referential hexachords, **H** and **h**, are reproduced, appearing in their registrally ordered form, once

[42]Ibid., 126.

within X. These reproductions, which I have identified as medial relatives, are transpositions by perfect fifth (above and below respectively). This transpositional relationship has the potential to shift the tonal orientation from one pc centre to another in a way analogous to fifth relations in more traditional contexts.

Earlier, we recognized that $\mathbf{H}_n$ and $\mathbf{h}_n$ are subsets of two different octatonic collections. As any two octatonic collections can be represented as related by perfect fifth, one can be heard as the *dominant* while the other is heard as the *tonic*. Due to their respective octatonic affiliations, $\mathbf{H}_n$ and $\mathbf{h}_n$ provide the referential collection with a latent dominant-tonic dynamic. In this context, $\mathbf{h}_n$ functions as a dominant, while $\mathbf{H}_n$ functions as a tonic.

3.2 Ernő Lendvai and Axis System

Such observations lead inevitably to a discussion of the highly influential theoretical writings of Ernő Lendvai, specifically those writings relating to his theory of axis symmetry.[43] Essentially an analogue of traditional harmony, Lendvai's theory extends the same "functional affinities"[44] (i.e., *tonic*, *dominant*, and *subdominant*) over all twelve notes of the aggregate. Lendvai bases his theory on the principle of relative equivalence, that is, "the kinship between keys of the same key-signature,"[45] which leads him to affirm that all pcs along the same ic-3 cycle serve one and the same harmonic function. Crucial to this theory is the concept of *relative and counterpole substitution.* According to Lendvai, tonal centres (i.e., those which lie along a minor-third axis), may be used interchangeably without affecting harmonic function; that is, their harmonic

[43] See Ernő Lendvai, *The Workshop of Bartók and Kodály* (Budapest: Musica Editio, 1983), 269-317.
[44] Ibid., 272.
[45] Ibid., 270.

function is identical.[46] For example, in the key-scheme A, C♯, F, A (arbitrarily assigning A as tonic), one would note the following harmonic relationship: *tonic-dominant-subdominant-tonic*. The key of C♯ (belonging to the axis comprising C♯, E, G, B♭) substitutes for the traditional dominant, E, while F (a member of the axis comprising F, A♭, B, D) substitutes for the traditional subdominant, D. Each key may be substituted for by any other along the minor-third axis. The flexibility of this theory suggests the same harmonic relationship would result using any combination of acceptable substitutions.

These same relationships may be applied to the registrally ordered 0369 tetrachords comprising ***X***. (Refer to Figure 2.2.) For example, we may regard all members of tetrachord *i*, pcs {C♯, E, G, B♭}, as belonging to the *tonic axis*, thus determining all members of *ii*, pcs {G♯, B, D, F}, as belonging to the *dominant axis*, and all members of *iii*, pcs {E♭, F♯, A, C}, the *subdominant axis*.

Before going further, a few problems with Lendvai's theory are worth considering. First, it must be noted that Lendvai's concept of equivalence is not a perceptual equivalence. While he maintains his theory is based on acoustic relationships, Lendvai's theory is, in fact, based solely on context. This is reflected in its inconsistent application in his analyses; invoked only when it suits his needs and ignored when it does not.

Second, despite maintaining functional equivalence among all pcs along each minor-third axis, Lendvai introduces the notion of "main" and "secondary" *branches* within each axis.[47] This finer distinction in fact contradicts Lendvai's earlier claims, and, as Paul Wilson has noted, implies "functional difference," privilege obviously being accorded to the main branch.[48] Finally, to cite Wilson again, assigning functional labels

[46] Ibid., 275.
[47] Lendvai, *Workshop*, 310.
[48] For a critical analysis of Lendvai's axis system see Paul Wilson, *Music of Béla Bartók* (New Haven: Yale University Press, 1992), 203–208. Considering the importance of pc centricity in Bartók's work, the

to these axes "adds nothing to one's understanding of the musical roles these structures perform."[49] Wilson cautions the reader, claiming: "[Lendvai's axis system] provides no understanding of ***function*** that a careful examination of context will not reveal, and his handling of the system actually can conceal intelligible and musically meaningful relationships."[50]

Alerted to these concerns, I will only very loosely apply Lendvai's theory in the present analyses. As it is such a loaded term, "function" will not hold the same weight in the following discussion as it would in a more traditional context. The concepts of dominant and subdominant are difficult to assert in an inversionally symmetric space. Having said that, we may, because of Bartók's retention of traditional principles of tonality, still find instances where the harmonic function is unequivocal.

It is necessary, therefore, that we recognize Lendvai's theory as a hierarchical system not identical, but analogous, to traditional harmony. As each tonal plane (Lendvai's tonic, dominant, and subdominant) may be expressed by any one of four different pcs along a minor-third axis, four different tonicizations are possible within each plane, all being regarded as equivalent. We may regard tonicizations of the four *tonic*-related pcs as "first-order tonicizations", those of the *dominant*-related pcs as "second-order", and those of the *subdominant*-related pcs as "third-order," since the subdominant is equivalent, in 3-cylce terms, to the dominant of the dominant.

Within each order, a further distinction may be made. As centres of inversion, tritone related pcs (or pc-pairs) determine the same index of inversion and, therefore, the same collection of symmetrical dyads. Minor-third related pcs do not. Thus, according

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concept of branches seems (at least to me) crucial—and therefore not a problem—since pc centres related by tritone share the same index of inversion, while those related by ic-3 do not.

49 Ibid., 208

50 Ibid., 208. Emphasis added.

to Lendvai's system, pc centres related by tritone—compared to pc centres related by minor third—are privileged and assigned higher status.

3.2.1 Tonic function

Tailoring Lendvai's overly general ideas to the case at hand, I will regard $\mathbf{H}_0$ and all subsets of $\mathbf{H}_0$ —in fact, any reference to OC2—as having tonic function at the global level. The prevalence of major and minor thirds imparts this referential harmony with strong tonal qualities. All of its tertian harmonies, with the exception of the dyad {G♯, B}, have their roots along the C♯ minor-third axis. As regards the major and minor triads realizable within $\mathbf{H}_0$, only the minor form may be constructed above C♯, while both major and minor forms may be built above E.[51] Dyads representing the "roots" and "thirds" (of potential triads) may be built on pcs G and B♭—the former suggesting major, the latter minor.

However, other triadic structures compromise the relative harmonic stability suggested by these traditional harmonies. Let us revisit the voice-leading graph of Figure 2.4 (p. 18) in which trichord ***a*** represents SC(025) and trichord ***b*** represents SC(037). Due to the intervallic structure of each trichord, ***a*** is perceived as acoustically less stable in comparison to ***b***; the former involving an interval of a major second, while the latter consists of only major and minor thirds. From this, we may conclude that the progression from the first trichord to the next is essential analogous to a move from a dissonance to a consonance. Consequently, while we may regard all subsets of $\mathbf{H}_n$ as fundamentally tonic, not all subsets are necessarily "consonant," (i.e., equally stable).

[51] Incapable of promoting harmonic stability (in the traditional sense), diminished triads and fully diminished tetrachords may be built on all pcs along the minor-third axis, making them virtually indistinguishable. Thus no mention yet will be made of these chords.

As demonstrated in Figure 2.3 (p. 17), tetrachords ***A*** and ***B*** belong to SC(0258). While each tetrachord belongs to the same set-class, the registral ordering of each tetrachord refers to different inherited tonal qualities. The registral ordering of tetrachord ***A*** reads as a minor triad with an added major sixth (the *sixte ajoutée*), while the ordering of ***B*** is more suggestive of a root-position half-diminished seventh. Of course, free treatment involving the registral ordering of pcs may reverse these relationships; ***A*** may be expressed as the half-diminished seventh, just as ***B*** may be expressed as the *sixte ajoutée*. This tetrachord, SC(0258), in all its manifestations, will be included among the roster of *referential* harmonies.

Despite the added dissonance of the major sixth, the harmonic stability of ***A*** may still be perceived and its "tonic" affiliation is not significantly jeopardized. Ascribing tonic function to ***B***, heard as a half-diminished seventh, is problematic from a traditional standpoint since, as such, it can only have dominant or predominant functions.[52] But viewed as a minor triad built on E with an added major sixth (e.g., {E, G, B, C♯}), ***B*** may be regarded as harmonically stable. Furthermore, as its "root" falls along the tonic axis it lies in a relation of octatonic equivalence with the same chord type built on C♯, a minor third below. Thus, we may legitimately assert tonic function for ***B***.

The tonic function of ***B*** will emerge or recede depending on its registral ordering in pitch space. As will be demonstrated, Bartók exploits the ambiguity surrounding this chord, often using the tonic *sixte ajoutée* as a pivoting element, in effect, making a dominant (half-diminished seventh) out of a tonic.[53]

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[52] While labelled by Lendvai as the "subminor," the half-diminished seventh chord, the intervallic mirror-image of the dominant seventh, has a long tradition in late nineteenth- and early twentieth-century music (including that of Bartók), during which time it was commonly used as a substitute for the traditional dominant seventh chord. For a discussion on the principles behind this theory, see Lendvai, *Workshop*, 279–283.

[53] See for example the discussion pertaining to the end of the first theme-group (specifically m. 54), chapter ***4.2***.

3.2.2 Dominant function

We may similarly note the inherited properties of $\mathbf{h}_n$. Complementing the tonal properties of $\mathbf{H}_n$, the dominant-referring subsets of $\mathbf{h}_n$ arise through the voice-leading between the various subsets comprising that hexachord.

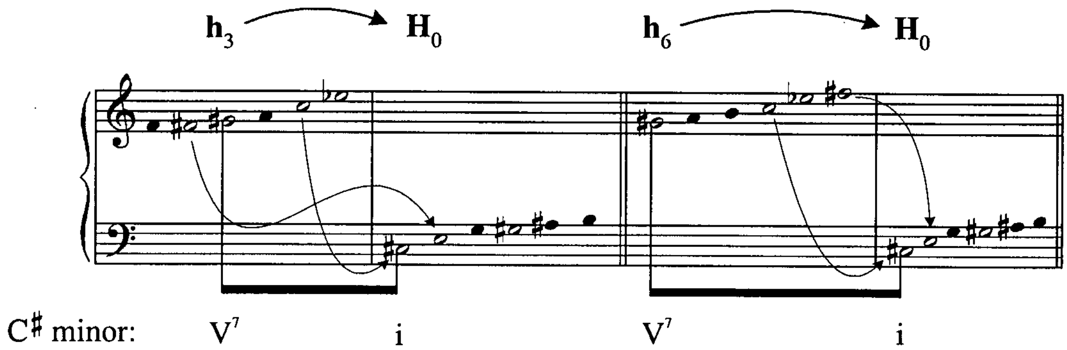
At $\mathbf{h}_0$, complete dominant seventh chords may be built on pcs D and F. (See Figure 2.3.) Whereas all four pcs of the tonic axis (C♯, E, G, B♭) appear in $\mathbf{H}_0$, only two of the four pcs along its dominant axis (D, F) appear in $\mathbf{h}_0$. This, however, does not diminish its tonicizing potential.

Let us consider the harmonic progression from tetrachord ***A'*** to ***B'***. (See Figure 2.3.) The tritone in the first chord resolves obliquely onto a consonant perfect fifth in the second, the second chord includes yet another tritone, creating another acoustic dissonance. (If the second chord were to resolve back to the first, its tritone would resolve obliquely onto the perfect fifth of the first.) As neither V^7 resolves according to traditional rules of harmony, a sense of harmonic instability is sustained or prolonged between the statements of the two chords. As such, the progression may be heard as acoustically neutral.

The dominant-to-tonic relationship between the two referential hexachords, based in the T_7 relationship between parent octatonic collections, is somewhat obscured because the complete V^7 chords on D and F, in $\mathbf{h}_0$, imply the tonics G and B♭, respectively, both of which are only minimally represented in $\mathbf{h}_0$. If the tonal functionality is to stand, complete triads (of major and/or minor quality) must be heard on G and B♭. In effect, the complete triads built on C♯ and E act as tritone substitutes[54] of the implied, incomplete G and B♭ chords. By the same token, the direct tonicization of C♯ (minor) may be realized

[54] In Lendvai's terms, these tritone equivalents are polar opposites or counterpoles.

by $\mathbf{h}_3$ or $\mathbf{h}_6$. As illustrated Example 3.1, we may in each instance perceive an apparent root motion by perfect fifth and the resolution of a leading-tone to its tonic. Moreover, it is possible in each case to hear the minor seventh (F♯) resolve to the third (E) of the "tonic" chord.



Example 3.1. Tonicization of C♯ via $\mathbf{h}_3$ and $\mathbf{h}_6$

3.3 An alternative hierarchical system of harmonic function

Having looked at how a specific interpretation of Lendvai's ideas may be applied to the basic structures of this music, I will now consider some of the concepts, intended for this same music, posited by Paul Wilson (1992), whose approach to Bartók's music is similarly based on the fundamental principles of traditional harmony. He proposes a hierarchal system of seven harmonic functions, ranking them in three groups of decreasing functional significance.[55] The first group contains two functions derived from the tonic, labelled initiating and goal events; the second group constitutes local dominants and secondary tonal centres; and the third group comprises tonic extensions, substitutes and, finally, local dominant preparations. Once again, the dominant-tonic relation proves fundamental to the theory.

[55] Wilson, *Music of Béla Bartók*, 46.

Wilson cautions the reader against assuming that in Bartók's music the initiating event and the goal event will necessarily be one and the same.[56] As support for this point it can be noted that—with reference to the first movement of the sonata, as a whole—that the opening measures have C♯ as their focal pc, while the concluding measures (the coda) have B♭.[57]

Local dominants and secondary tonal centres are, in Wilson's hierarchical system, attributed slightly less significance. According to this theory, a local dominant first prepares and is then immediately followed by the privileged tonic goal event. Notably, both events occur on the same time scale. In extremely non-traditional contexts, determining with any certainty the function of a local dominant may only be possible where there is considerable repetition; obviously, the more complex the context, the greater need for repetition. As the interval or duration (the time scale) between these two events increases, the strength of the local dominant "grows in structural weight," and it may acquire the status as a "secondary tonal centre," if separated from the tonic by enough transitional material.[58] While all of this sounds quite elementary, Wilson's concept of "dominant" assumes relationships far exceeding those of the perfect fifth variety. Whereas Lendvai's axis system assigns dominant function to the pc a perfect fifth above the fundamental tone, and subsequently to all pcs centres along the dominant's minor-third axis, resulting in four possible "dominants," Wilson's theory essentially considers any non-primary pc centre, any "interior tonal center,"[59] as "dominant," irrespective of any acoustic considerations or equivalence relation based on equal partitions of the octave. Consequently, Wilson is partial to the idea that the pc a

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[56] Wilson, *Bartók* , 47.
[57] We may further suggest that due to the symmetrical construction of the referential collection the focal pcs of each section are the semitone dyads C/C♯ and A/B♭ respectively.
[58] Wilson, *Bartók*, 36.
[59] Ibid.

tritone away from the principal tonic may serve as a large-scale dominant.[60] This concept is certainly merited with regard to many of Bartók's later works. However, the piece at hand, while coming close to atonality because of its aggregate structures, is still rooted in more traditional concepts of tonality and is, therefore, better represented adopting a more circumspect version of Lendvai's theory of axis symmetry, one that ties it to equivalence with respect to the octatonic collection. Thus, in the present context, tritone related pc centres, rather than implying a large-scale dominant as Wilson might suggest, will be recognized as sharing the same harmonic function.

[60] Ibid., 37.

CHAPTER 4

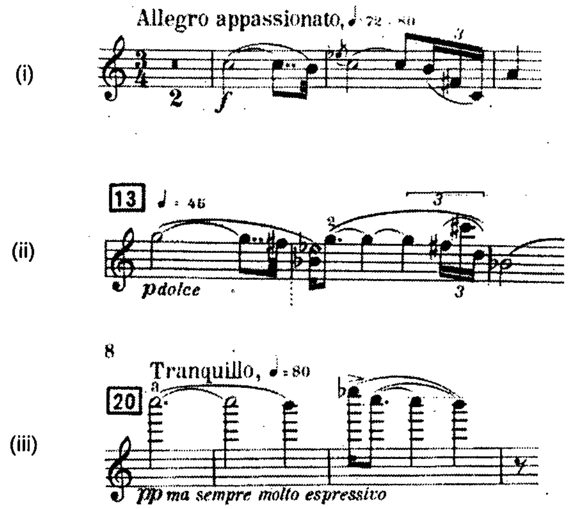
ANALYSES

4 An Introduction to the Analyses

Having examined both the inherent and inherited properties of ***X***, the many referential subsets ranging from trichords to hexachords, and certain voice-leading tendencies of pcs in this construction, we have at our disposal the means of discussing the work in greater detail. I will start with a broad formal analysis, observing, only generally, the formal functions of each section. Following this, I will present a detailed analysis of the exposition and development, suggesting ways of hearing the harmonic and tonal framework of the constituent passages of each, while making use of the concepts discussed in the earlier chapters.

4.1 Formal Analysis

On the whole, the ternary design of this sonata movement is well-defined. Given the clarity of the statements of the basic idea (*a*), out of which larger motive-complexes are developed, the formal divisions of the sonata form appear obvious. Three statements of the basic idea are shown in Example 4.1. Each statement signals the start of a different formal function: the first statement (m. 3), labelled (i), begins the exposition; statement (ii) (m.123), a slightly modified transposition up by perfect fifth, signals the middle section, which I will call the "development" even though it more closely resembles a thematic transformation of the first section; and statement (iii) (m. 187), which is at the original level of transposition, announces the recapitulation (m. 187). This is not to suggest, however, that there are no other instances of the basic idea found in the movement. Measures 38–50, for instance, treat the basic idea sequentially, whereas mm. 127–129 express it diatonically (in A major) as an arpeggiation.



Example 4.1. Statements i, ii, and iii of basic idea, *a*

Despite the apparent clarity on the large scale, subtleties arise within each section, making the internal composition of phrase groups, etc., considerably more complicated. The wealth of motivic material comprised by the exposition, for example, allows for a variety of interpretations regarding the beginnings and endings of its various theme-groups. Indeed, while we may recognize statement (ii) (m. 123) as belonging to the development, it is not immediately obvious just where the exposition ends and the development begins.

The first part of the exposition (i.e., the first theme-group) is essentially a self-contained small ternary form, labelled ***ABA'***. This is easily confirmed. A uniform texture of arpeggiating figures in the piano characterizes section *A* (mm. 1–15), during which statement (i) is composed out in the violin. Following this, a change in texture marks a contrasting middle section, ***B*** (mm. 16–37). Signalling the return of *A*, the basic idea (*a*) is restated, transposed at the tritone (m.38). However, this is not a mere repeat. First, a major sense of arrival on a new tonal centre occurs at m. 50. This is achieved by way of a quasi-authentic cadence on an E major triad. And second, mm. 50–58 contain new material, even seeming at first to announce a new theme. This theme, however, does not quite materialize: instead, the ♫♩ motive first heard in m. 8 returns at m. 51.3, and quickly turns to cadential material (in mm. 55–56) and, thence, to a cadence on C, in m. 57. (See §§***4.2–4*** for detailed analyses of the first and second theme-groups.)

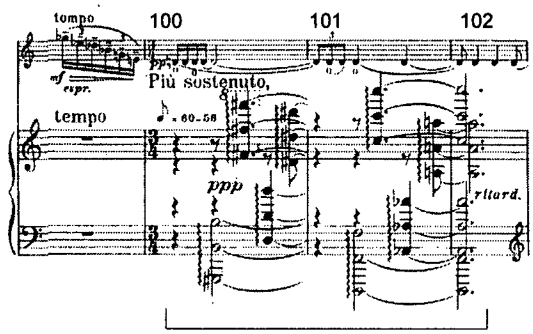
A short passage (mm. 58–62) links the first and second theme-groups, during which $\mathbf{H}_n$ is heard in various transposed forms, and arpeggiated figures in the violin allude to various transpositions of ***X***. For reasons to be explained later, this passage appears in my tabular description of the form as part of the second theme-group. (See Figure 4.1.)

As is shown in the same figure, the second theme-group is also a small ternary (***CDC'***), starting in m. 63. Its contrasting middle, beginning in m. 78 and marked *a tempo (sostenuto)*, functions as the climax of the exposition, reaching the point of climax at m. 87. A change in tempo at [9], marked *sostenuto*, initiates a return of theme-group ***C***. The exposition nears its close as the violin settles on the pitch D4 (m. 96) and the piano arpeggiates diminished seventh chords {D, F, A♭, B} and {D♯, F♯, A, C} to create an octatonic field, OC3. This marks the first time in the work in which the two instruments appear to be in agreement; both instruments cooperate in establishing D as a large-scale dominant to the global tonic, C♯, where tonal function is associated with the three octatonic scales, hence with ic-3 partitioning of the aggregate (as in Lendvai's model of axis tonality).

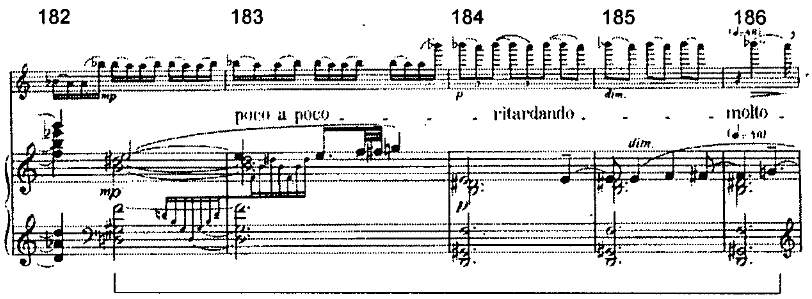
As previously mentioned, the beginning of the development is not entirely obvious. Yoko Hirota's formal analysis identifies the start of the development at m. 120.[61] Given its proximity to statement (ii) of *a*, this may appear like a logical choice. It implies, however, that the measures leading up to m. 120 are still part of the exposition. According to Hirota, mm. 96–120 all function as part of the same closing section. I agree that a sense of cadence occurs at m. 96, as suggested by the violin's melodic descent of a perfect fifth from A4 to D4, the fragmentary quality of mm. 96–102, and an overall recessive dynamic. However, this explanation does not take into account or deem significant the obvious thematic, textural and harmonic changes that occur between mm. 103–119. As I hear it, the development begins in m. 103. Certain parallels may be found between mm. 100–102 (the proposed end of the exposition) and mm. 184–6 (the irrefutable end of the development), supporting this reading. (See Example 4.2.)

Each passage is controlled by a different TS collection, obscuring any obvious harmonic relationship. A single octatonic field, OC3, concludes the exposition, while a less familiar symmetrical collection, composed of two chromatic tetrachords (e.g., pcs {D, D♯, E, F} and {G♯, A, B♭, B}) concludes the development.[62] However, we may note that both passages share the same 0369 tetrachord {D, F, G♯, B}, the pcs of which represent the global dominant axis. Moreover, in each instance a similar and obvious prominence is given to D: in the first, it is heard simultaneously in both the violin and piano (lowest note); in the second, as the lowest note in the piano, prolonged over six measures.

[61] Hirota, "Past and Present Analytical Perspectives", 119.
[62] As one of the centres of inversion of the TS collection, the dyad F♯/G completes the ascending chromatic line in the piano <E, F, F♯, G>, stated twice, each time in a different octave. The G may be heard simultaneously as the tritone associate and anticipation of the forthcoming C♯ tonic in the recapitulation.



OC3, pcs {**2**, 3, **5**, 6, **8**, 9, **e**, 0}



pcs {**2**, 3, 4, **5**, **8**, 9, t, **e**}

Example 4.2. 8-note TS collections concluding Exposition (mm. 100–102) and Development (mm. 182–186)

The recapitulation is slightly abridged and its component parts are subtly re-arranged. For example, the sections comprising the first theme-group are reordered; ***A*** segues into ***A'*** and is then followed by ***B***, resulting in an asymmetrical binary structure. As well, the second theme-group, now in *tonic* space (expressed by the C♯ major/minor tonality), completely omits its return of ***C*** and consequently projects another binary form.

The coda, starting in m. 261, is essentially a descending sequence of the basic idea, rounding out the movement as a whole. The violin, coming full-circle, returns to its place of origin, resting on C5 starting in m. 267. However, coinciding with the arrival of C5, the piano unexpectedly shifts the referential harmony $\mathbf{H}_0$ down a minor third, and with it, the implied referential pitch-class center. Whereas the opening was organized around the semitone dyad C/C♯, this sudden shift transposes the inversional centre to A/B♭. This shift, which accounts for the violin's iteration of A, may be said to provoke a continuation into the second movement by leaving the first open-ended.

Exposition: (mm. 1 – 102)

- *first theme-group*:
  - ***A*** (mm. 1–11), (*extension/trans* mm. 11–15)
  - ***B*** (mm. 16 – 34), (*trans/* mm. 35 – 37)
  - ***A'*** (mm. 38–50), (mm. 50/51–57)
- *second theme-group*:
  - *introduction* (mm.58–62)
  - ***C*** (mm. 63–78)
  - ***D*** (mm. 78–86)
  - ***C'*** (mm. 87–96), (*closing/* mm. 96–102)

Development: (mm. 103 – 186)

- mm. 103 – 112 B major/minor
- mm. 113 – 120 B♭ major/minor, sequence
- mm. 120 – 126 G♯ major/minor, T_6(***a***)
- mm. 127 – 133 D♯ major/minor, (***a***) diatonic
- mm. 134 – 145 ascending fifth sequence (T_7), asymmetrical period
- mm. 146 – 158 (***A'***)
- mm. 159 – 167 (***D***)
- mm. 167 – 186 retransition

Recapitulation/Coda: (mm. 187 – 274)

- *first theme-group*:
  - ***A*** (mm. 187 – 196), ***A'*** (mm. 196 – 210), (*extension/trans* mm. 211 – 213)
  - ***B*** (mm. 214 – 224)
- *second theme-group*:
  - *introduction* (mm. 225 – 232)
  - ***C*** (mm. 233 – 243)
  - ***D*** (mm. 244 – 250, mm. 250 - 261)
- *Coda*: (mm. 267 – 273)
  - ***A'*** (261 – 267), (*extension*: mm. 267 – 274)

Figure 4.1. Formal Analysis of Bartók, *Sonata for Violin and Piano No. 1*, mvt. I

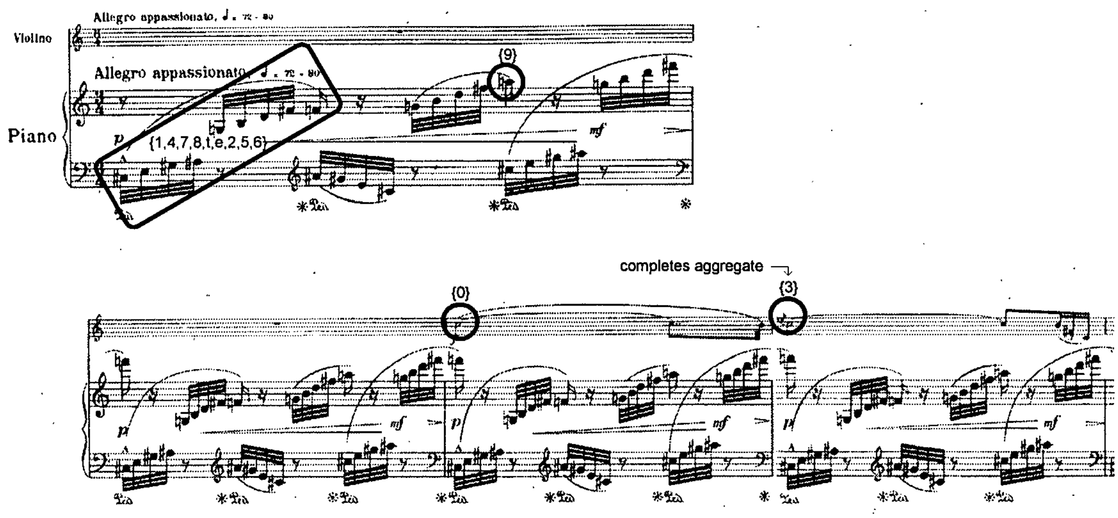
4.2 Exposition, First Theme-Group, mm. 1—57

Before elaborating on the tonal organization of the movement, it will be instructive to discuss the initial emergence of the referential construct, $\boldsymbol{X}$, especially as it plays such a crucial role in the analysis. Following this, I will examine the tonicizations of various pc centres comprising the first theme-group, demonstrating how these centres are determined through conventional and non-conventional dominant-tonic relationships. In addition, I will examine the relationships among the established pc centres comprising this section, illustrating how dominant-tonic progressions operate on a broader level. In conclusion I will demonstrate that, despite the many operative pc centres, the first theme-group is ultimately controlled by an overriding tonic environment.

4.2.1 The Emergence of X

X_0 is realized within the first four measures of the movement. However, its emergence is not entirely obvious, thus requiring some degree of justification.

As shown is Example 4.3, the first six notes define $\mathbf{H}_0$, pcs{C♯, E, G, G♯, A♯, B}. These are heard, however, as part of a larger 9-note gesture, of which the latter notes (D, F, F♯), obviously, belong to $\mathbf{h}_0$. The completion of the aggregate happens piecemeal, but is very clearly articulated through strong-beat placement: A is first heard on the third beat of m. 1, and then repeated on the third beat of m. 2; C, the first note of the violin, arrives on the downbeat of m. 3, while the last note, E♭, is heard on the downbeat of m. 4. The significance of E♭ as an aggregate-completing pc is minimized since it is articulated as a mere grace-note elaborating C. While E♭ is of course an octave "too high" to produce $\boldsymbol{X}_0$ in its literal form, it gains expressive value by being the highest pitch in the violin (until m. 9), also adding a characteristic vocal catch to the basic idea (*a*).



Example 4.3. Emergence of $\boldsymbol{X}_0$, mm. 1–4

We will immediately recognize several problems with this manifestation of $\boldsymbol{X}$. First, the temporal order in which pcs are unfolded in mm. 1–4 never reflects the ordered pc series that defines $\boldsymbol{X}$. (In fact, no where in the movement does Bartók realize $\boldsymbol{X}$ in such a temporally explicit manner.) Moreover, the partitioning into and recognition of familiar tetrachords (e.g., the *sixte ajoutée*, the major-major seventh, and the major-minor seventh) detracts from the significance of the combinatorial hexachords. Consequently, it may appear counter-intuitive to the reader/listener to attribute any significance to the referential construct.

Second, as already implied, not all members of $\mathbf{h}_0$ are stated in the correct register with respect to the proposed canonical form of $\boldsymbol{X}_0$. For example, A5 and E♭5 appear in the wrong octave. However, four of the pcs of $\mathbf{h}_0$ are in the correct register, (D4, F4, F♯4 C5), the last and most important of which is the second element of the dual pc-centre.

Individually, these are minor inconsistencies. When combined, they may put into question the validity of this supposed referential construct. However, this is its first emergence and as will be demonstrated, later manifestations will be determined more easily and with less abstraction.

4.2.2 Dominant-Tonic Relationships and Other Forms of Tonicization

The harmonic entities that will concern us in this music are, for the most part, hexachords, but I will be interpreting them, in many cases, as polychords that combine two T_3-related trichords or tetrachords.

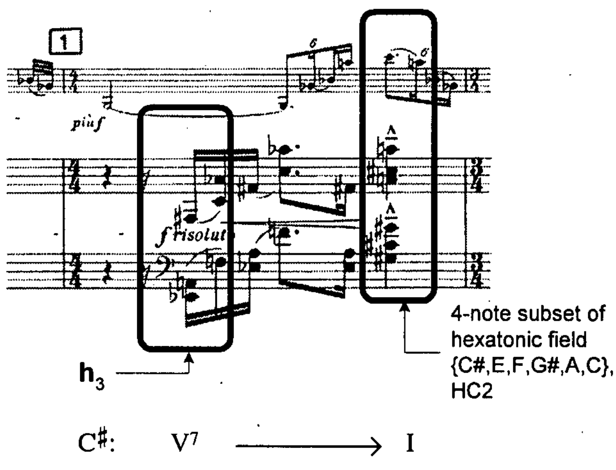
As explained in Chapter 2, $\mathbf{H}_n$ of X_n is a particular ordering of a transposed form of pc-set {0, 1, 3, 4, 6, 9}.[63] The actual registral ordering of $\mathbf{H}_n$ is <6, 9, 0, 1, 3, 4>, which determines the pitch-interval class (***p-i c***) series <3, 3, 1, 2, 1>. Similarly, $\mathbf{h}_n$ of X_n is a corresponding ordering of an inverted form of the same set-class, but comprising pcs {2, 5, 7, 8, t, e}. The $\mathbf{h}_n$ ordering of this set would be <7, 8, t, e, 2, 5>, which determines the ***p-i c*** series <1, 2, 1, 3, 3>.

The ***p-i c*** series of $\mathbf{H}_n$ <3, 3, 1, 2, 1> incorporates as subsets the ***p-i c*** series <3, 3, 4> and <3, 4, 2>, both forms of the added-sixth type seventh chord; while $\mathbf{h}_n$'s implied series incorporates the retrogrades of these subset-series, both of which, of course, are of the dominant-seventh type. For this reason, it is plausible to identify $\mathbf{h}_n$ with dominant function, and $\mathbf{H}_n$ with tonic function.

Example 4.4 illustrates the tonicization of C♯ via a dominant functioning polychord. (cf. rehearsal [1], m. 11) Specifically, $\mathbf{h}_3$ is grouped into two transpositionally related (026) trichords, each assigned to a different hand—{E♭, A, F} in the left hand and {F♯, C,

[63] In the following discussion I avoid referring to any specific transposition of the referential hexachords. Instead, the discussion takes the pc-sets out of context and therefore the use of integer notation is preferable.

A♭} in the right. The combination is a polychord with the potential of tonicizing two different pcs: in this instance, B♭ and C♯. Despite a textural equality of the two trichords (i.e., neither trichord is emphasized more than the other), a way of inferring a hierarchy of sorts is needed to hear one of the trichords as the traditional V^7 of the following harmony. The privileging of the upper trichord offers a consistent basis for such inferences. Further examples in which $\mathbf{h}_n$ is partitioned into transpositionally related trichords will be noted in following analyses. This is not to suggest, however, that the lower trichord serves no harmonic function, as, in this case, it definitely contributes toward the tonicization of C♯. A traditional resolution of the E♭/A tritone would be to E/G♯, the third and fifth respectively of the C♯ tonic triad. While E is not realized in the music, it is implied by the hexatonic field evident in the chord of resolution. As will be demonstrated below, the trichord {F, A, E♭} appears as a subset of dominant sevenths and augmented sixths used to tonicize other important pc centres throughout the first theme-group.



Example 4.4. Tonicization of C♯, m.11

The chord on which this dominant-functioning polychord is resolved is, in a traditional sense, tonally ambiguous. The open fourth and fifth in the left hand implies the root C♯, while the major-third dyad built on A simultaneously implies an A-rooted harmony. A new harmonic space is suggested by this chord; specifically, a hexatonic space implicating both C♯ and A as triadic roots that partition the octave in a 4-cycle. The hexatonic field that includes C♯ and A triads is re-asserted when the trichords of $\mathbf{h}_3$ are transposed in mm. 13–14 by T_4, resolving on an F-rooted chord, {F, C, D♭}. In this way, the complete T_4-cycle of the hexatonic field {C♯, E, F, G♯, A, C} is realized.[64]

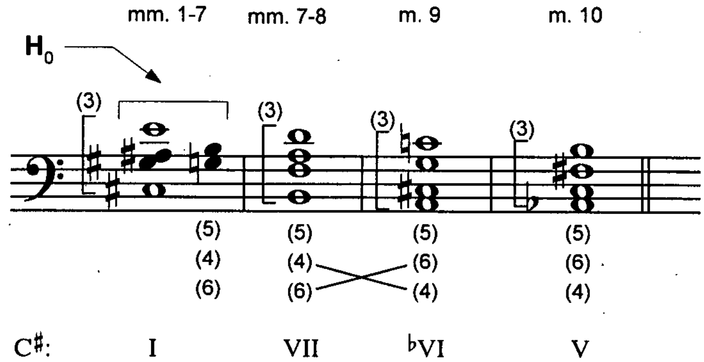
The tonicization of C♯ at m. 11 is part of a longer progression, starting in m.7, which involves a linear descent of a perfect-fourth in the bass, <C♯, B, A, G♯ (= A♭)>. This serves as a model for the violin which begins on C5 in m. 3 and ends on G3 in m.11. As such, the piano and violin descend by perfect-fourth (***p-i c*** 5) while creating with each other the interval of a major seventh (***p-i c*** 11) at its beginning and end points.

Examining these measures more closely, we will notice that the tetrachord arpeggiated in the left hand in m. 10 (beat 2, first eighth) ultimately functions as a traditional dominant seventh chord, spelled as an octatonically extended augmented sixth on A♭: <A♭, C, F♯, B>. (This is preceded by a similar octatonically extended augmented sixth in m. 9, <A, C♯, F𝄪, C>, which serves a traditional pre-dominant function.) Consequently, mm. 1–11 may be understood loosely as a self-contained phrase beginning and ending on tonic harmony.

The progression of complex sonorities may be regarded analogous to a traditional diatonic progression in C♯ minor and expressed by the following Roman numerals: C♯: I

[64] The notes of this hexatonic collection appear in X_0 as a registrally ordered ***pi-c*** series <3, 4, 9, 4, 3>. Its complement, embedded symmetrically within X_0, appears as a maximally compact form of the hexatonic collection, <3, 1, 3, 1, 3>. Refer to §*2.6* for a discussion on TS collections.

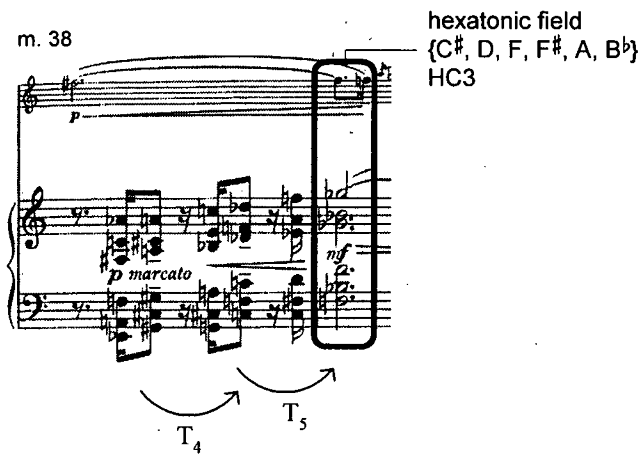
– VII – $^{\flat}$VI – V – (I). Example 4.5 labels the registral ordering of *p-i cs* in the relevant tetrachords in the piano.



Example 4.5. Harmonic progression of mm. 1–10

Despite the different set-classes, the same three ***p-i cs*** are contained in each of these chords. As is shown, the ordering of intervals 4 and 6 are exchanged when VII moves to $^{\flat}$VI. The first measure in the example comprises two tetrachords, the combination of which expresses $\mathbf{H}_0$. The second chord of that measure is transposed down two semitones in the following measure. Chords three and four of the example could be identified as 4-note subsets, SC(0146), of $\mathbf{h}_7$ and $\mathbf{h}_6$ respectively, though these identifications may be superfluous in this instance, since it is a traditional C♯ tonality (i.e., the suggestion of $^{\flat}$VI and V in C♯) that is more to the point.

After the contrasting middle (mm. 16–34, discussed separately below), the abovementioned dominant functioning polychord—heard at the same pc-level—is repeated (mm. 35–37). Following this, in mm. 38–39, we hear a sequence based on this motive: first up 4, then up 5 semitones. (See Example 4.6.)

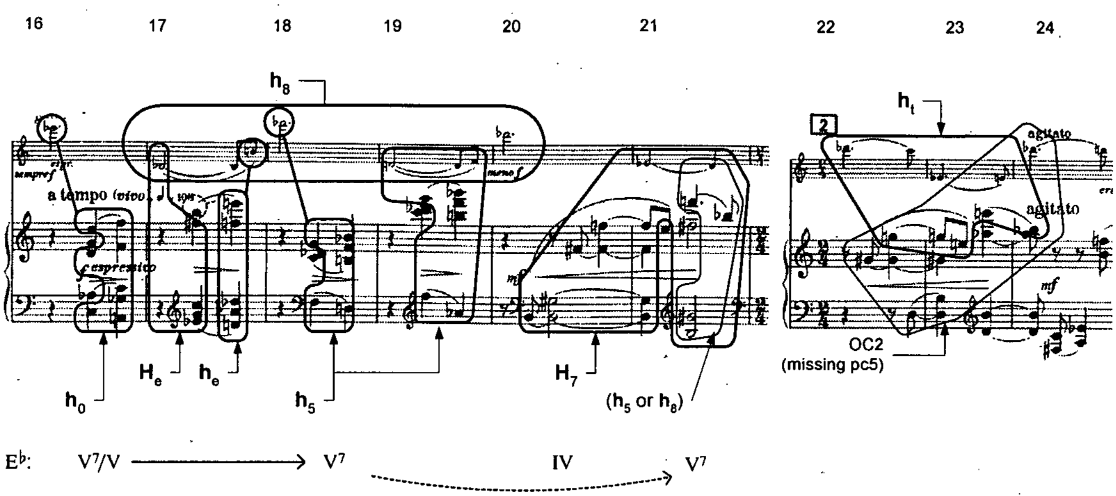


Example 4.6. Arpeggiation of B♭, mm. 38–39

Each (015) trichord is "tonicized" by a different transposition of $\mathbf{h}_n$, partitioned into two transpositionally related 026 trichords and articulated independently in each hand of the piano. The proposed "roots" of each (015) trichord, <C♯, F, B♭>, spell out, enharmonically, a B♭ minor triad in first inversion. Whereas the chord in m. 11 implies HC2, the chord at m. 39 implies HC3. These hexatonic fields, represented at only the most local level, temporarily disguise the deeper level minor third space suggested by the progression of pc centres from C♯ to B♭.

4.2.3 Contrasting middle (mm. 16–37)

Example 4.7 illustrates the extensive treatment of SC(013469) through the first part of the contrasting middle (mm. 16–21). With only two exceptions, every expression of this set-class is a transposition of $\mathbf{h}_n$. As indicated in the example, m. 18 is a straight transposition by T_5 (in pc space) of m. 16. Underscoring the transpositional relationship between these $\mathbf{h}_n$-forms, we hear descending perfect fifths in the upper register of the violin, from E♭7 in m. 16 to A♭6 in m. 18 and D♭6 in m. 20. The pc collections in the piano are often 4- or 5-note subsets of some $\mathbf{h}_n$. Notably, the pc needed to complete each $\mathbf{h}_n$-form is provided by the violin.



Example 4.7. Hexachordal saturation, mm. 16–24

The pcs comprising beats 1–2 of m. 17 (excluding B) form a 5-note subset of $\mathbf{H}_e$—the first exception (by virtue of being an inversion of the form at m. 16). This is immediately followed on beat 3 of the same measure by a complete form of $\mathbf{h}_e$. The anticipation of B on the second beat of this measure produces a melodic perfect fourth in the uppermost voice of the piano, as B5 moves to E6. This suggests traditional root voice-leading motion, which points to E as the root of a V^7 subset of $\mathbf{h}_e$, specifically {E, G♯, B, D}. That X_5 and X_e share the same index of inversion (I_e) suggests that $\mathbf{h}_e$ in m.17 functions as the tritone associate of and consequently anticipates $\mathbf{h}_5$ in mm. 18–19.

The projections of $\mathbf{h}_n$ heard thus far as verticalities in the piano are complemented by a statement of $\mathbf{h}_8$ in the violin (mm. 17–20). Following this, in mm. 20–21 there is an important statement of $\mathbf{H}_7$—the second exception—that begins in the piano (pcs <B, G♯, F♯, F>) and is completed by the violin (pcs <E♭, D>). (See below for a discussion on its significance.) This gives way to yet another 5-note subset of $\mathbf{h}_n$, which may be interpreted as either $\mathbf{h}_5$, with a missing G, or $\mathbf{h}_8$, with a missing C♯. (A form of $\mathbf{h}_2$ may also be detected in mm. 20–21, but this is not so clearly articulated.) It is worth noting that all of the $\mathbf{h}_n$-forms present in mm. 17–21 ($\mathbf{h}_e$, $\mathbf{h}_5$, $\mathbf{h}_8$,) are subsets of the same parent octatonic collection, OC2. We may conclude, therefore, that the minor-third axis {C♯, E, G, B♭} is implied, since these are the roots of the dominant sevenths in these hexachords. Whereas this axis serves tonic function at the global level, here, at the local level and as a consequence of the prevalent $\mathbf{h}_n$ context, its pc elements are associated with dominant function.

Finally, a combination of pcs from both instruments in mm. 22–23, determines an instance of $\mathbf{h}_t$: pcs {C, D♭, E♭, E} are stated in the violin, and pcs {E, G, B♭} in the piano. This $\mathbf{h}_t$, a subset of OC1, is overshadowed, however, by the stronger projection of the $\mathbf{h}_n$-forms comprised by OC2.

The various forms of $\mathbf{h}_n$ expressed over the course of these measures have appeared quite systematically. Understanding $\mathbf{h}_0$, $\mathbf{h}_3$, $\mathbf{h}_6$, and $\mathbf{h}_9$, as subsets of OC3, $\mathbf{h}_e$, $\mathbf{h}_2$, $\mathbf{h}_5$, and $\mathbf{h}_8$, as subsets of OC2, and $\mathbf{h}_t$, $\mathbf{h}_1$, $\mathbf{h}_4$, and $\mathbf{h}_7$, as subsets of OC1, we can confirm that mm. 16–24 basically cycle through all three octatonic collections: i.e., <OC3, OC2, OC1>, whereby each collection functions as the dominant to the one following it in this series. It remains to explain, however, the privileging of OC2.

The arrival on E♭7 in m. 16 is very easily heard as a temporary tonic. It is determined through register and durational accent, but more importantly by the pc content of m. 13 (beat 2) through m. 15 (beat 1) in the violin, which strongly implicates both the E♭ scales and the E♭ triad. Only subsequently do we hear the functional dominants that are necessary to tonicize the minor-third axis that includes E♭. These are expressed in the various forms: $\mathbf{h}_e$, $\mathbf{h}_2$, $\mathbf{h}_5$, and $\mathbf{h}_8$ (all subsets of OC2).

By the third beat of m. 16, E♭ no longer functions as the root of a tonic harmony, but instead, functions as the seventh of a V^7 chord built on F. As this V^7 chord is in turn followed by a prolongation of another built on B♭, it is reasonable to infer that the harmony of m. 16 functions as an applied dominant (V^7/V) to that in m. 18. This is indicated in Example 4.7 above.

We may now discuss the salient form of $\mathbf{H}_7$ in mm. 20–21. In context, this is meant to sound like an elaborated first inversion A♭ minor triad (spelled enharmonically) with added sixth (F) and minor seventh (F♯ = G♭). Following $\mathbf{h}_e$ and $\mathbf{h}_1$, $\mathbf{H}_7$ sounds like a subdominant which, since it returns to $\mathbf{h}_5$ and/or $\mathbf{h}_8$ at the end of m. 21, acts as a neighbour to the surrounding dominant. The latter function is prolonged by the unfolding of a seven-note subset of OC2 in the piano and violin, in mm. 22–24.

4.2.4 Tonal Design of the Contrasting Middle

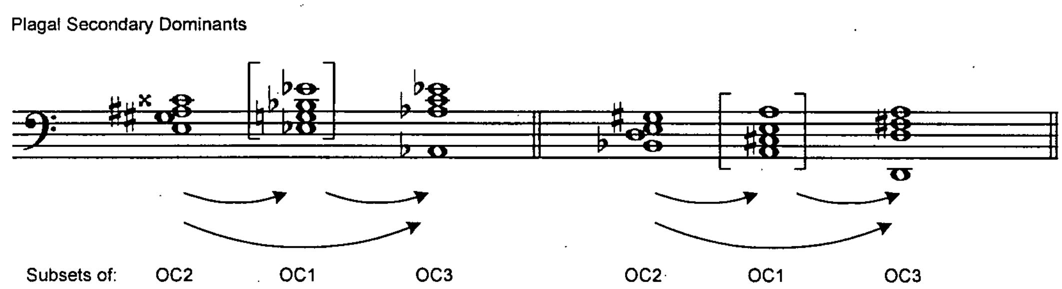
The violin's descending fifth sequence <E♭7, A♭6, D♭6> on the downbeats of mm. 16, 18, and 20, motivates a large-scale tonal progression that spans the entirety of the contrasting middle. As I have just demonstrated, mm. 16–24 assert, if only retrospectively, the tonality of E♭ by way of minor third related $\mathbf{h}_n$-forms, and the subdominant form of $\mathbf{H}_7$. This is followed by a passage in A♭, starting in m. 31, and another which re-establishes the global tonal space defined by the tonic axis around C♯, starting in m. 37.

The tonal centre of E♭ begins to dissolve starting in m. 24, marked *agitato*. A series of overlapping diminished seventh chords in the piano essentially levels the tonal playing field. Expressed as a two chains of ic-6 dyads, this sequence may be heard as four independent voices, each following the same ordered interval series: <3, 1, 3, 1, 3>. Consequently, all four hexatonic collections are expressed: HCs 1 and 3 in the left hand; HCs 2 and 4 in the right, the collections in each pair being complements of one another.[65]

As the piano moves through its tonally neutralizing diminished seventh chords, the violin plays a series of melodic major thirds, beginning with <E6, C6> in m. 26. This dyad is reached by way of appoggiaturas in mm. 22–23. The intervening measures (mm. 24–25) may be heard to melodically tonicize C, and thus override the tonal neutralization taking place in the piano. The <E6, C6> in m. 26 initiates a series of ic-4 pairings: <E6, C6> with <A4, C♯5>; <E6, C6> with <D5, F♯5>; and <G6, E♭6> with <E5, G♯5>. While this is open to many interpretations, one, as suggested by the preceding analysis of mm. 16–24, is to now assign primacy to the ic-4 dyads drawn from OC1, namely, {C6, E6} and {A4, C♯5} in mm. 26–28, and the {E♭6, G6} in mm. 29–30. Despite the composite effect of the largely atonal mm. 24–29, the emergence of A♭ as a local tonic in mm. 30–34 suggests that the minor-third axis {A, C, E♭, F♯} changes from a tonic to a dominant function. A♭ emerges largely because of the repeated sounding of {A♭3, C3} in the piano's left hand against the {E♭6, G6} in the violin, the two dyads making up the major-major seventh {A♭, C, E♭, G}.

[65] This implied hexatonic space is later confirmed when at [3] the 015 trichord, with the roots C♯ and A, is stated and restated, bringing this section to a close.

The other important sonority in this passage, {B♭, D, E, G♯}—made up of an ic-4 in the piano, {D4, B♭4} (mm. 31–34) and one in the violin, {E5, G♯5} (mm. 30–32)—associates OC2 pcs with a cadence on A♭, and is heard as a plagal secondary dominant[66] of A♭. Example 4.8 illustrates how this progression essentially by-passes the dominant harmony (shown in square brackets) and can resolve in one of two ways (on chords related by T_6) depending on how the plagal secondary dominant is interpreted.



Example 4.8. Plagal Secondary Dominants

This passage concludes with both dominant seventh chords, B♭ and E, arpeggiated and superimposed above an A♭ root in the left hand (see ic-4 dyad A♭/C), thus further emphasizing the plagal secondary dominant relationship.

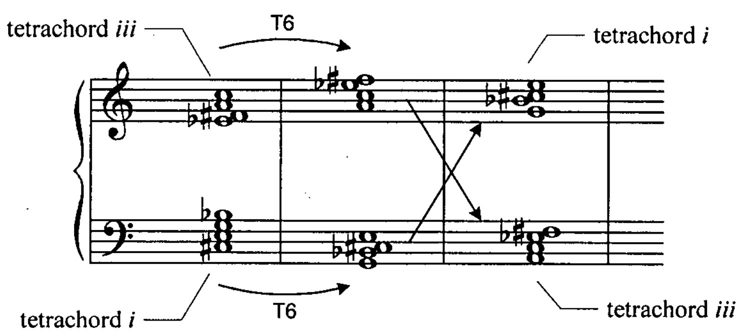
It should also be mentioned that there is a strong sense of registral symmetry specifically when A♭ is tonicized (mm.30–32). Apart from the overall tonal design of this passage and the interrelationship among multiple TS collections, these measures highlight ***X***'s susceptibility to subtle distortions, such that what may emerge in one interpretation (of how ***X*** is deployed) is contradicted by another. Moreover, these

[66] Whereas "plagal" is typically associated with root motion by descending perfect fourth (or ascending perfect fifth), it is also associated with harmonic progression in which a common tone shared between the two chords serves as the root of the second chord. It is in the latter sense that I am using this term.

measures demonstrate a greater interdependence among the instruments than what might initially be thought.

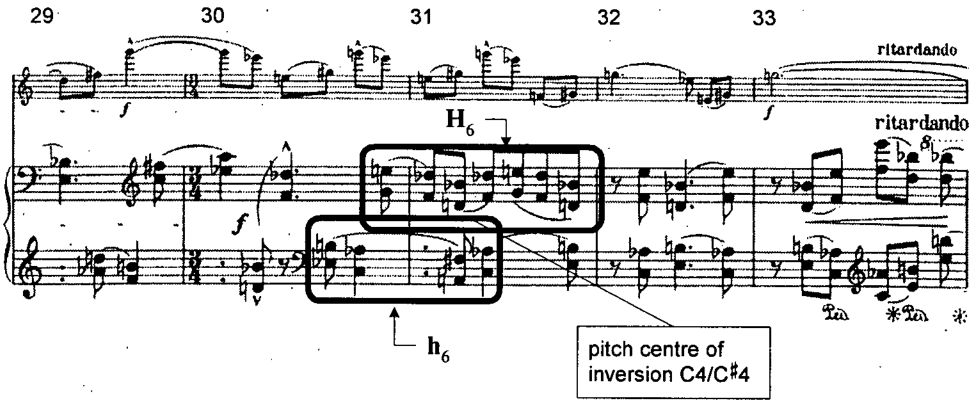
I will offer for comparison three ways in which X is manifested starting in m. 30. The obvious inversional symmetry around the dual pitch centre {C4/C♯4} is assumed with respect to the first two interpretations, which consider only the piano part. As will become evident, this centre of inversion serves no purpose in the third interpretation, which involves both instruments.

The first responds to the registral ordering of all three diminished seventh chords. Here the reader is reminded of the referential construct partitioned as a triple of interlocking 0369 tetrachords. At X_0, pc-sets <C♯, E, G, A♯>, <G♯, B, D, F>, and <E♭, F♯, A, C> constitute tetrachords *i, ii and iii* respectively, ordered registrally from low to high. (cf. Figure 2.2) The referential construct as expressed here, however, exchanges the position of tetrachords *i* and *iii* so that *iii* is on the bottom and *i*, on top. Complicating matters further, making the connection to X_0 less explicit, the two outer tetrachords in mm. 30–31 are inverted (i.e., each is rotated outward and thus transposed by T_6). This is illustrated in Example 4.9. (As tetrachord *ii* remains in the middle and is unaffected by rotations, it is not included in the Example.)



Example 4.9. X_0, rotation and exchange of tetrachords *i* and *ii*

The second interpretation considers each hand independently. As seen in Example 4.10, the hexachords assigned to each hand belong to SC(013469), $\mathbf{H}_n$- and $\mathbf{h}_n$-forms. (These hexachords are not in their canonical registral orders.) Here, however, $\mathbf{h}_n$ assumes the lower register, and $\mathbf{H}_n$ the upper. Though the semitone dyad C/C# remains the center of symmetry, we may, in fact, determine the actual transposition of the referential construct as $\boldsymbol{X}_6$.[67] Viewed this way, mm.30–31 initiate or motivate the T_6 transposition of the violin's basic idea (*a*) at m.38.



Example 4.10. $\boldsymbol{X}_6$ with $\mathbf{H}_6$ and $\mathbf{h}_6$ exchanging former positions, mm. 29–33

The third interpretation recognizes the importance of A♭ as a tonal centre, thus ignoring the centre of inversion alluded to by the piano. The dynamic tension between this pc centre and the highest pitch in mm. 30–32, played by the violin (G6), suggests that we are dealing with a form of $\boldsymbol{X}_7$, and this turns out to make sense. This may be qualified

[67] While the referential hexachords can similarly be realized in X_0, the pcs of each hexachord are not adjacent to one another; that is, they are found equally distributed among both hands making it difficult to hear this relationship.

in the following way. One of the component diminished seventh chords of X_7 is shifted down and re-ordered, so that a new symmetry results. Instead of:

ii

<A♭, B, D, E♭, F, F♯> <A, B♭, C, C♯, E, G>

i *iii*

We can conceive of tetrachords *i* and *ii* trading places, resulting in:

i

<A, C, E♭, F♯, A♭, B> <D, F, B♭, C♯, E, G>

ii *iii*

This, in turn, is modified further, whereby E♭ and E exchange positions:

<A, C, E♭, F♯, A♭, B> <D, F, B♭, C♯, E, G>

<A, C, E, F♯, A♭, B> <D, F, B♭, C♯, E♭, G>

Through this exchange of positions the major-major seventh chord {A♭, C, E♭, G} can emerge as it appears in the score. This chord is of course fundamental to the symmetry of X_7, where it is crucially placed as the combination of the perfect fifths above and below the bottom and top pitches, respectively:

<A♭, B, D, E♭, F, F♯> <A, B♭, C, C♯, E, G>

In this way, the relationship to X_7 is asserted despite the registral distortion.

This passage illustrates the often subtle interdependence of the two instruments. While the symmetrical construction of the piano part is relatively explicit and certainly functional at one level—suggesting either X_0 and/or X_6—it plays no part whatsoever in the projection of X_7, an interpretation that takes into account the interdependence of both instruments. As well, this passage underscores the multiplicity of ***X***, the potential of simultaneously referring to different forms of ***X***. And finally, it highlights the fragility of the referential construct, such that its symmetry may be easily disturbed.

As a result, we find ourselves seemingly secure in the tonicized dominant region vis-à-vis the piece's opening, only to find that, almost immediately the music slips back into the tonic region, tonicizing C♯ in m. 37 by the same means as used in m. 11. Thus, the descending fifth figure in the violin in mm. 16–20, <E♭7, A♭6, D♭6>, prefigures the larger tonal design of the entire contrasting middle (i.e., from subdominant, to dominant, to tonic).

4.2.5 Measures 35–57, Shifts in Tonal Centres

Measures 35–57 constitute ***A'*** of the small ternary design of the first theme-group. One of its more subtle features is a gradual unfolding in the violin of a $\mathbf{H}_7$. The reader is reminded of the discussion on medial relations in §*2.1.1*. Example 4.11 transcribes the violin melody from mm. 38–50. Over the course of these measures, five notes are made focal through durational accent: <F♯5, E♭5, D5, B4, G♯4>. These notes form a 5-note subset of SC(013469), specifically $\mathbf{H}_7$, one of the two medial forms found in X_0. To complete this hexachord, we merely need to locate and include some F; this is found in m. 39 as a sixteenth-note immediately following F♯. Unlike all the others, this note does not receive a durational accent. However, it does appear in the correct register (F5) and is placed temporally between F♯ and E♭, in agreement with the ordered interval series that defines $\mathbf{H}_n$, <3, 3, 1, 2, 1>. Moreover, F5 is heard as part of the basic idea. This hexachord unfolds in pitch-space (not pc-space), thus making it easier to perceive.

Example 4.11. $\mathbf{H}_7$ as medial relative in X_0, mm. 38–50

While it is possible to read this chord as evoking a dominant tonal space determined by pcs{D, F, G♯, B}, the tonicizations of B♭ at m. 39 and E at m. 50 suggest a prolongation of tonic. Thus $\mathbf{H}_7$ appears merely as a remnant of the contrasting middle and may best be interpreted as a medial relative, referencing X_0 and, by implication, the global tonic axis {C♯, E, G, B♭}.

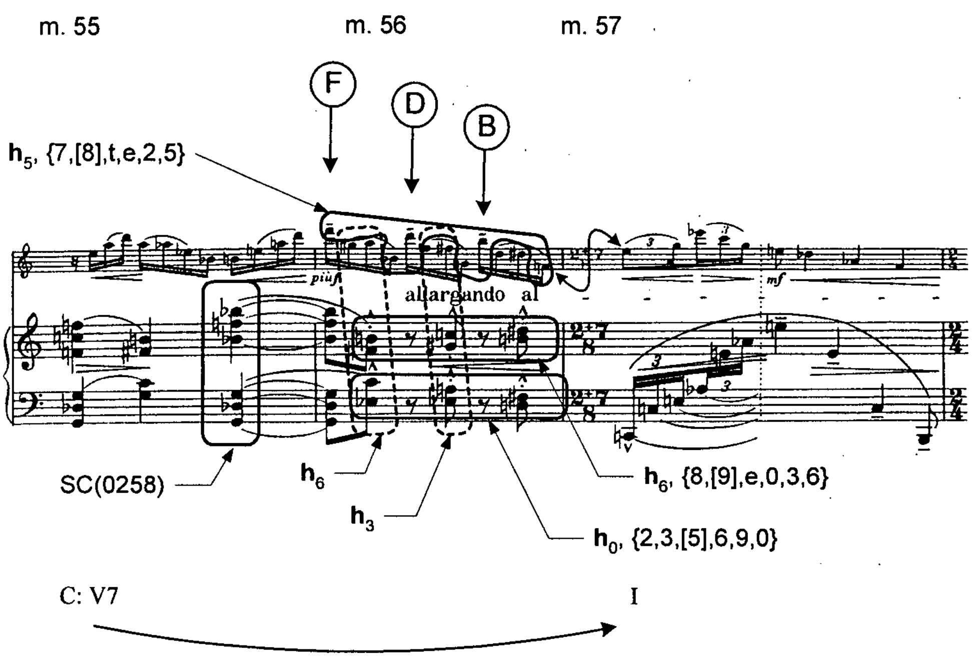
The privileged status of E major at rehearsal [5] (m.50) is unequivocal, and may be equated with a temporary realization of C♯ minor's relative major. E is tonicized in m.

49 by the same augmented sixth chord that was used in mm. 29–30, {F, A, B, D♯, F𝄪}. Understood similarly as an extended dominant seventh built on F, the acute listener may expect a resolution to some type of B♭ chord, in which case the arrival on E will come as a surprise. However, its arrival is warmly embraced; all the previous harmonic tension is suddenly and for the first time alleviated. Instead, we may interpret this chord as simply an augmented sixth built on ♭II in E.

It has been demonstrated that throughout the first theme-group several different tonics have vied for control. Comparing their relative significance, the most prominent and irrefutable tonics have all been pcs belonging to the same ic-3 cycle starting on C♯. That the centres B♭ and E are symmetrical around C♯, suggests (if only gently) that C♯ acquires primary status among the hierarchy of tonal centres thus far affirmed. However, we may say that they all belong to the same higher tonality. To do this, we need not explicitly invoke Lendvai. Instead we can point out that the dominant sevenths that tonicize these pcs, at mm. 10, 38, and 49 respectively, are all subsets of OC3, the symmetry of which produces 3-cycle equivalence in this context.

Consequently, it can be argued that, up to this point, the first theme-group is dominated or controlled by one tonality as might be expected of a traditional sonata-allegro. In other words, we may speak of a kinship of tonal centres, all serving the same formal function.

Only four measures after the tonicization of E, the final pc of the tonic minor-third axis appears (i.e., G). However, instead of functioning as a stabilizing tonic harmony, the half-diminished seventh chord built on G (see mm. 54–56) introduces a segment of dominant function that ultimately tonicizes C at m. 57. As illustrated in Example 4.12 (see m. 56), the sequential pattern of the violin's arpeggiation figure underscores the seventh, fifth, and third chord members respectively of a conventional G dominant seventh chord. The pitches F6, D6, and B5 occur on the first, second and third downbeats of the measure. We may configure a 5-note subset of $\mathbf{h}_5$ simply by combining these notes with the lower notes of the violin's compound melody: B♭4, G4, and F4 (the fourth sixteenth-note of each four note grouping, respectively).



Example 4.12. Tonicization of C, mm. 55–57

Having established G2 as focal, the bass moves to an inner voice (G remaining the structural bass note) at m. 56, leaping to an incomplete upper-neighbour E♭3 before resolving by step to the fifth of the V^7 chord, D3. Meanwhile, the uppermost voice of the pairs descends to the third of the V^7 and is followed by stepwise motion in the opposite direction through scale degree 4 to ♯5: <B4, C5, D♯5>. D♯5 is disposed toward E5, which is stated by the violin on the downbeat of m. 57.

In addition to presenting a fairly conventional voice leading and harmonic pattern, m. 56 is almost entirely saturated by various forms of the referential hexachord. As noted above, a 5-note subset of $\mathbf{h}_5$ is manifested in the violin. Two other 5-note $\mathbf{h}_n$- subsets are heard in the piano: $\mathbf{h}_0$ in the left hand, and $\mathbf{h}_6$ in the right.[68] As well, the example identifies complete forms of $\mathbf{h}_3$ and $\mathbf{h}_6$, resulting from the interaction of the two instruments.

I now turn to the relationship between the violin statements of $\mathbf{H}_7$, heard in mm. 38–50, and $\mathbf{h}_5$ at m. 56. Both forms appear embedded within X_0 and have been termed medial relatives. As mentioned above, the mere appearance of $\mathbf{H}_7$ was insufficient to establish the dominant space (i.e., the tonic space remained functional) and $\mathbf{H}_7$ was therefore interpreted as a medial form; $\mathbf{h}_5$, however, actively participates in the modulation to C. We may conclude that the first medial form, $\mathbf{H}_7$, prefigures and motivates the second medial form, $\mathbf{h}_5$, which, because of its inherited tonicizing properties, is capable of motivating a modulation to a different tonal region. In this regard, the G serves a dual function. As the root of the half-diminished seventh chord {G, B♭, D♭, F}—a subset of $\mathbf{H}_6$—G functions as an element of the tonic axis; however, as the root of a dominant seventh chord, G takes on a tonicizing function.

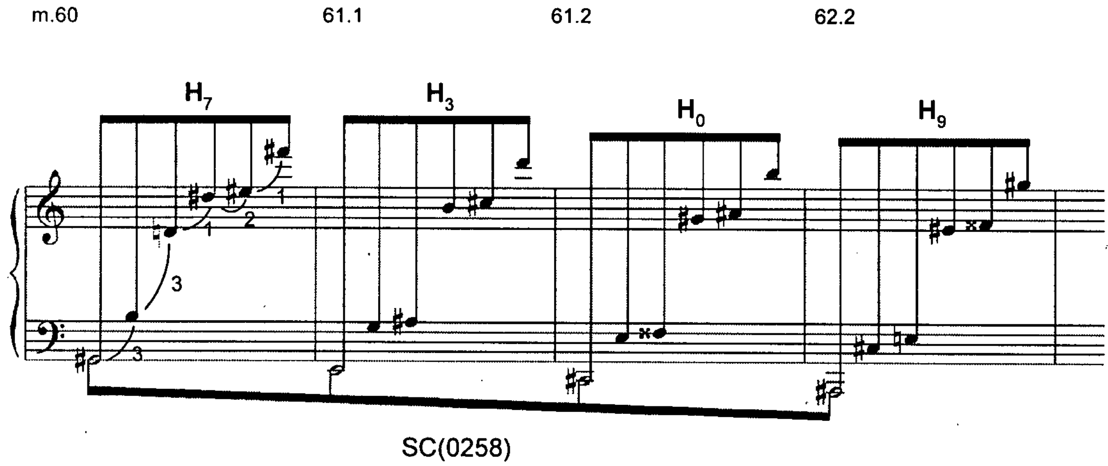
[68] We may similarly configure $\mathbf{h}_9$ out of the 5-note subset set: {[e], 0, 2, 3, 6, 9}, however, $\mathbf{h}_0$ is preferred because of the complete V^7 chord on D.

4.3 Exposition, Introduction to the Second Theme-Group, Rehearsal [6]

An obvious centre of inversion around D4/D♯4, heard in m. 58, is suddenly distorted in m. 59. The contrary motion in the piano continues, providing an illusion of symmetry around the dual pc-centre. However, a closer look at the intervallic content reveals an asymmetrical structure; the collection of pcs in m. 59, in fact, realizes SC(013469); specifically, $\mathbf{H}_7$. Although spanning several octaves, the registrally ordered interval series of this gesture maintains the same ordered ***p-i c*** series of $\mathbf{H}_n$ in its most compact form: reading from bottom to top, <3, 3, 1, 2, 1>. The use of G♯ at the bottom of $\mathbf{H}_7$ is, in itself, not decisive for its tonal function. Is it still part of the global dominant axis, or has it become a local tonic? The peculiar arrival on C at m. 57 sheds some light on this. As with some earlier centres, C is presented in a hexatonic context, as a stable root within HC1. As such, it is equivalent to E and G♯. This makes it plausible to hear G♯ as a local tonic. As a result, when G♯ appears in m. 59, as the root of $\mathbf{H}_7$, we have been primed to hear it as a tonic, and thus to hear that a fundamental modulation, to the dominant level, has taken place.

Following the initial statement of $\mathbf{H}_7$ in m. 59, we hear T_3, T_0, and T_9 transpositions of $\mathbf{H}_n$, the roots of which all appear along the global tonic-axis, {C♯, E, G, B♭}. (See Example 4.13.) The roots of all four hexachords (indicated by open note-heads in the example) form a half-diminished seventh chord when combined, and the pcs comprising this tetrachord are precisely those of the *sixte ajoutée*, stated repeatedly at the beginning of the work, yet now expressed as an inversion (or rotation) of that chord.[69] In this regard, we may infer that, at least at this point, the tonic axis is subtly asserted.

[69] This also anticipates the arpeggiation of its enharmonic equivalent heard at the end of the movement, {B♭, D♭, F, A♭}. (See mm. 267ff.)



Example 4.13. $\mathbf{H}_n$-forms resulting in arpeggiation of SC(0258), mm. 60–62

However, while the piano arpeggiates various transpositions of $\mathbf{H}_n$, the boundary intervals of the violin's arpeggiations project various transpositions of ***X*** (i.e., identifiable abbreviations in its most compact form of 23 semitones, ***p-i c*** 11). Following several measures in which D4 is clearly prolonged, a sequential pattern begins (m. 60) where ***p-i c*** 11,{F4, E6}, is followed by a second ***p-i c*** of the same size, {A♭4, G6}. This in turn is followed by another and another, and so on. (See Example 4.14.) Consequently, the arpeggiation of a B♭ minor-minor seventh chord can easily be discerned; its respective pcs (with some repetition) are heard on every quarter note downbeat starting on beat two of m. 60: <A♭4, B♭4, A♭4, F4, D♭4>.[70] If we include D4, which precedes the arpeggiation, this chord may be regarded as a B♭ dominant seventh. From this standpoint, the D♭4 at m. 62 may be said to deflect the listener's expectations at the very last moment. However, taking both D and D♭ into account, we may read this as a 5-note subset of $\mathbf{h}_8$: {B♭, [B], D♭, D, F, A♭}.[71] As a subset of OC2, this chord is expected to tonicize some member of OC1, either C, E♭, F♯, or A. And in fact, this is what happens. (See §***4.4.1***

[70] The similarity between this chord and the half-diminished seventh chord mentioned above is worth noting. The pcs {1, 8, t} are common to both chords. Whereas the half-diminished seventh chord is a subset of $\mathbf{H}_n$, the minor-minor seventh chord is a subset of $\mathbf{h}_n$.
[71] Notes in square brackets, [ ], indicate missing pcs.

for a discussion on the tonicization of A at m. 63.) The fifth relation between the open note-heads <D, A> suggests a move from tonic to dominant (where the prevailing dominant space is temporarily assigned tonic status); however, the inherited dominant properties of $\mathbf{h}_8$ suggest the exact opposite, and $\mathbf{h}_8$ serves here as an applied dominant.

$\mathbf{h}_8$, {B♭, [B], D, D♭, F, A♭ }

(V⁷/V)

D: I → V

Example 4.14. Projections of X_n, mm. 60–62

While the motivic treatment and emphasis on tonic-axis related harmonies, especially in the piano, suggests some continued relationship with the first theme-group, I am inclined to hear these events as local level phenomena.

There is a strong indication that, starting at [6], a tonicization of the dominant axis has occurred. This is suggested by: the emphasis placed on pcs 2 and 8 (e.g., D4 in mm. 58–60 and G♯2 in m. 60), and by the tonicization of the latter, discussed above. The shift to the dominant axis is then confirmed by the arrival on F at [7]. Thus, to describe mm. 58–62 as a continuation of the transition seems inappropriate, and I am inclined to hear this as the start of the second theme-group proper.

4.4 Exposition, Second Theme-Group

The following analyses will discuss the two themes (labelled ***C*** and ***D***) that constitute the small ternary of the second theme-group. Theme ***D*** may be referred to as a second *contrasting middle*, but to avoid confusion, it will hereafter be referred to as the second subordinate theme. Apart from being thematically distinct, themes ***C*** and ***D*** refer to different tonal spaces: the first privileges pc centres along the global dominant axis, while the second returns to the tonic axis. The determination of E as the second subordinate theme's pc centre may, again, be equated with a temporary modulation to the relative major of the home key, an analogue of the common practice.

4.4.1 First Subordinate Theme, C

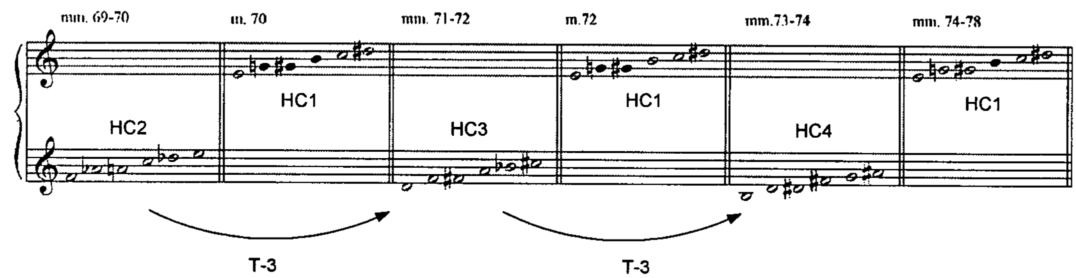
The outer sections of the ternary form (***C*** and ***C'***) are distinguished by a pedal-point on A in the violin. (cf. mm. 63–77 and 92–95) Prolongations of the pitch D4 precede the first section (mm. 58–60) and immediately follow the second (mm. 96–103). While this symmetry suggests hearing A as the (upper-fifth) dominant of D, a somewhat more roundabout explanation of A's function seems more in line with the facts. I draw the reader's attention to how, with considerable care, Bartók prepares this pc. As mentioned earlier, the initial prolongation on D is immediately followed by an arpeggiation of a B♭ V^7 chord (mm. 60–62). Rather than resolving this chord on an E♭-rooted harmony, creating an obvious dominant-tonic relation, Bartók resolves this on the latter's tritone associate, A. Viewed this way, the seventh of the V^7 chord may be re-interpreted enharmonically as G♯, creating the interval of an augmented sixth between it and B♭, thus resolving to an octave on A. Moreover, the violin's A3 in m. 63 is the exact centre of inversion of the outermost notes comprising the arpeggiation of $\mathbf{H}_9$ in the immediately preceding measure (i.e., A♯1 and G♯5).[72] In this regard, A may be understood at the local level as a transitional tonic, related by minor third to the C transitional tonic at m. 57. Just as C's tonicization at m. 57 lead to G♯'s at m. 59, so A's tonicization at m. 63 leads to F's at m. 66. All four pcs then combine into the symmetrical tetrachord {F2, A♭3, A3, C5} at m. 66.

F, the root of this major-minor tetrad, is the third pc of the global dominant axis to be tonicized—after D (at m. 58) and G♯ (as just discussed)—and is the principal goal of the preparatory activity in mm. 58–65. The F major-minor tetrad, with its axis of symmetry around the pcs A♭/A, has the same index of inversion (I_5) as that which was tentatively confirmed at [6] around the pcs D/D♯. These associations support the idea, as posited above, that mm. 58–62 have a closer affinity to the second theme-group and should be understood as introductory rather than transitional. Despite this passage being controlled by the large-scale dominant axis, it is interesting to consider that there has not yet been a complete manifestation of $\boldsymbol{X}_1$, $\boldsymbol{X}_4$, $\boldsymbol{X}_7$, or $\boldsymbol{X}_t$.

Before the start of the second subordinate theme-group ([8]), the temporary tonic on F is destabilized by way of a descending sequence of major-major seventh chords (mm. 69–74). The stability of the dominant axis of minor-third related pcs {D, F, G♯, B} is suddenly compromised by a switch to a hexatonic field at m. 69, after which all four hexatonic collections unfold. This sequence is illustrated in Example 4.15. As shown, the collections on the lower system move through an ic-3 cycle (<HC2, HC3, HC4>). I hear the contextually projected roots of these collections to be F, D, and B, respectively. The upper system—separating these from the T_3 transformations—projects the stability of the overriding collection, HC1. As suggested by solid note-heads indicating missing

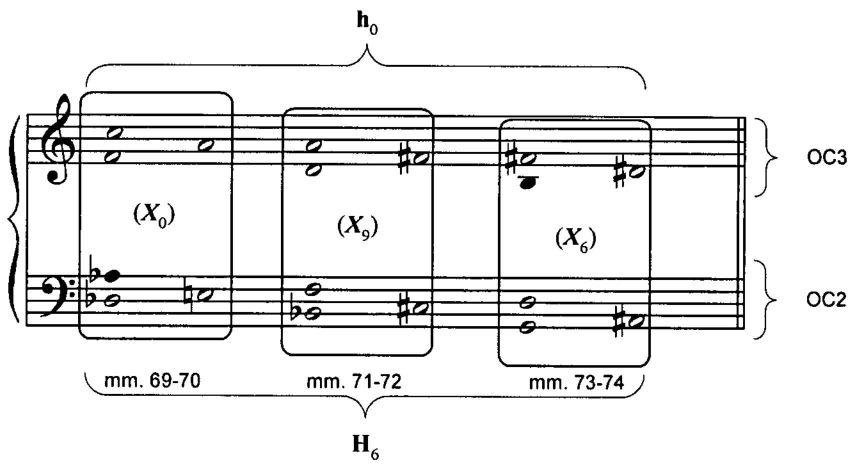
[72] We may also note that the interval between A♯1/A3 and A3/G♯5 is 23 semitones.

pcs, HC1 becomes gradually more defined (albeit never completely) as the sequence progresses: at first only a 3-note subset of HC1 is heard, then a 4-note, and finally a 5-note subset is realized.



Example 4.15. Sequence of hexatonic collections, mm. 69–78

As shown in Example 4.16, these measures also project the gradual unfolding of OC2 and OC3. The 0369 tetrachord common to both collections (pcs {2, 5, 8, e}) appears in the inner voices: the trichord on pcs {B, D, F} is found in the lower voice of the upper system, while the trichord on pcs {D, F, A♭} is in the upper voice of the lower system.



Example 4.16. Emblematic subsets of X_n, mm. 69–74

Even more striking, however, all the notes in the upper system (with the exception of B3), are elements of $\mathbf{h}_0$. The registral ordering of pitches reflects the ordered interval series <1, 2, 1, 3, 3>. B3 is, in fact, the next lower pc in the ordered interval series determining $\boldsymbol{X}_0$. Similarly, all the notes in the lower system, with the exception of A♭, are members of $\mathbf{H}_6$ and reflect the registral order of intervals <3, 3, 1, 2, 1>. A♭3 is the next higher pc in the ordered interval series determining $\boldsymbol{X}_6$.

Looking at Example 4.16 once again and considering these measures vertically, I point out three chords that may be regarded as emblematic of $\boldsymbol{X}_0$, $\boldsymbol{X}_9$, and $\boldsymbol{X}_6$ respectively.[73] (This reflects the same T_{-3} sequence of hexatonic collections noted in Example 4.15.) First, the boundary interval of each chord is 23 semitones (***p-i c*** 11). Second, each triad in the left and right hands represent the bottom three and top three pcs of $\boldsymbol{X}$ in these three transpositions, respectively. Each subset of $\boldsymbol{X}$, moreover, is a complete hexatonic collection with the ordered interval series <3, 4, 9, 4, 3>. (cf. §*2.6*n.31, p. 22)

If we are to give any weight to the significance of the hexatonic fields, it is reasonable to suggest that the first half of the second theme-group concludes in a hexatonic environment determined by pcs {0, 3, 4, 7, 8, e}, HC1. The sense that E is meant to emerge here in a tonic role, as it clearly does at [8], is arguably produced by a decidedly veiled B V^7 chord, comprising m. 73 and the downbeat of m. 74.[74] While relatively inconsequential and completely independent up until this point, the violin pedal on A (not shown) suddenly serves as the seventh of the V^7 chord. That this note

[73] As these are incomplete manifestations of $\boldsymbol{X}_n$, their respective forms are enclosed in parentheses.
[74] Given that the B major triad appears in the r.h. of the piano (i.e., embedded within the complete texture), one may argue, alternatively, that it is subordinate to, or subsumed by, the G minor triad in the l.h.

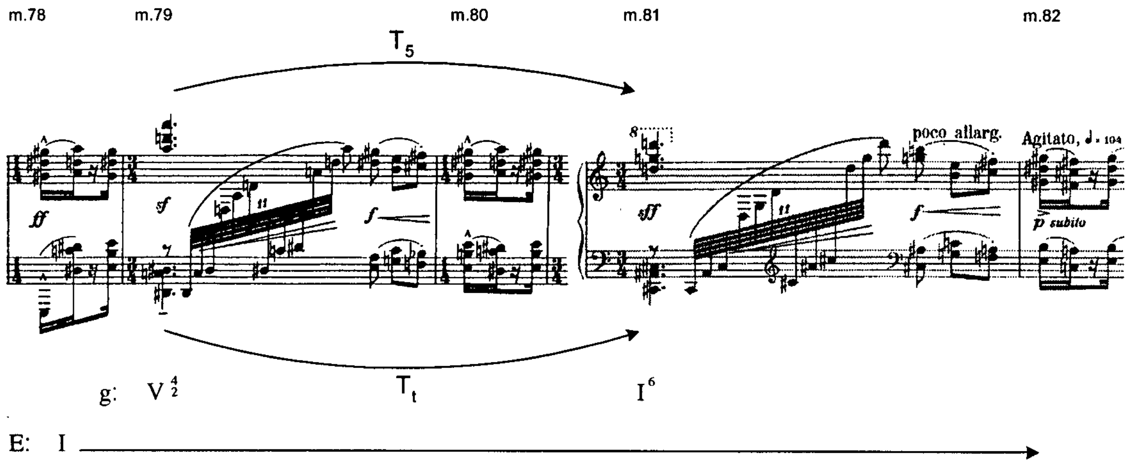
immediately resolves to G♯ on beat two of m. 74 (an implied third of an E chord) further supports this hearing.[75]

4.4.2 Second Subordinate Theme, D

As stated previously, the principal pc centre of the second subordinate theme is E. However, as will be demonstrated, several events contradict, obscure, and destabilize this centre. One such event occurs almost immediately.

Measures 78–81 serve as introductory material to the theme proper, which starts at m. 82. Despite the cadence on the E major-major seventh chord in m. 78 and the restatement of this chord in m. 80, the listener may not identify E as an unequivocal tonic harmony until it is heard at m. 82. I argue this point because each of mm. 78 and 80 is merely a single quarter note in duration and is more likely heard as an upbeat to the following measure (mm. 79 and 81 respectively), which receives a durational accent lasting a dotted half-note in each case.[76] In other words, the registral and durational accents placed on the downbeats of mm. 79 and 81 deflect the listener's attention away from mm. 78 and 80. Moreover, the downbeat chord of m. 79 acts as a dominant to the downbeat chord of m. 81, resulting in a temporary tonicization of G minor at m. 81. Admittedly, this is slightly obscured by the fact that the G minor chord, spelled enharmonically as {G, A♯, D}, is supported in the bass by its tritone associate C♯. (Example 4.17) It is interesting to consider that E is compromised even before the second subordinate theme proper begins.

[75] The earlier and somewhat random instances of G♯ (see mm. 71–73) may be understood as anticipated stutterings before finally coming into agreement with the piano at m. 74.2.
[76] The listener may easily perceive this new basic idea as comprising a single measure in 4/4 time.



Example 4.17. Tonicization of G minor, mm. 78–81

The dominant-tonic relationship, so explicit in the right hand, is latent in the left, where the ic-3 dyads in mm. 79 and 81 are merely related by T_t. To be sure, there is nothing explicitly tonal about this transpositional relationship. However, it can be argued that the C in m. 79, serving as the seventh of a V^7 chord built on D, in fact resolves to the third of the next chord (B♭), and thus functions similarly to conventional voice-leading practices. (Again, refer to Example 4.17.)

Although a tonal centre on E is explicit by m. 82, the exact origin of the E major-major seventh chord used in this passage remains uncertain. The following discussion will explore various possibilities.

As an inherent property of ***X***, each transposition has exactly four root-position major-major seventh chords, all a minor third apart: specifically, three have the ordered interval series <4, 3, 4>, whereas only one has the ordered interval series <7, 9, 7>.[77]

[77] See §*2.6.1* for a discussion of the major-major seventh chords inherent in ***X***.

This means that the E major-major seventh chord (expressed specifically as one of these two ordered interval series) is inherent in four transpositions of $\boldsymbol{X}$, namely: $\boldsymbol{X}_0$, $\boldsymbol{X}_3$, $\boldsymbol{X}_6$, and $\boldsymbol{X}_9$. For reference, Figure 4.2 lists the registrally ordered interval series of these transpositions. Included also are their respective indices of inversion. Numbers underlined and in boldface represent the pcs comprised by E major-major seventh chord. As is immediately apparent, symmetrically embedded forms of this chord appear in only two transpositions: $\boldsymbol{X}_3$, and $\boldsymbol{X}_9$.

<1, **4**, 7, **8**, t, **e**, 2, **3**, 5, 6, 9, 0> = $\boldsymbol{X}_0$, I_1

<**4**, 7, t, **e**, 1, 2, 5, 6, **8**, 9, 0, **3**> = $\boldsymbol{X}_3$, I_7

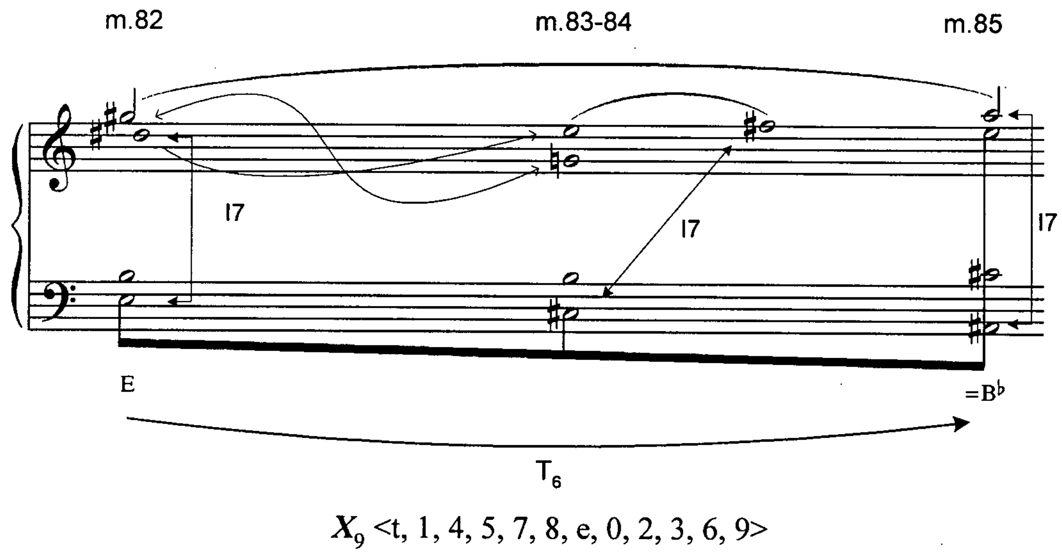
<7, t, 1, 2, **4**, 5, **8**, 9, **e**, 0, **3**, 6> = $\boldsymbol{X}_6$, I_1

<t, 1, **4**, 5, 7, **8**, **e**, 0, 2, **3**, 6, 9> = $\boldsymbol{X}_9$, I_7

Figure 4.2. Embedded registrally ordered E major-major seventh chords

We will note that the second subordinate theme involves a shift of pc centre from E to B♭, described as a move between tritone associates. This relates to the G/C♯ tritone pairing in m. 81 (mentioned above) such that all four focal pcs belong to the same minor-third axis. Thus, we may assert the prolongation of a single tonal environment, the global tonic space, starting at [8].

Example 4.18 is a voice-leading interpretation of mm. 82–85. As indicated by the stemmed notes in the upper voice, the essential motion is from G♯ to A. In the score, however, this involves a gradual octave ascent in pitch space, through G♯5 to A6. This is further embellished by the emergence of an inner voice. As is suggested in the example, the upper two voices in m. 82 cross parts in the following measure, thus allowing the E to be heard as the upper-most note in m. 83. This voice continues its ascent, arriving on F♯ in m. 84 and finally on A in m. 85. Although this is not obvious, the upper voice starting on D♯ (m. 82) essentially ascends by ic-3 through F♯ and A, moving symmetrically with the bass, which descends by ic-3: <E, C♯, A♯>. Consequently, we can determine a single index of inversion governing these measures. As indicated in Example 4.18, I_7 is implied by the pc-dyads {E/D♯}, {C♯/F♯}, and {A♯/A}. This voice-leading suggests a gradual unfolding of $\boldsymbol{X}_9$.



Example 4.18. Emergence of I_7, realizing $\boldsymbol{X}_9$

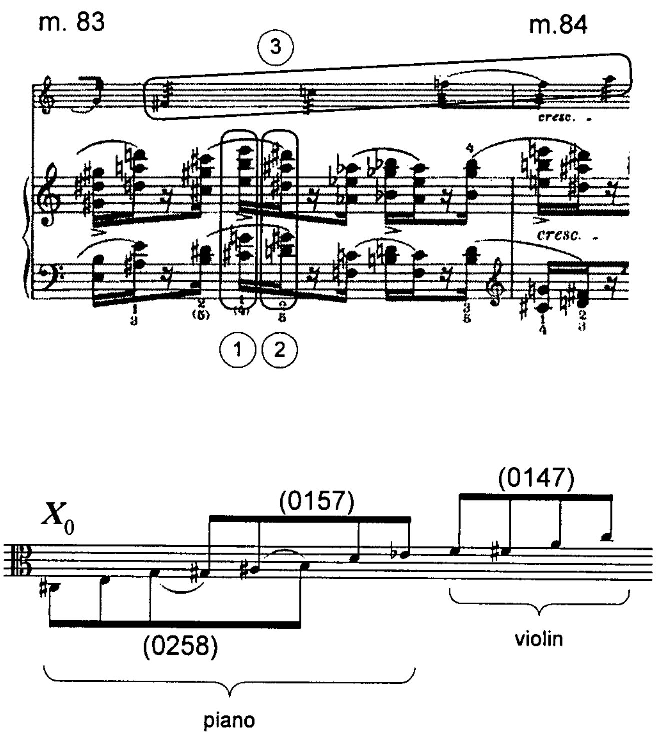
In addition to $\boldsymbol{X}_9$, other forms of the referential construct may also be detected. These occur more locally. The series of events of mm. 82–85 recall the earlier, sequential events of mm. 69–74. (cf. §*4.4.1*) While there is no thematic connection between the two sections (all the voices descended in parallel motion in the earlier sequence, whereas the relation between successive chords, as depicted in Example 4.18, is irregular), we may observe that the bass in each case descends by minor thirds. Moreover, this descent, which starts a minor third higher, involves pcs belonging to the same minor third axis that was realized previously. Whereas earlier, emblematic subsets of T_0, T_9 and $T_6(\boldsymbol{X})$, were projected by a descending minor-third sequence, here, in mm. 82–85, forms of T_3, T_0 and $T_9(\boldsymbol{X})$ are implied, in a more veiled way.

The first form I will discuss is $\boldsymbol{X}_3$. As indicated in Figure 4.2, the pcs of the E major-major seventh chord appear in $\boldsymbol{X}_3$ as a combination of perfect fifths above and below the lower- and uppermost pcs, respectively; hence the ordered interval series of this chord is <7, 9, 7>. The exact same ordering of this major-major seventh chord occurs in mm. 80, 82, and 83 (i.e., ignoring the octave doublings of E and G♯). However, as pcs D♯ and E constitute the outermost notes of this series, the subsequent semitonal, pc-contrary motion outward obscures this reference.

The second form to be projected, $\boldsymbol{X}_0$, coincides with the introduction of C♯ on the second beat of m. 83. (Please refer to Example 4.19) The second and third chords of this three-chord progression (hereafter referred to as chords one and two) are those that presently interest us. The first tetrachord in Example 4.19 (a), that which is built on C♯, is one of the four referential tetrachords discussed earlier, and referred to as tetrachord ***B***. (See §*2.4*, p.17.) This is followed by the second tetrachord which belongs to SC(0157). The voice-leading between chords is simple: each voice in the first chord moves by semitone (in pitch space) to its corresponding voice in the second. In the earlier discussion of tetrachords ***A*** and ***B***, it was observed that a ***p-i c*** 2 dyad (involving pcs {G♯, A♯}) moved in contrary motion to a ***p-i c*** 4 dyad (pcs {G, B}). Here, the voice-leading is simply reversed: using the same pcs, the ***p-i c*** 4 dyad voice-leads in contrary motion onto the ***p-i c*** 2 dyad. Whereas with tetrachords ***A*** and ***B*** two common-tones were held constant, here things go slightly awry. Rather than keeping pcs {C♯, E} as common-tones, two new pcs are introduced, pcs D and D♯. Consequently, eight different pcs are stated. As shown in Example 4.19 (b), the combination of these pcs corresponds with the bottom eight notes of X_0 (e.g., <1, 4, 7, 8, t, e, 2, 3>). The violin, meanwhile, arpeggiates a third tetrachord, SC(0147): <F♯, C, F, A>. (See mm. 83–84.) Notably, these are the last four pcs in the series (<5, 6, 9, 0>). As such, the combination of all three tetrachords completes the aggregate: the first two chords—interlocking with each other—constituting the first eight notes of the series; the third making up the last four. Slurs between notes in (b) indicate the voice-leading from the ***p-i c*** 2 dyad to the ***p-i c*** 4 dyad.

(a)

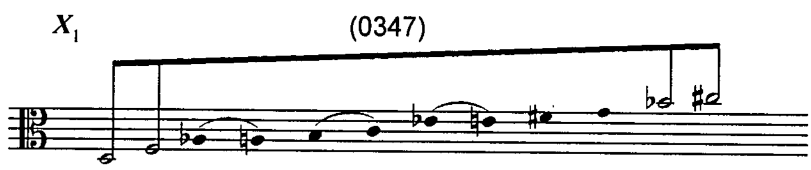
(b)



Example 4.19. X_0, mm. 83–84

4.4.3 Climax of the Exposition, Conflation of TS Collections

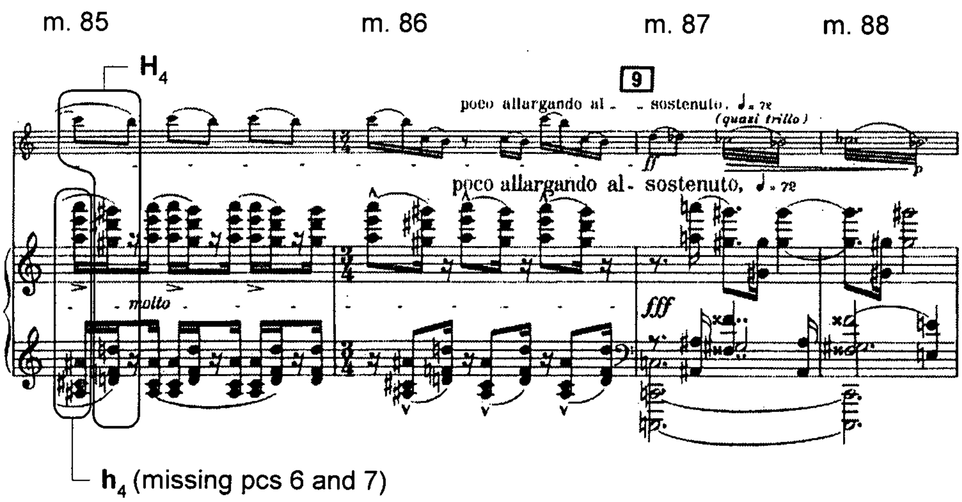
The harmonic function of the various harmonies at the climax of the exposition (specifically, mm. 85–86) is highly uncertain. The following discussion will examine possible ways of grasping these measures more concretely. As suggested above, while we can justify hearing the prolongation of pc A♯ in mm. 85–86 as serving tonic function (at the global level), there is as much evidence to contradict this. For example, the arpeggiation of the B♭ major-minor tetrad in the left hand underscores the significance of an inversional centre around C♯/D. To make a case for this, one might interpret the minor-third pairs ({A♯, C♯} and {D, F}) as the upper two and bottom two notes, respectively, of X_1: <**2**, **5**, 8, 9, e, 0, 3, 4, 6, 7, **t**, **1**>. A look at the voice leading in the other parts in mm. 85–86 (piano r.h. and violin) adds weight to this interpretation, since it groups notes in semitonal pairs, all of which are adjacencies along the ordered interval series X_1. This is indicated in Example 4.20, where slurs indicate these voice-leading pairs. The aggregate, however, is incomplete: pcs 6 and 7 are absent.



Example 4.20. X_1, mm. 85–86

The often independent nature of the violin has been a frequent concern throughout this analysis and it would be a significant mistake if, at this point (i.e., the climax of the exposition), one were to relegate the violin to merely an accompanimental or passive role. This is indeed a limitation of the immediately foregoing analyses—the first of which privileged B♭ as the focal "tonic" pc, and the second of which inferred the projection of X_1—since the violin part provides little evidence for either.

One way we may attribute greater significance to the violin is by pairing its pcs {C, B} with the second of the two verticalities in the piano, {D, F, G♯, D♯}. (See Example 4.21.) These pcs compose a complete form of $\mathbf{H}_4$, pcs, <5, 8, e, 0, 2, 3>. From this standpoint, the pcs of the first verticality (piano only) can be said to represent a 4-note subset of $\mathbf{h}_4$. We may now interpret the entire pc content as an alternation between $\mathbf{h}_4$ and $\mathbf{H}_4$. It will be noted that X_4 is one of four transpositions of the referential construct that determines the broad-level dominant axis. As is by now quite obvious, the inherent and inherited properties of $\mathbf{h}_n$ project dominant function, while those of $\mathbf{H}_n$ project tonic function. Therefore, the sense that {D, F, G♯} are being locally tonicized, as an axial subset of $\mathbf{H}_4$, contributes towards the destabilization of both B♭ and the broad-level tonic environment, and prefigures the return of the dominant axis in a stable role in ***C'***.

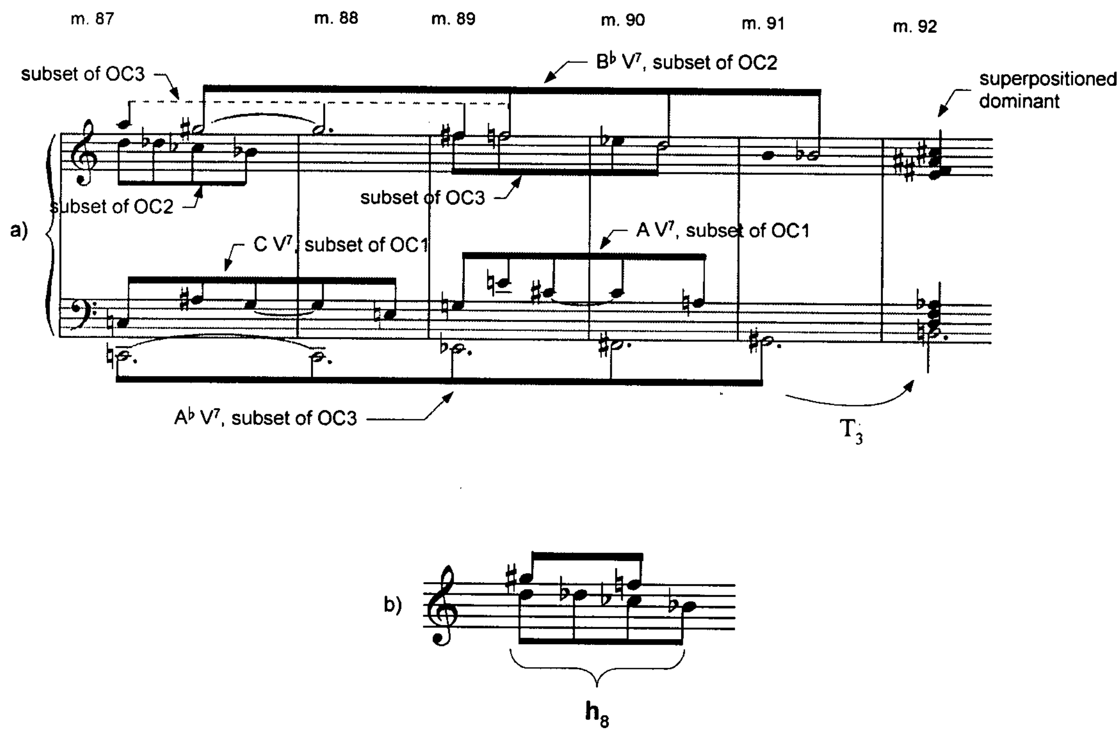


Example 4.21. Referential hexachords in X_4, mm. 85–86

While mm. 86 to 87 are superficially reminiscent of a traditional deceptive cadence (e.g., the behaviour of the lowest pcs of these measures suggests a conventional V-VI progression in the key of E♭), the following discussion will argue that the harmonic function immediately preceding [9], where $\mathbf{H}_4$ assumes a tonic role, is maintained all the way through to the end of the exposition.

While the pcs comprising $\mathbf{H}_4$ belong to OC3, the climax of the exposition is marked by the conflation of all three octatonic collections, thus obscuring OC3's harmonic centrality. The projection of each octatonic collection is suggested by: i) the melodic 0134 motives, stated in the violin and piano r.h., and ii) the arpeggiation of several prominent V^7 chords. (See Example 4.22a.) Although much emphasis is placed on C starting in m. 87, suggesting a shift in tonal centre to the global subdominant axis, this pc ultimately proves to be not a fundamental but the third of the arpeggiated A♭ (=G♯) V^7 chord. There is then a shift in m. 92 to a prominent low-register B, over which the violin's A pedal acts as a chordal seventh (not shown in the example), while the piano's right hand superimposes a T_7-related dominant seventh chord, {F♯, A♯, C♯, E}. Essentially, the global dominant axis, expressed by the roots G♯ and B and the projection of OC3, governs the music at this point of termination of the exposition.

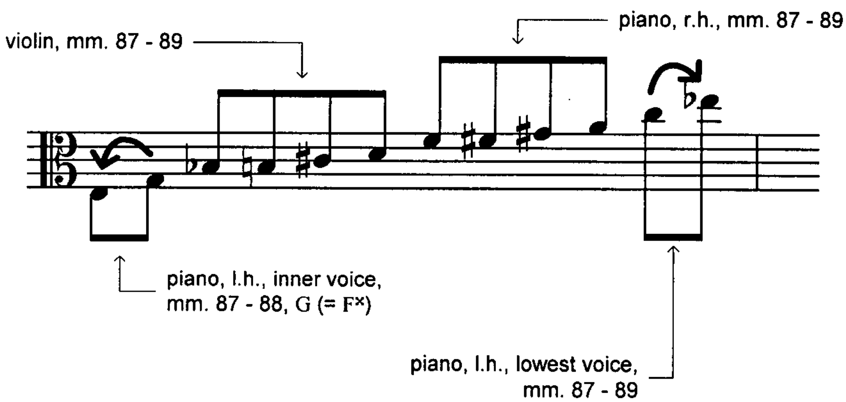
To be sure, there is little in these measures to suggest a stable tonal centre. In mm. 87-89, we may observe in the upper register the gradual unfolding of $\mathbf{h}_8$ (pcs <t, e, 1, 2, 5, 8>). (See Example 4.22b.) Here, the 0134 motive in the violin (pcs <2, 1, e, t>) interacts with the durationally accented pcs of the piano's 0134 motive (pcs <8, 5>) Viewed this way, the piano's octave on A and F♯ may be said to function as chromatic neighbour notes to G♯ and F, respectively As such, one can argue that the inherited dominant properties of $\mathbf{h}_8$—a subset of OC2 and agent of X_8— compete with the simultaneously projected OC3 elements surrounding them.



Example 4.22. Climax of Exposition, mm. 87–92

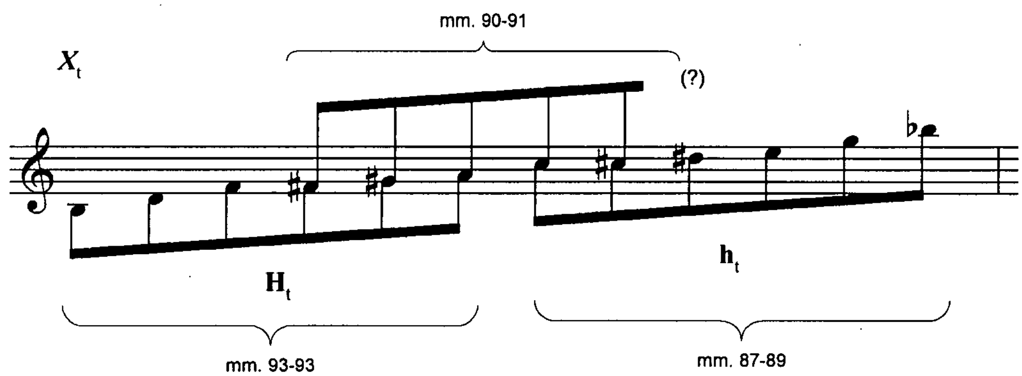
Considering that no one particular octatonic collection is stated explicitly, let alone in its entirety, the reader may question the merit of asserting octatonic significance to this passage. However, if one compares this section with its counterpart in the recapitulation (mm. 250–255), it becomes evident that the conflict, opposition, and uncertainty among the competing octatonic collections at this moment in the exposition is resolved and made more intelligible in the recapitulation where the OC2 field is made explicit via a scalar two-octave descent in the violin, albeit challenged by arpeggiated V^7 chords on F♯ and C in the piano l.h., which affirm OC1.

Apart from this, there is much to suggest a statement of X_3 starting at [9]. This is indicated most clearly in the relationship of pcs heard between the violin and piano r.h. in mm. 87–89. Each part is assigned the same set-class motive of 0134: the piano plays pcs {5, 6, 8, 9}, while the violin plays pcs {t, e, 1, 2}. Together, these two transpositionally and inversionally related pc sets represent the central eight notes of the ordered pc series at T_3: <4, 7, **t**, **e**, **1**, **2**, **5**, **6**, **8**, **9**, 0, 3>. Contributing towards the completion of the series, a low C in the piano is followed by a low E♭ in m. 89, constituting the upper two notes of the ordered pc series. Pcs G (= F𝄪) and E, representing the lower two notes of the series, appear embedded within the tenor voice in mm. 87–88. The melodic ordering of these last pcs, <G, E>, as a directional reversal of the bas line's <C, E♭>, emphasizes the inversional symmetry around E♭/E representative of X_3. Although expressed in pc-space, the partitioning into symmetrically related subsets, as shown in Example 4.23, encourages this hearing. Arrows between pcs of the ic-3 dyads indicate respective temporal ordering.



Example 4.23. Tetrachordal Partitionings of X_3, mm. 87–89

Serving a local tonic function, the global dominant axis is re-affirmed at m.92. The harmonic support in the piano l.h. instances a 5-note subset which may be interpreted as either $\mathbf{H}_t$, pcs {e, 2, 5, [6], 8, 9}, or $\mathbf{H}_1$, pcs {2, 5, 8, 9, e, [0]}. In support of former, it is reasonable to hear the F♯ dominant seventh chord in mm. 92–93 (arpeggiated in the r.h. overtop the low B pedal) as a representation or composing-out of pc 6 and thus completing $\mathbf{H}_t$. Moreover, with the exception G♯3 heard in mm. 87–88, all of the pcs in the l.h. through mm. 87–89 belong to its complement, $\mathbf{h}_t$, {0, 1, 3, 4, 7, t}. The pcs in mm. 90–91 (pcs {4, 6, 8, 9, 0, 1}) combine elements from both hexachords, and may be thought to serve the purpose of essentially linking one hexachord to another. In effect, the harmonic basis of mm. 87–93, provided by the l.h., involves the projection of $\mathbf{h}_t$ followed by $\mathbf{H}_t$. The relevant derivations of $\boldsymbol{X}_t$ are indicated in Example 4.24.



Example 4.24. Hexachordal partitionings of $\boldsymbol{X}_t$

The exposition nears its close starting at [10]. Here, the violin resolves its A, functioning as a seventh of B and fifth of D, on the local tonic of the first subordinate theme-group, pc D. The piano, meanwhile, reiterates the arpeggiated/contrary-motion figure of mm. 58–59, recalling the introduction to the second theme-group, now transposed by T_6. Whereas there, this figure instanced the form $\mathbf{H}_7$, here at m. 98 we would expect to hear the form $\mathbf{H}_1$, {D, F, A♭, A, B, C}. This is essentially what happens, except that B is omitted.

As a contextually stable pc complex $\mathbf{H}_1$ is understood as the temporary tonic harmony. At m. 100, this harmonic complex is transformed into a purely octatonic construct. As mentioned earlier, these measures are defined by an unequivocal OC3 field; $\mathbf{H}_1$, a subset of OC3, thus anticipates the octatonic environment.

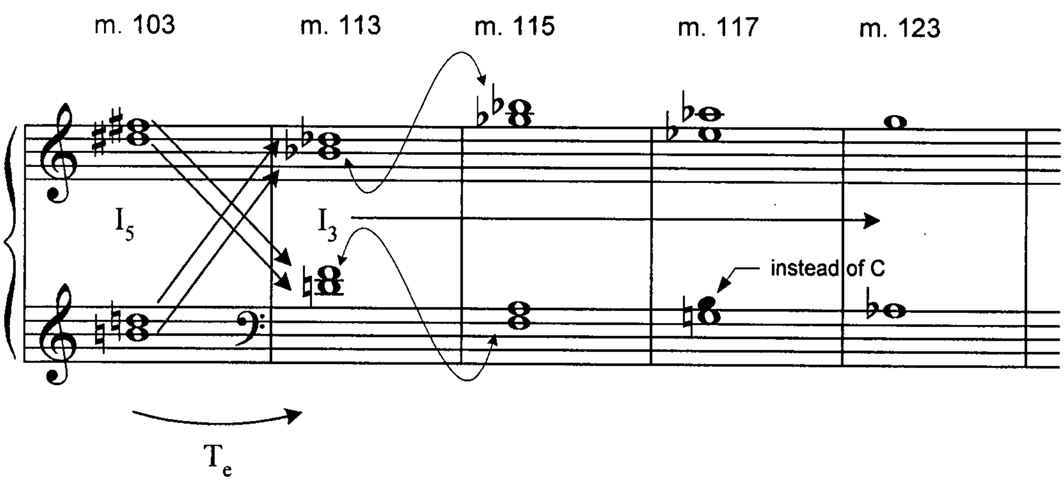
4.5 Development, mm. 103 – 133

The following analysis will examine the relationship between the various pc centres heard at the start of the development. To characterize these relationships, certain pc centres are deemed functional and others, non-functional. The tonal axis implied at the end of the exposition, namely that of dominant functioning as local tonic, is sustained throughout the first half of the development. This is not to suggest, however, that tonicized dominant function is always and entirely explicit. Indeed, it is frequently obscured by the assertion of opposing tonal fields at various local levels. However, as will be shown, pc centres along the dominant-axis are repeatedly treated as focal, thus creating a sense of coherence to this passage.

While a centre of inversion around the pc-dyad D/D♯ is evident starting in m. 103, it functions here in the service of a temporary tonic defined by the root of the B major-minor tetrad, much as G♯/A functions in the service of the F tonality at [7]. This tonal centre around B manifests itself further when the violin plays a polymodal melody starting in m. 109, in which B functions as the *finalis* of both the Lydian and Phrygian modes. Despite its elaborate arpeggiations spanning several octaves, the violin melody clearly articulates an ascent of the perfect fifth in the Lydian mode <B, C♯, D♯, E♯, F♯>, followed by a descent of the perfect fifth back to B using the Phrygian mode <F♯, E, D,

C, B>. *Tenuto* markings positioned above each of these notes underscore this polymodal relationship.[78]

When the gesture of m. 103 is restated at m. 113, the dyads exchange registral positions and the entire chord is transposed down a semitone. (See Example 4.25.) The resulting dyads are related inversionally around G/A♭, and thus by I_3. While the root of the major-minor tetrad in m. 103 was said to serve as temporary tonic, the symmetrical aspect of the {0, 3, 4, 7}-type chord becomes its primary structural feature in the opening measures of the development. The contrary motion of the outermost voices through mm. 115–117 preserves the centre of inversion, which seems more important than the black-key/white-key opposition of registers and the predominance of HC3 as a pc field. Although another pc centre of inversion is asserted at m. 120 (to be discussed in due course), the same index of inversion (I_3) is recalled when the violin re-enters in m. 123 on the pitch G5 against the piano's low G♯3.

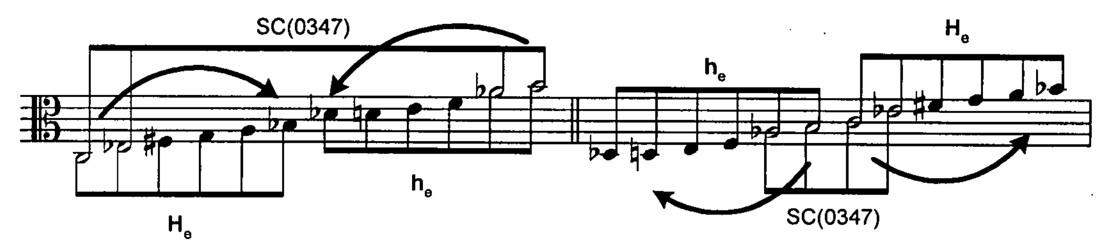


Example 4.25. Voice leading reduction; mm. 103–123

[78] For discussion's on Bartók's treatment of *polymodal chromaticism* please see: Kárpáti, "Polymodal Chromaticism," *Bartók's Chamber Music*, 169–183; Bartók, *Essays*, 367–371, 376–383; and Morrison (1991).

The design of the first part of the development is essentially marked-out by three temporary tonal centres: B starting in m. 103; B♭ in m. 113; and G♯ in m. 122. It is quite reasonable to interpret the overall move from B to G♯ as analogous to a conventional modulation from the tonic major to the relative minor. With the exception of B♭, which merely serves a passing function, all of the pc centres since the end of the exposition belong to the dominant minor-third axis. Moreover, all have privileged SC(0347).

While the major-minor tetrad has been heard previously (the reader may recall the first subordinate theme-group, mm. 63–67, in which the F major-minor tetrad functioned as a temporary tonic harmony), it soon becomes evident that the symmetrical construction of this tetrachord is used for the purpose of alluding to the referential construct.[79] With reference to the particular tetrachord in m. 122 ({G♯, B, C, E♭}), one may say that its lower two pcs {G♯ (=A♭), B} represent the upper two pcs of X_e, while its upper two pcs {C, E♭} represent the lower two pcs of X_e. (See Example 4.26.) It is as if the centripetal, inward projecting, tendency of X, prominent throughout the exposition, is suddenly replaced by a centrifugal, outward reaching urge in the development.



Example 4.26. Centripetal and Centrifugal Projections, X_e

Viewed this way, we might expect either one (or both) of these two minor-third dyads to be extended outwards, so as to complete either $\mathbf{H}_e$ or $\mathbf{h}_e$. In this arrangement,

[79] A similar interpretation of this tetrachord was suggested earlier. See §*4.4.3*.

their respective registers, as they appear within X_e, have been reversed: $\mathbf{H}_e$ is now situated above $\mathbf{h}_e$. I would argue that $\mathbf{H}_e$, built on the C/E♭ dyad, is projected as the violin realizes the second statement of the basic idea (see mm. 123–126). Of the four pcs needed to complete this hexachord (pcs{F♯, G, A, B♭}), three receive durational accents: G, B♭, and A. The fourth, F♯, appears as part of the basic idea's characteristic grace-note figure. Certainly, other pcs are involved. However, they appear superficially and can be extracted from the surface without significantly compromising the coherence of the basic gesture.

As the piano continues to expand this G♯ major-minor tetrad outwards, the outermost voices expand at different intervals, essentially dissolving the index of inversion around B/C. The direct result of this is the tonal shift at m. 129, a modulation by perfect fifth, which comes about as follows. The new tonal centre, E♭ (=D♯), is tonicized by the D/A♭ boundary interval in the piano in m. 126. This diminished fifth is resolved in two stages. First, A♭ may be heard to resolve to G on the second beat of m. 127, after the quarter-note rest.[80] The resolution of D to E♭ (=D♯) is delayed until m. 129. Moreover, this resolution is considerably obscured since E♭ is approached chromatically, starting in m. 127, from above, in a subsidiary motion.

The D/A♭ boundary interval of m. 126 may also be interpreted enharmonically; that is, as an augmented fourth. Accordingly, we would expect this to resolve to an interval of a sixth, resulting in a tonicization of A. While this pc centre is not manifest in the piano part, it is nonetheless manifest (quite explicitly) in the violin by means of its arpeggiation of the A major triad: <E6, C♯6, A6, E6> (mm. 127–129). In effect, two pc centres a tritone apart have simultaneously been tonicized. These pcs belong to the global

[80] Although there is the immediate resolution to G in m. 126, it is understood in this context as a passing tone to F; the arpeggiation of the F minor triad is thus privileged.

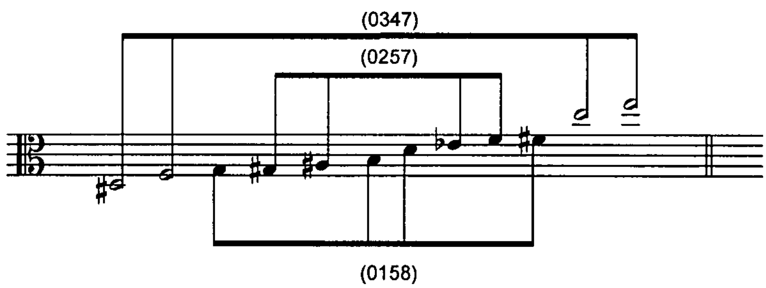
dominant axis, but function here in a passing role. They connect the dominant-axis pcs of the preceding music to tonic-axis pcs, which predominate at [14], without signalling (yet) a return to the global tonic axis, since the development section continues, as a whole, to prolong the dominant axis.

4.6 Development, mm. 134–145

The following analysis examines a short section extracted from the development, specifically mm. 134–145. Unlike many of the previously discussed passages where either one or both of the referential hexachords saturated the texture, these measures are free of any such explicit reference. However, as will be shown, despite the partitioning and reordering of its elements in pitch-class space, various X_n-forms may be noted. The partitioning of X in this instance is a variation of those partitionings discussed in Chapter 2. Not surprisingly, we will observe a further interrelationship between opposing TS collections (i.e., octatonic and hexatonic collections) functioning on local- and medium-scale levels of structure.

The passage is essentially an asymmetrical periodic structure comprising a four-measure antecedent and an eight-measure consequent, the latter being subdivided into 5- and 3-measure phrases. Prominent throughout this phrase group, the highly ornate violin melody is essentially controlled by a single octatonic collection. Durational accents, demarcating the triple meter, are placed only on those pcs belonging to OC1, specifically pcs < 0, 4, 7, 3, 6, 9, t> (although pc 1 is present, it receives no durational accent, and therefore OC1 remains incomplete).

The symmetrical layout of the violin's four-note gesture <C6, A5, E5, C♯5> at [14] reflects the bottom two, and top two pcs of X_0, and may thus be regarded as a telescoped (or contracted) version of X, spanning the interval of 11 semitones rather than 23. The tetrachords played by the piano in m. 134 complete the aggregate. Despite a pitch-inversional symmetry around F♯4/G4, these chords, too, are derived from a symmetrical partitioning of X_0, expressed in pc-space. As shown in Example 4.27, all three tetrachords are inversional around C/C♯: open note-heads indicate the violin gesture, while solid note-heads—the middle eight notes of the referential collection—indicate the piano tetrachords. Each tetrachord is identified by its set-class above or below the beamed notes. With respect to the succession of the piano's tetrachords, each element of SC(0158), {G, B, D, F♯}, is voice-led to a member of the SC(0257), {A♭, B♭, E♭, F}, either by an ascending or descending ***p-i c*** 1.



Example 4.27. Symmetrical partitioning of X_0, SCs 0158, 0257, and 0347

Each tetrachord in m. 134 is subsequently transposed in m. 135 by T_7, down a perfect-fourth in pitch space. While the parallelism between measures seems to point to X_7, this is never fully realized as there is no statement of the arpeggiated violin tetrachord at T_7, (i.e., pcs <7, 4, e, 8>).

A definite parallelism arises when the chords that begin the consequent phrase (mm. 138–41) are transposed by T_2, a whole-tone higher, relative to those in m. 134.

Comparing the piano chords of mm. 134, 135 and 138, one sees a particular sequence emerging. Figure 4.3 shows how the transposition of X by T_2 is the result of two earlier transpositions by T_7. Were this to continue, we would land on X_9 in m. 139. This does not happen and, instead, m. 138 is transposed by T_3, resulting in the suggestion of X_5 in m. 139. To make sense of this break in the sequence, we need only observe the inversional relationship between the T_2 of mm. 134/138 and the T_{-2} of mm. 135 and 139. As such, this passage is made coherent as the inversional symmetry within each measure (i.e., at the local level) is realized at a slightly higher structural level.

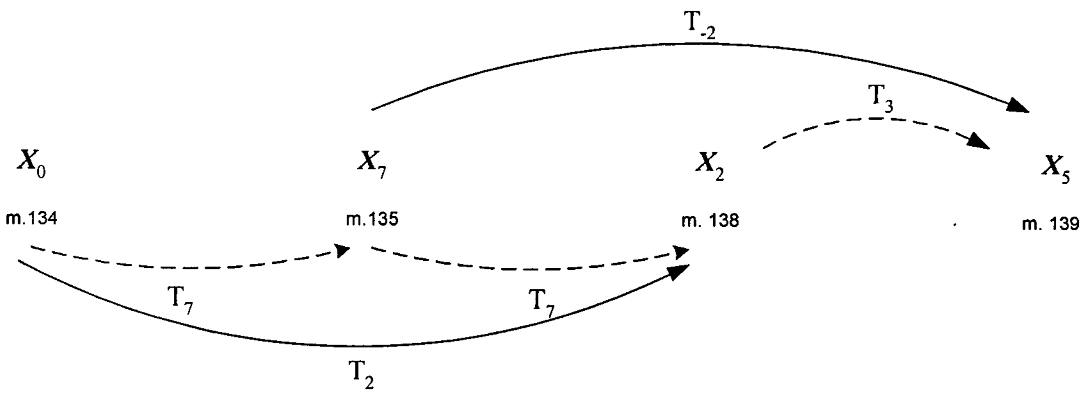
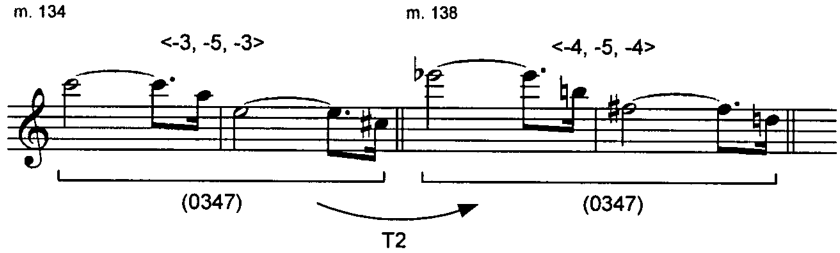


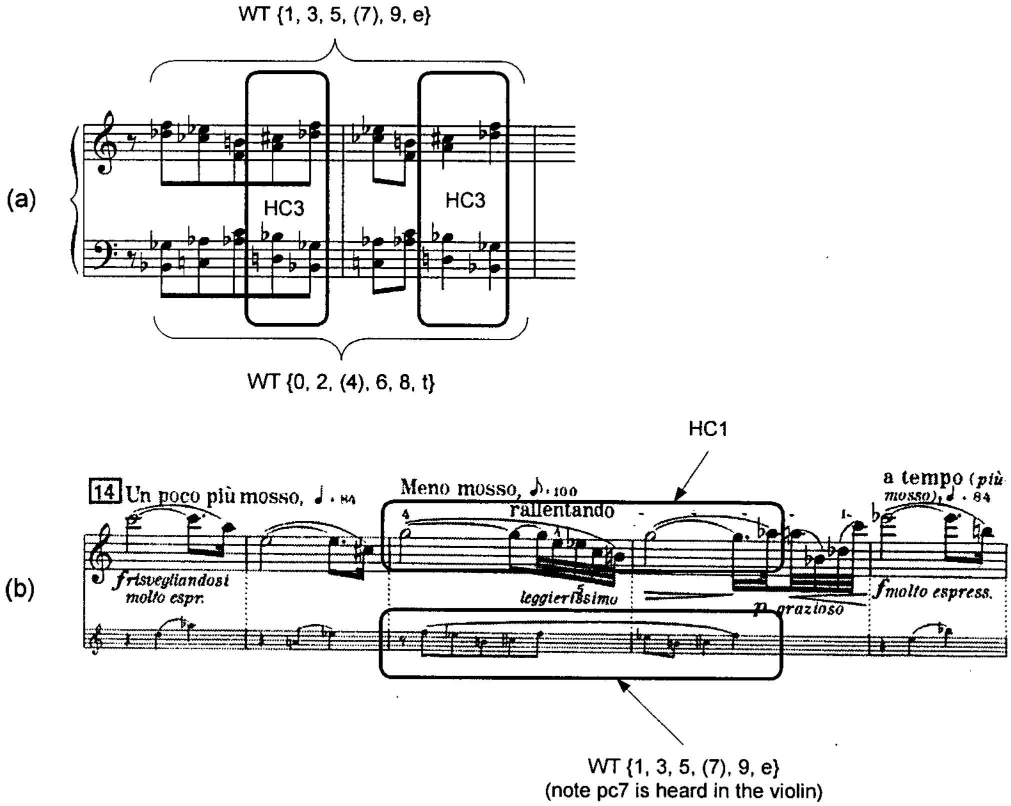
Figure 4.3. Inversional symmetry, $T_{+/-2}$

The transposition by T_2 is not entirely obvious, since the violin begins its "sequence" in m. 138 on E♭6, which suggests a transposition by T^3 relative to the first note of the violin gesture in m. 134. While each statement of the violin gesture is characteristically similar (i.e., both are descending arpeggiated figures), the ordered interval series of each tetrachord is slightly altered: <-3, -5, -3> and <-4, -5, -4> respectively. (See Example 4.28.) Despite different ordered interval series, each arpeggiation is a projection of the same set-class, SC(0347).



Example 4.28. Arpeggiation of SC(0347)

A hexatonic space intervenes in mm. 136–37, forming a contrasting idea to the basic idea of mm. 134–135. As shown in Example 4.29(a), the left hand is controlled by the whole-tone (WT) scale starting on C, while the right hand is controlled by that which starts on C♯. Each collection, however, is incomplete; pc-integers in parentheses indicate the missing notes. Concluding each measure, the augmented trichords {B♭, D, G♭} in the l.h. and {A, C♯/D♭, F} in the r.h. define a hexatonic space, HC3. As shown in Example 4.29(b), the violin's elaboration of G5—the absent pc of the WT scale starting on C♯—is controlled by HC1 (the complement of HC3), thus confirming this sudden shift in field.



Example 4.29. mm. 136–137

Rehearsal [15] (m. 142) coincides with the last note of the violin's octatonic melody and initiates a cadential extension of the 5-measure consequent phrase. The restlessness in both instruments makes determining the tonal identity of these measures rather difficult. The prolongation of B♭ in the violin is indisputable. However, the symmetrical design of the violin gestures suggests that something else is going on. The gesture that the violin traces in elaborating its focal B♭ is inversionally symmetrical around the pitch A4. This implication of A recalls the explicit prolongation of this same pc heard as part of the exposition's first subordinate theme-group, ***C***. (See §***4.4.1.***) Its inference is further supported if we bear in mind: i) the broken A major triad heard in mm. 127–129 and ii) the downward arpeggiation of the A major-minor tetrad {A, C, C♯, E} in mm. 134–135.

The piano part, also starting at [15], I would argue, essentially asserts an E-rooted harmony, obscured, however, because the root is always heard in an inner voice. The same E major-minor tetrad is essentially heard in all four measures.[81] However, neither of these focal pcs (B♭ in the violin or E in the piano) is perceived as tonic.

Instead, if we consider the inversional symmetry around A, in other words, interpreting this as an implied pc and an expected goal, then both the piano and violin—the focal pcs of each being tritone associates of the other—may be heard to have dominant function; the piano by way of a conventional fifth-relation, the violin semitonally. This reading seems reasonable given the general restlessness of these final measures.

4.7 Development, mm. 146–167

Starting in m. 146 (marked Tempo I) the 015 trichord, featured prominently in the first theme-group of the exposition, is reintroduced. The following discussion will examine how this chord is treated. As mentioned earlier, these trichords have the potential of projecting roots a major third apart. As such, we can determine that the chord on the second beat of m. 146 projects the hexatonically related roots C♯ and A. (Similarly, the roots of the chords in mm. 148–151 may be heard as B♭ and G♭.)

While the A root at m. 146 answers to the expectation of the immediately preceding measures, wherein B♭ and E functioned as dominants, it ultimately proves subordinate to the stronger presence of C♯. This is tonicized, without any substantial dominant preparation, at the start of the measure by $\mathbf{h}_3$, which comprises V^7 chords on F and G♯. Admittedly, this tonality is short-lived, as B♭ is asserted starting in m. 148. However,

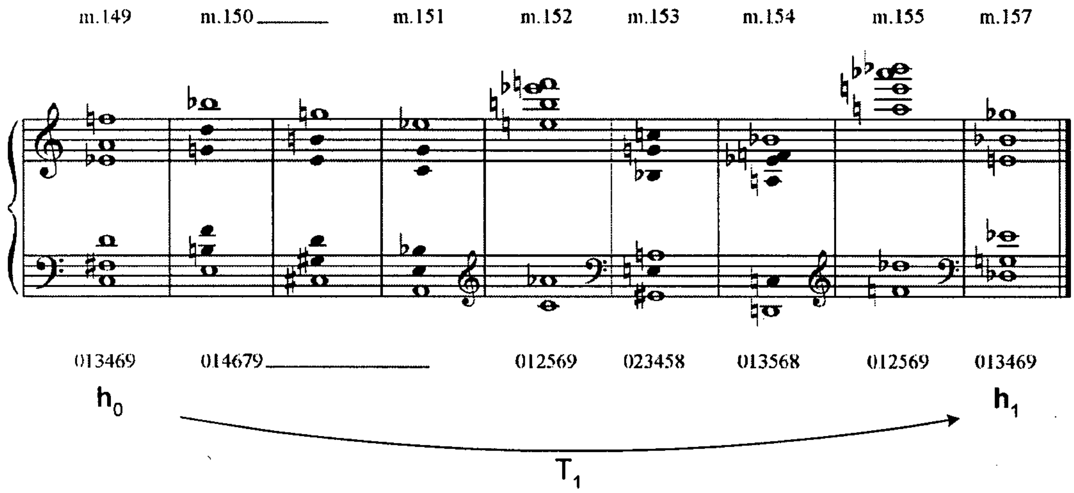
[81] Only in m. 143 is the tetrad slightly altered; C substitutes B, resulting in SC(0148). More importantly, however, both pc-sets belong to the same hexatonic collection: HC1, {0, 3, 4, 7, 8, e}.

these two tonal centres are related by minor third and, therefore, suggest the prolongation of a single tonal field.

The local dominant function is maintained through mm. 149–157, while $\mathbf{h}_n$ undergoes a series of subtle transformations.[82] (See Example 4.30.) As indicated by solid note-heads in the example, with the exception of inverted form of SC(012569), which appear in mm. 152 and 155, all of the transformations involve an embedded, yet explicit V^7 chord.

The first transformation, occurring in m. 150, involves the transformation of $\mathbf{h}_0$ into another 6-note octatonic subset, SC(014679). The T_3-related sixteenth-note hexachords in m. 150 belong to OC2. This means that they tonicize roots of major (or minor) triads in OC1; hence, the roots in the longer, emphasized chords of m. 150 are A (not C♯, as at m. 146) and G♭. Although this is not immediately clear in the example, the first three $\mathbf{h}_n$-transformations result in a gradual increase in chromatic density: prior to m. 152 only chromatic dyads are present in the chords; the harmony at m. 152 includes a chromatic trichord; and finally, the harmony at m. 153 includes a chromatic tetrachord. The increase in chromatic density is reached in m. 153 and parallels the rise in an overall surface-level activity. Starting in m. 154 there is a gradual lessening of this chromatic tension resulting in a return of the $\mathbf{h}_n$ *ur*-form in m. 157. This contradicts the continued increase in surface level activity, which reaches its climax in m. 158. These transformations, however, result in a T_1 transposition of $\mathbf{h}_0$ in m. 149 to $\mathbf{h}_1$ in m. 157, thus creating the opportunity of tonicizing pcs belonging to the global dominant minor-third axis.

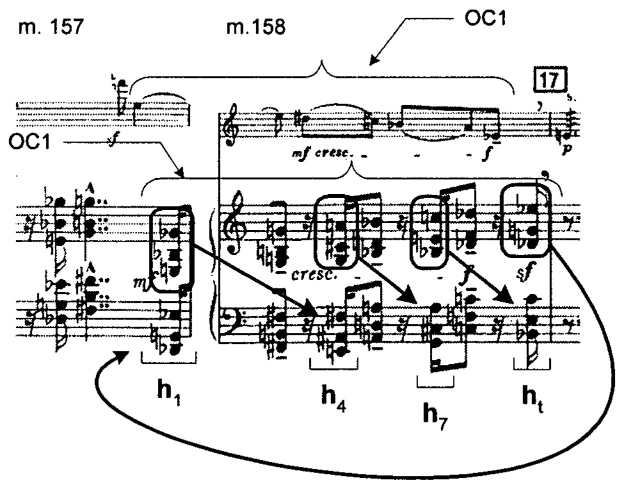
[82] The term "transformation" is not used here in the strict sense. It refers to slight distortions, disturbances, or deformations of the referential set, $\mathbf{h}_n$.



Example 4.30. Transformations of $\mathbf{h}_n$, mm. 149–157

Having some understanding of the accompaniment starting at m. 146, we can now consider how the principal melody participates with or contradicts that which is suggested in the accompaniment. The pcs comprising the violin melody of mm. 148–152 (omitting only the sixteenth note F♯5 of in m. 152) all belong to the same octatonic collection (OC2) and, consequently, prolong this tonal field. The violin melody begins to stray outside of its OC2 domain, introducing pcs foreign to this collection, at precisely the same moment the piano initiates the various transformations of $\mathbf{h}_n$. But for the violin repeatedly gravitating towards E (see mm. 155 and 157), there is little that remains of the original collection as this section builds towards a climax at m. 158.

As is illustrated in Example 4.31, a complete form of OC1 is expressed in mm. 157–158, uniting the pcs of the descending violin melody, <E5, D♯5, C♯5, B♭4, A4, E♭4>, with those of the ascending piano gesture (see uppermost pitches), <G♭4, G4, A4, B♭4, C5, D♭5, E♭5>. However, the super-positioning of multiple TS collections contradicts, if not negates, the significance of this particular octatonic field. I draw the reader's attention to the lowest register of the piano at m. 158. The ic-5 dyads heard on each quarter-note downbeat express an arguably convincing 6-note subset of OC3. Each dyad is tonicized by a T_3-related form of $\mathbf{h}_n$: namely, $\mathbf{h}_1$, $\mathbf{h}_4$, $\mathbf{h}_7$, and $\mathbf{h}_t$ (all of which belong to OC1). Arrows in the example show that with each transposition the upper 026 trichord is positioned as the lowest 026 trichord of the next. In effect, the large-scale motion of mm 146–158 from OC2 to OC1 takes on the aspect of a chain of dominants, which is quite proper to a development section, as well as being "natural" to motions from one octatonic collection to its T_{-1} relative.



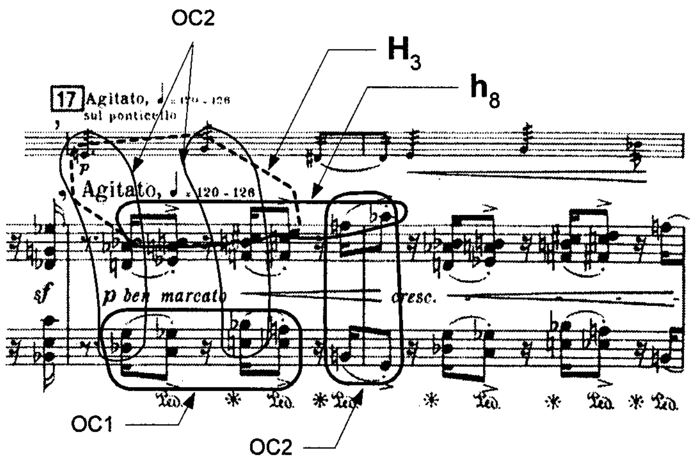
Example 4.31. mm. 157–158, manifestation of OC1

A sudden change in dynamic at [17] (m. 159) coincides with the start of a new section, whereby the second subordinate theme-group (***D***) is recalled. The violin melody, alluding to the key of E minor,[83] immediately falls out of sync with the piano. Whereas the piano maintains a steady quarter-note pulse coinciding with each downbeat, the violin

[83] The reader will recall that in the exposition E minor reasserted tonic space. Consequently, the manifestation of E at [17] may be thought to serve an identical function. However, the return of a deep-level tonic at this point is premature. See §***4.8*** on how this is corrected.

establishes its own quarter-note pulse landing on the “and” of each beat. A sequence of these measures transposed up a perfect-fourth shortly follows, starting on the last eighth-note of m. 161.

Bartók’s multifarious treatment of the referential hexachord and super-positioning of multiple TS collections is striking here. (See Example 4.32.) In the uppermost notes of the piano accompaniment, starting in m. 159 and continuing to the downbeat of the following measure (pcs < B♭, B, C♯, D, F, A♭>), we may recognize a complete expression of $\mathbf{h}_8$. While this is especially prominent, another form of the referential hexachord may be constructed by combining the same 0134 tetrachord in the piano with the ic-3 dyad in the violin, pcs <E, G>. This results in $\mathbf{H}_3$, pcs {E, G, B♭, B, C♯, D}. Notice that both sets belong to the same octatonic collection, OC2, and the combination of both sets completes this collection.



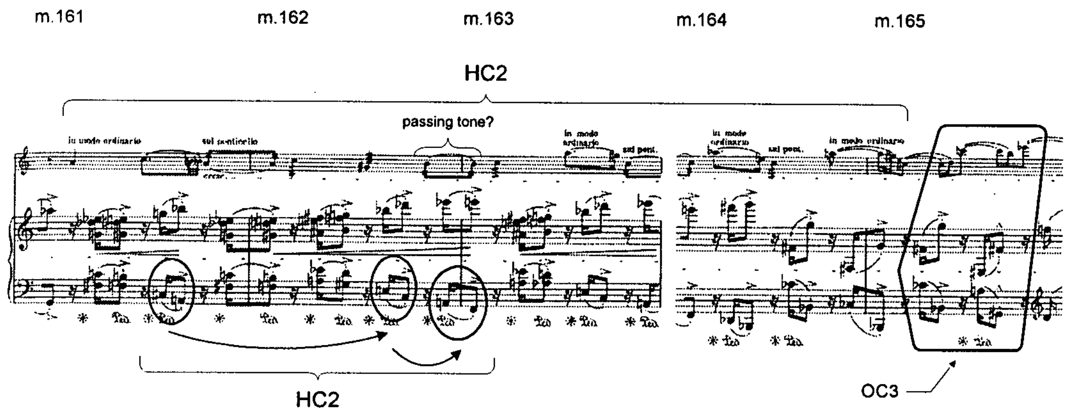
Example 4.32. mm. 159–160

OC2 gains further emphasis because the piano's first and third verticalities combined with the violin's E and G, respectively, instance 6-note subsets of this collection, and because both of the piano's dyads, <F5, A♭5> and <B2, G2>, leading into m. 160, belong to it. A pattern of ic-6 dyads in the piano l.h. articulating OC1 and a parallel pattern of ic-6 dyads in the lower two voices of the piano r.h. articulating OC3 destabilize the OC2 field.

Once the gesture of m. 159 is sequenced up a perfect-fourth, OC1 appears in the upper voices (manifested through $\mathbf{H}_8$ and $\mathbf{h}_1$), OC3 in the bass, and OC2 embedded in between. This saturation by octatonic collections plus the characteristic use of the ic-6 dyads is reminiscent of the contrasting middle of the first theme-group (mm. 24–30). It is therefore not surprising that the violin, having built toward another climax at m. 166, suddenly reintroduces a second characteristic gesture from the contrasting middle, the major third motive. (See §***4.2.4***.)

The major third motive emerges as early as [17]: {G, B} dyads are heard crossing measures 159–160 and 160–161, after which the major third begins exploring new territory. Three occurrences of this motive are shown in Example 4.33a (mm. 161–163): all three dyads ({A, C♯}, {C, E} and {F, A} respectively) appear in the bass. This collection of pcs is strongly suggestive of HC2, which is the same hexatonic collection used in the violin melody of mm. 161–165. A sudden digression to OC3 at m. 165 provides a smooth transition leading to the {B, E♭} dyad of the violin at m. 166 (not shown), which suggests the hexatonic complement, HC4. This is further realized when in m. 167 the violin falls in pitch by a semitone, beginning a new phrase on the pcs D and B♭. Moreover, the piano's intervals on the downbeats of mm. 166 and 167 are both ***p-i c*** 4, related by $T_{+/-4}$, and further instance HC4. Notably, the final dyad, {G, B}, is the same as that which began this passage (m. 159–60). The pc missing from this hexatonic collection (F♯) appears as the upper-most note of the second verticality in m. 167 (comprising pcs B, D♯, E♯, F♯), creating a boundary interval of ***p-i c*** 11 with the low G immediately preceding. (See Example 4.33b.) The realization of the hexatonic collection built registrally between G and F♯ seems appropriate under the circumstances, given its symmetrical position within X_0. This symmetrical collection has the potential of going one of two ways: either toward the tonic functioning $\mathbf{H}_n$ or toward the dominant functioning $\mathbf{h}_n$. As will be discussed below, it opts for the latter.

a)



b)

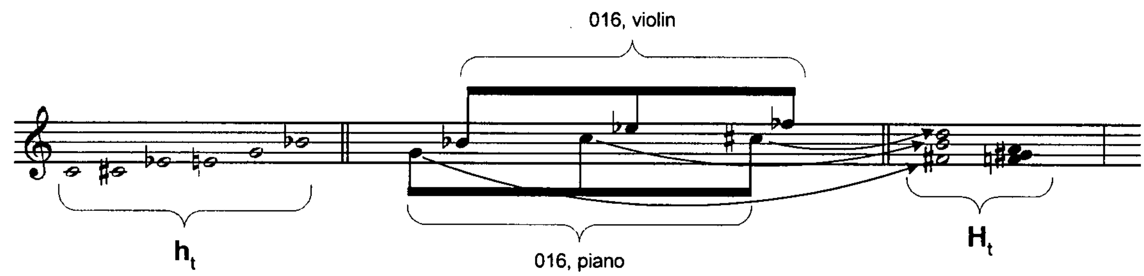
Example 4.33. HC2, mm. 161–165

4.8 Development, mm. 167–186, Retransition

Rehearsal [18] marks the beginning of the retransition. The highly chromatic nature of this passage allows any number of TS collections to be configured. However, unlike earlier where the interaction between collections was relatively explicit, here there appears to be little systematic use of any collection. Instead, it remains to explain the emergence and harmonic function of two focal pc centres.

G is the first pc centre to assert itself, extending through mm. 167–174, and, as I hear it, serves an unquestionable dominant function, irrespective of belonging to the global tonic axis. Despite the presence of some very dense and highly chromatic verticalities, the characteristic intervals of the V^7 chord are carefully articulated: the minor seventh is heard between the lowest voices in mm. 167–168, and then inverted (suggesting 4/2 position) in mm. 172–173; the major third can be heard as the boundary interval of the chords in mm. 169–171; and finally, in the same measures, the tritone is projected between the upper-most voice in the piano and the violin's F5 (marked ***sf***) and later between the two lowest voices in mm. 172–174. However, if this chord were to function properly it would need to resolve to a pc along the subdominant minor-third axis, which this does not. To be sure, the strength of the V^7 chord is considerably compromised first by the additional chromaticism and second by the suggested 4/2 inversion starting in m. 172. This relative instability leads directly to the second focal pc centre, B.

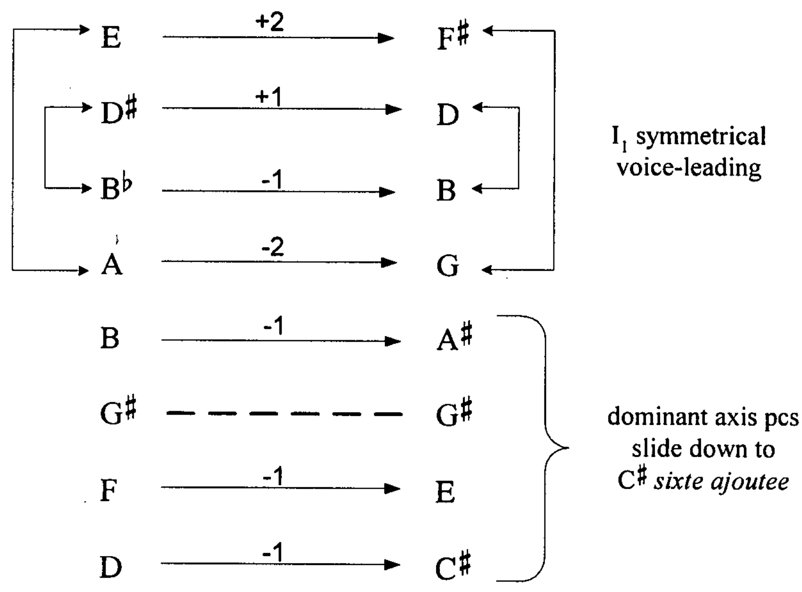
The deflection to B minor at m. 175 re-establishes the dominant functioning minor-third axis. We will examine how this is tonicized. (See Example 4.34.)



Example 4.34. Tonicization of B minor, $\mathbf{H}_t$

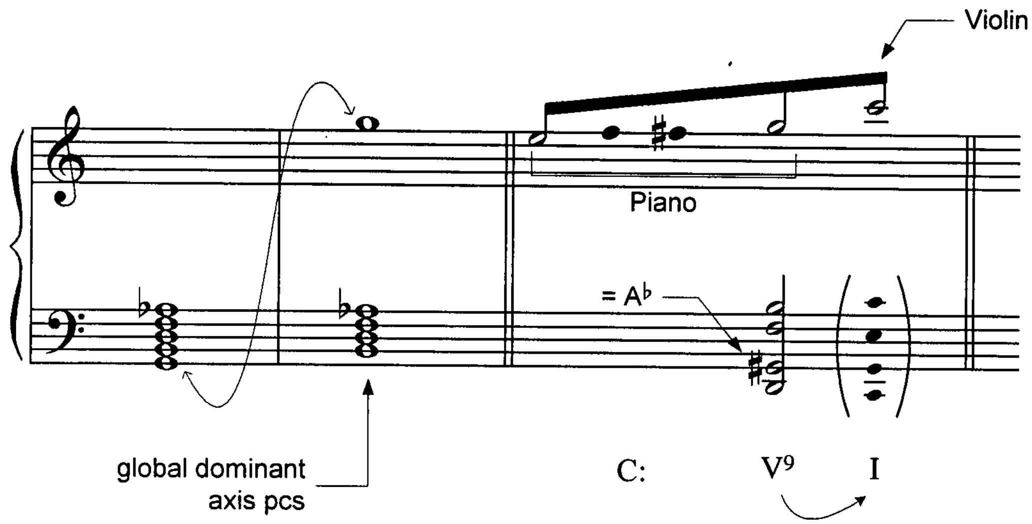
The voice leading from the dominant functioning 016 trichord to the B minor triad could hardly be more explicit: each voice of the first chord simply moves by semitone to a member of the following chord. It is not until m. 176 that the purpose or intent of the violin becomes clear. Following a frantic, almost manic, episode in which it loses its orientation, the violin finally secures itself upon a collection of three pcs: {B♭, E♭, F♭}. This, too, forms a 016 trichord. As indicated in the example, the combination of both trichords results in a form of $\mathbf{h}_t$. While this particular transposition of $\mathbf{h}_n$ does not explicitly tonicize B minor, it does tonicize pcs along the same minor-third axis shared by B; specifically F and A♭. More importantly, however, B minor is an integral subset of $\mathbf{H}_t$, <**B**, **D**, F, **F♯**, G♯, A>. Thus it is reasonable to assert starting at [19] a temporary (albeit incomplete) manifestation of X_t, < B, D, [F], F♯, [G♯], A, C, C♯, D♯, E, G, A♯>.

The tonicization of E minor at m. 178 results from a transposition by T_5 of the progression heard in mm. 175–176. However, E minor does not qualify as a satisfactory return to the global tonic level: first, the violin refuses to participate in this tonicization and second, it is merely a sequence of the model used to tonicize B minor in the immediately preceding measures. Consequently, the dominant field is reasserted by means of the eight-note harmonic complex in mm. 181–186. This chord, however, does not serve as a traditional dominant of C♯; the reader will observe contained within this chord prominent dominants sevenths on E and B♭, both of which traditionally resolve to either A or E♭. It remains to explain exactly how this chord re-tonicizes the material at m. 187. As noted earlier, this harmonic complex contains (at its core) the tetrachord {D, F, G♯, B}, the notes of which refer to the deep-level dominant field. This tetrachord functions as a common-tone diminished seventh, which resolves in m. 187 to {C♯, E, G♯, A♯}, the referential *sixte ajoutée*. (See Example 4.35.) Contrary to convention, the fifth, not the root, of the tonic chord is held in common. The remaining four pcs {A, B♭, D♯, E} ultimately resolve to members of the G major-major seventh chord, which is arpeggiated on the first beat of m. 187. This involves the voice leading of inversionally related dyads. As illustrated in the same example, the dyad {A, E} resolves to {G, F♯}, while {B♭, D♯} resolves to {B, D}. Notably, the pc integers of each dyad sum to 1, thus suggesting the index of inversion I_1. Moreover, this symmetrical voice leading anticipates and prepares for the return of $\boldsymbol{X}_0$, which is symmetrically organized around C/C♯, that is, with an index of inversion I_1.



Example 4.35. Tonicization of C♯

There is, however, yet another strictly harmonic aspect of the tonicization at m. 187. (See Example 4.36.) The violin's E, which I interpret above as leading to F♯, actually moves locally to G (see mm. 182–183 and 185–186). This G can be heard as the root of a true dominant ninth sonority consisting of {G, B, D, F, A♭}, the upper four notes of which are the dominant axis pcs. (These are heard below the root.) This chord has the traditional function of tonicizing C, and it is this pc which emerges in full force as the top note of X_0, in m. 187. The violin's C thus materializes by way of a traditional root-progression voice leading, but in an unusual register: that is, the roots of the dominant and tonic harmonies appear, not in the bass, but in the uppermost voice (the former is heard in the piano, the latter in the violin). The piano's chromatic gesture, <E, F, F♯, G>, leads to and concludes on the root of this dominant harmony. A registral transfer and shift in instrumentation immediately follows, such that the violin assumes this "voice" and realizes the root of the "tonic" goal in m. 187. As illustrated in the same example, the entire gesture (including C) essentially arpeggiates a first-inversion C major triad. Moreover, the reader will note the similarity of this gesture to a typical cadential bass progression frequently found in traditional tonal music practice.



Example 4.36. Tonicization of C

The foregoing analysis of the retransition demonstrates how Bartók succeeds in simultaneously tonicizing two pcs, C and C♯, at the onset of the recapitulation, pcs that serve as the inversional centre of X_0. In summary, C♯ is tonicized by way of a minor-third axis system, whereby the dominant-axis pcs {D, F, G♯, B} resolve in the manner of a common-tone diminished seventh chord; and C is tonicized by a conventional, albeit modified, dominant ninth chord, where the roots of the functioning dominant and tonic are unexpectedly expressed in the upper voices.

CONCLUSION

Throughout this analysis, one of the challenges has been to reconcile Bartók's quasi-twelve-tone system of composition with a modified but rigorous concept of tonality. Because of the work's complex harmonic vocabulary, a non-conventional and broadly argued concept of tonality is required if one is to make a convincing case that certain tonal relationships govern the work. To arrive at such a concept, I examined the tonal models of Antokoletz, Lendvai, Morrison and Wilson.

Although Antokoletz's concept of a *tonal center* appears valid, in suggesting that any pc or collection of pcs may acquire primary status either through contextual, surface level means or by the symmetrical arrangement of a collection of pcs around such a centre, I have favoured Morrison's definition, which specifically takes into consideration the co-existence of both traditional and non-traditional principles of tonality in an atonal context. This is preferable since many primary pcs throughout this work are established by traditional means.

In order to demonstrate that the tonal relationships between the various theme-groups and larger sections are analogous to those which are typically found in a traditional sonata-allegro, it was necessary to abandon a unitary system of harmonic function, whereby each function in a context is assigned to only one pitch class or pc set. I concluded that Wilson's model was too liberal, and opted instead for the more rigid system put forward by Lendvai, in which equivalent harmonic function is extended to all pcs along the same ic-3 cycle. Unlike Lendvai, however, I consider these relationships strictly within an octatonic context, whereby dominant sevenths (or some comparable constructs) tonicize specifically those pcs in an octatonic collection on which major and/or minor triads may be constructed.

I have shown that all of the work's referential harmonies (triads, tetrads, and hexachords) derive from a single registral ordering of the aggregate, $\boldsymbol{X}$. All of these harmonies are contiguous or minimally-interrupted linear segments of $\boldsymbol{X}$, or are combinations of inversionally related pairs of pcs (symmetrically places dyads within $\boldsymbol{X}$). Although as the music unfolds several triads and tetrads become prominent, the most significant referential harmonies are the combinatorial hexachords of $\boldsymbol{X}_n$, labelled $\mathbf{H}_n$ and $\mathbf{h}_n$. While many of these subsets are expressed in pc space, that is, in free registral order, many instances have been shown where the registral ordering is preserved exactly, thus making explicit reference to transpositions of $\boldsymbol{X}$. While I have used both transpositions and inversions when relating various subsets to one another, I have limited myself to only the group of 12 transpositions when specifically referring to $\boldsymbol{X}$. The perfect balance of $\boldsymbol{X}$ proves extremely vulnerable to distortions; as I demonstrated, a change of one pc can imply the transformation of $\boldsymbol{X}$ from one transposition to another.

Chapters 2 and 3 explored the inherent and inherited properties of $\boldsymbol{X}$ and its complementary hexachords. I have shown that it is reasonable to assert tonic and dominant function (i.e., "locally" within a given $\boldsymbol{X}_n$) for $\mathbf{H}_n$ and $\mathbf{h}_n$, respectively. Having noted the frequent unfolding of $\boldsymbol{X}$, I examined certain voice-leading tendencies of these unfoldings. I further showed that the perfect fifth had a special role within each $\boldsymbol{X}_n$: the ordered interval series of $\mathbf{H}_n$ is replicated exactly a perfect fifth higher within $\boldsymbol{X}_n$, whereas that of $\mathbf{h}_n$ is replicated a perfect fifth lower. Together, these properties help activate and set in motion this otherwise static construct.

The foregoing bar-by-bar analysis of the exposition and development has demonstrated the functional equivalence among pc centres a minor third apart, validating one of Lendvai's central concepts. The various pc centres within the first theme-group of the exposition, for example, are located along a single minor third axis, whereas those of the second theme-group occur along a different axis. These relatively stable centres of tonality are frequently established and articulated by dominant-tonic progressions, albeit highly distorted.

With this essay, I hope to stimulate continued study of Bartók's music, on which the final word has yet been spoken, especially concerning the interaction of traditional tonal principles with atonal modes of organization.

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