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## The first movement of Bartók's Second String Quartet: sonata form and pitch organization

James N. Bennett

*Louisiana State University and Agricultural and Mechanical College*

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**THE FIRST MOVEMENT OF BARTÓK'S SECOND STRING QUARTET:  
SONATA FORM AND PITCH ORGANIZATION**

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
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in

The School of Music

by  
James N. Bennett  
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## ABSTRACT

The *moderato* of Bartók's Second String Quartet is a lucid and eloquent sonata form that conforms rhetorically to sonata-form norms of the eighteenth century. This thesis will fully delineate the form and analyze the extent to which it conforms to these norms. In order to precisely place the movement in context, the Sonata Theory of James Hepokoski and Warren Darcy and William E. Caplin's system of formal functions will be employed. In addition, the movement's *Grundgestalt* will be identified, and motivic connections between it and the other thematic materials will be revealed.

Bartók's pitch organization, while non-traditional, also aids in articulating the sonata form. Building on the work of George Perle, Elliott Antokoletz, Joseph Straus, and others, this thesis will show the movement's pitch organization to be a synthesis of pitch centers (arranged symmetrically) and three distinct families of harmonies. This system of families is derived from the work of Straus, in which he suggests a polarity between octatonic subsets and hexatonic subsets. His argument is amplified here by including diatonic subsets, creating three families of harmonies.

Each of the *moderato*'s thematic areas is represented by a particular family and its transitional areas are defined by ambiguous harmony belonging to either several families or none. In this way, the pitch organization is laid out analogously to that of a traditional sonata. Processes analogous to traditional recapitulatory fulfillment (as in Edward T. Cone's "sonata principle") are also at work. Ultimately, the unique construction of this astonishing work will be shown to be a combination of old and new, a twentieth-century reinterpretation of an eighteenth-century form.

## 1. INTRODUCTION

Sonata form is traditionally understood as a synthesis of two forces: thematic development and tonal construction. In the history of music theory, each of these forces has been understood as primary at some point, with prevalent views oscillating between an emphasis on tonic/non-tonic polarity and on the working out of contrasting themes. Today, the field of sonata-form theory remains in a state of conflict, not only regarding this disagreement, but also regarding the extent to which historical usage allows generalizations of any kind. Nevertheless, it is still acknowledged that sonata form derives its power from and is defined by an interaction between the working out of both tonal polarity and the development of thematic ideas. Often these two forces cooperate in creating structurally important points, such as the "double return," in which the main or primary theme returns accompanied by the restoration of the tonic key, and conversely, expectations can be exploited for the tension that results when the tonal construction and the thematic events do not line up.

In the twentieth century, composers continued to employ sonata forms, often within post-tonal idioms, and this raises the question of whether these works can be thought of as sonata forms at all. Without the force of tonal construction, can thematic design and development alone articulate the form? In his assessment of the *moderato* of Bartók's Second String Quartet (the subject of the present analysis), Halsey Stevens makes the following claim:

Faced with a new musical work, the analyst is tempted to pour it into a preconstituted mould, a sort of Procrustean bed which the music is compelled by drastic means to fit. The term sonata-allegro is applied indiscriminately to the most diversiform structures. It is true that the first movement of the Second Quartet resembles in certain respects the traditional sonata-movement; but it would be a mistake to label it, considering the analytical problem at an end.<sup>1</sup>

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<sup>1</sup> Halsey Stevens, *The Life and Music of Béla Bartók* (Oxford: Clarendon Press, 1996), 178.

The "analytical problem" for Stevens is the non-tonal pitch organization of Bartók's music and the continuously developing nature of the thematic material. But the "temptation" he speaks of is important--it is clear that Bartók is referencing sonata form, but more importantly, reinterpreting it, and his music deserves to be considered in this way, as a non-tonal sonata form. Semantic decisions based on subjective criteria ultimately serve little purpose in understanding his music. "Should this work be labeled a sonata form?" may be replaced by "Can Bartók's non-tonal pitch materials be interpreted as somehow functioning analogously to traditional tonal constructions?"

In his article "Sonata Form" in the second edition of *The New Grove Dictionary of Music and Musicians*, James Webster claims that

Bartók's wild, dissonant style based on unusual diatonic scales renounces the perfect triad as the basic sonority in favour of (often dissonant) primary intervals (for example C–E and C–F# in the String Quartet no.4). But since these intervals can still imply directional motion and articulate tonal areas, they have the power to create a sense of tonal potential (exposition), conflict (development) and resolution (recapitulation).<sup>2</sup>

This approach comes close to providing a way of understanding the pitch organization of Bartók's sonata forms, but characterizing the relationship between intervals as having "tonal potential" is misleading. In order to achieve the synthesis of content and structure that epitomizes sonata form, post-tonal composers must create meaningful *non-tonal* pitch relationships that can function analogously to the tonal polarity in traditional sonata forms.

Webster places the audibility of the form as the paramount criterion for whether non-tonal pitch relationships can be seen as analogous to tonal polarity, and for this reason, classifies the sonata forms of the 12-tone composers as "necessarily different in practice." The audibility of the form is not the issue, but rather the successful linking of the thematic content and the pitch content.

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<sup>2</sup> James Webster, "Sonata Form," *Grove Music Online*, ed. Laura Macy, accessed 7 December 2006, <<http://www.grovemusic.com>>

It is entirely conceivable that this could be achieved through materials that do not create "tonal potential" but that are organized in a way that is readily audible. Joseph Straus explains the importance of recognizing the linkage of thematic and pitch organization which functions analogously to the traditional tonic-dominant polarity:

Composers that have understood the sonata in a nineteenth-century sense [thematically] have tended to write uninteresting sonatas. In such works the sonata form floats upon the musical surface, a mere arrangement of themes lacking in real connection to the harmonic structure beneath. There are, however, twentieth-century sonatas that grapple in a profound way with the structural issues raised by the eighteenth-century [harmonic] view of the form.<sup>3</sup>

A distinction must be made, then, not between works that, due to the perceivability of their non-tonal pitch relationships, can be considered sonata forms and works that cannot, but rather between non-tonal sonata forms that are *interesting* and *successful* as sonata forms and those that are not. The purpose of this thesis is to analyze both the thematic and pitch construction of the *moderato* of Bartók's Second String Quartet and to demonstrate that it is indeed an interesting and successful sonata form. In fact, it is a work of intense expression and extraordinarily clear and eloquent formal structure in which a continuously developing sonata form is articulated through the organization of the thematic materials, and in a more complicated process, through the organization of pitch materials.

Previous analyses of the work largely concur with regard to its formal thematic structure, for the formal structure is remarkably clear; i.e., the thematic material and the formal sections are presented and developed in a fully explicit manner. Chapter 2 of this analysis aims to augment the commonly held view of the movement's structure by more precisely describing its form and by placing the work in relation to past sonata forms. In particular, the movement will be described in terms of the norms of sonata form at the height of its expression. The paradigm introduced by James

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<sup>3</sup> Joseph Straus, *Remaking the Past: Musical Modernism and the Influence of the Tonal Tradition* (Cambridge: Harvard University Press, 1990), 97.



Hepokoski and Warren Darcy in a series of articles and most importantly, in their recently published work, *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata*, provide a means to determine that relation.<sup>4</sup> For this reason, it will be used to examine the movement's thematic structure and precisely describe its relation to sonata-form norms. In addition, the terminology and methodology of William E. Caplin's *Classical Form* will be employed for detailed descriptions of the thematic material.<sup>5</sup> Chapter 3 aims to provide an analysis of the traditionally functional pitch centers of the movement in isolation from its non-tonal organization.

Chapters 4 and 5 address the movement's non-tonal pitch organization and its relation to the formal structure. Chapter 4 contains a consideration of previous views of the movement's pitch organization, most of them being either demonstrations of isolated constructions (such as the transformations of certain pitch-class sets) or brief descriptions of pitch organization with little discussion of their relation to sonata form. Chapter 5 presents an amplification of Joseph N. Straus's concise, yet provocative and illuminating, analysis of the *moderato* in *Remaking the Past*. Straus's analysis can serve this purpose due to its analytical stance: he views the pitch organization of the movement as a non-tonal reinvention of the traditional tonal polarity found in sonata forms, thus providing a means of understanding the music as a successful example of sonata form reconceived in post-tonal terms.

The basis of Straus's analysis is that the movement's sonata form hinges upon the polarity between two fundamentally different groups of harmonies: subsets of the octatonic and hexatonic

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<sup>4</sup> Warren Darcy and James Hepokoski, *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata* (Oxford: Oxford University Press, 2006).

<sup>5</sup> William E. Caplin, *Classical Form: A Theory of Formal Functions for the Instrumental Music of Haydn, Mozart, and Beethoven* (New York: Oxford University Press, 1998).

collections. In order to accomplish an amplification of Straus's analysis, several theoretical additions, which considerably expand and reinforce his analytical argument, are considered. First of all, his analytical approach must be applied to the parts of the movement he does not consider, that is, the remainder of the first and second theme groups, the transitions, the development, and the coda. Secondly, in order to fully flesh out his argument by including these sections, an additional group of harmonies must be considered: subsets of the diatonic collection including a particularly important subset, the pentatonic collection. Bartók achieves interaction between and movement among the three collections through a variety of means; however, the most ubiquitous way is through a process of symmetrical chromatic expansion and contraction. Therefore, this idea is also added as a means to link all three collections.

The goal of this analysis is to obtain an understanding of this particular sonata form as a whole, while not isolating structure from content and not atomizing particulars of the movement's fascinating pitch organization. When understood as a whole the work can be better placed into context with sonata forms of the past and also to those contemporaneous to it. But ultimately, this analysis aims to provide insight into one of Bartók's masterful quartet movements, a movement of immense beauty which demands to be understood on its own terms.

## 2. FORMAL/RHETORICAL ORGANIZATION

*The moderato first movement of the Second Quartet has . . . a Mozartian balance of grace and controlled eloquence.* --  
Stephen Walsh<sup>6</sup>

Most commentators on the *moderato* first movement of Bartók's Second String Quartet agree that it qualifies as a sonata form. However, as noted in the introduction, Halsey Stevens is somewhat reluctant to apply the label. Even so, his analysis includes statements such as "An apparently new motive. . . is found in the proper place for a subsidiary theme," "[The triplet figure] is the dominant element, eventually flowering into what may be considered a closing 'theme'," and "The developmental process is intensified through the central part of the movement."<sup>7</sup> Clearly, Stevens recognizes typical formal and rhetorical elements of sonata form. Despite its non-tonality and continuously developing nature, Stevens admits that the movement displays many of the markers of sonata-ness.

This intuition of sonata-ness is shared by other analysts of the movement, including Joseph Straus, János Kárpáti, Erno Lendvai, and Paul Griffiths, and they all label it as a sonata form.<sup>8</sup> Stevens is admittedly attempting to avoid forcing the independent and unique construction of the movement into a static analytical mould. In this way, he engages what James Hepokoski and Warren Darcy call "The War Against the Textbooks," a movement that declares that a rigid textbook view of sonata form is inadequate to describe the multiform reality of actual music.<sup>9</sup> In the words of Darcy and Hepokoski: "In their intensity they tempted one to overstate the degree to which such classifications were intended to be equivalent to scientific laws. Within the humanities norms,

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<sup>6</sup> Stephen Walsh, *Bartók Chamber Music* (London: British Broadcasting Corporation, 1982), 21.

<sup>7</sup> Halsey Stevens, 179 – 180.

<sup>8</sup> Joseph N. Straus, *Remaking the Past*; János Kárpáti, *Bartók's String Quartets*, trans. Fred Macnicol (Budapest: Franklin Printing House, 1975); Erno Lendvai, *The Workshop of Bartok and Kodaly* (Budapest: Editio Musica, 1983); Paul Griffiths, *Bartók* (London: J.M. Dent & Sons Ltd, 1984).

<sup>9</sup> Hepokoski and Darcy, 6.

generic options, and more-or-less standard procedures are not laws at all."<sup>10</sup> Perhaps sonata form should be seen as a set of parameters that can be tweaked, even dramatically (as in Bartók's Second String Quartet), while still maintaining the quality of sonata-ness. A familiar analogy is that of typefaces or fonts—letter forms are still recognizable despite dramatic differences in their features (see Figure 1). Similarly, sonata forms can be drastically different and still be understood as sonata forms.



Figure 1. As in Different Fonts<sup>11</sup>

The Sonata Theory of Darcy and Hepokoski is a system that aims to describe sonata form through the examination of sonata norms and their deformations; it is an attempt "to sketch the outlines of a complex set of common options or generic defaults."<sup>12</sup> The aim of this first chapter is to describe the rhetorical form of the *moderato* first movement of Bartók's Second String Quartet in

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<sup>10</sup> Ibid., 7.

<sup>11</sup> Douglas R. Hofstadter, "Variations on a Theme as the Crux of Creativity," in *Metamagical Themas: Questing for the Essence of Mind and Pattern* (New York: BasicBooks, 1985), 243.

<sup>12</sup> Hepokoski and Darcy, 8.

the terms of Darcy and Hepokoski's paradigm, delineating its parts and examining them in the light of these late-eighteenth-century norms. In addition, the smaller thematic/formal units will be examined using the system suggested by William E. Caplin in *Classical Form*. In particular, his ideas of tight-knit and loose-knit themes, fundamental theme types (sentence, period, and so on), and terms such as "fragmentation," "extension," and "continuation" will be used extensively.

Of course, the systems of Darcy and Hepokoski and Caplin rely on tonal function to distinguish musical alternatives and define formal concepts. For example, the default choices that define a *medial caesura* in Sonata Theory are different kinds of cadences (such as V:HC or I:PAC) and the *period* theme type of Caplin depends in large part upon harmonic function. The formal units of Bartók's *moderato* cannot be understood as having harmonic function in a strictly tonal sense. Nevertheless, it is still possible to frame them in the terms of Darcy and Hepokoski and Caplin using only their *rhetorical* functions. For example, as we will see, part one of the exposition contains a clearly defined primary theme and transition (P and TR) despite the lack of traditionally tonal cadential material. These units are defined by their strong fulfillment of expected rhetorical tasks (such as energy-gain in TR) and bounded by clear formal markers that correspond to their rhetorical parts (such as *presentation* followed by *continuation* in Caplin's explanation of the *sentence* theme type).<sup>13</sup>

Despite the general lack of traditional tonal functions in the *moderato*, there are areas that are diatonic and/or have clear pitch centers. Chapter 3 will take these into consideration, and investigate how they aid in articulating the formal structure of the movement. Here, we shall consider them as analogues to traditional key areas. The diatonic collection and its subsets play an important part in the pitch organization of the movement, but non-tonal manipulations of the

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<sup>13</sup> Ibid., 16; Caplin, 35 - 47.

collection and its subsets—as well as their interaction with the other important collections (hexatonic and octatonic)—are the main topic of Chapter 5. As we will see, the establishment of tonal centers is an important part of this unique expression of sonata form.

Figure 2 shows the thematic organization of the movement, expressed in the terms of Darcy and Hepokoski:

Exposition				Development	Recapitulation				Coda
Primary Theme (P)	Transition (TR)	Secondary Theme (S)	Closing Theme (C)		(P)	(TR)	(S)	(C)	
1 - 19	20 - 31	32 - 62	63 - 69	70 - 116	117 - 135	136 - 140	141 - 155	156 - 161	162 - 180
	(MC)	(EEC)				(MC)	(ESC)		

Figure 2. Thematic Organization of the Movement

It is an example of the most typical sonata form, a Type 3 sonata, consisting of exposition, development, and recapitulation.<sup>14</sup> Other ways of labeling certain formal units will be considered at appropriate points within this analysis, including different views of the tonal centers. And previous analyses will be referenced along the way when they provide insight or interesting contrast. For example, there is general agreement on the location of large-scale parts, but some examples of alternative views concerning the smaller subdivisions of the form will prove to be analytically enlightening. Before moving on to the business of analysis, it is important to emphasize that the purpose of this chapter is, in addition to delineating the rhetorical organization of the movement in detail and to examine its tonal organization, to provide a necessary preparatory step in understanding the pitch organization as a whole and how this pitch organization articulates the formal/rhetorical structure.

<sup>14</sup> Hepokoski and Darcy, 16.

## 2.1 Exposition

### • Primary Theme (P)

The Primary Theme (P) is a formal unit made up of two parts: mm. 1-7 and mm. 7-19 (see Figure 3). In terms of Caplin's formal types, it may be described as a *compound basic idea* + *continuation*.<sup>15</sup> The *compound basic idea* + *continuation* is a hybrid theme type, a combination of the *period* and *sentence* types.<sup>16</sup> Darcy and Hepokoski sum up their relationship as follows: "In general, sentences are more active, more restless, more forward-driving than periods, which tend to be more static and symmetrical."<sup>17</sup> The *continuation* in this case is extremely restless and its length (almost twice that of the *compound basic idea*) gives P an asymmetry typical of the *sentence*. As we will see, this is typical of Bartók's exposition, which is replete with extended developmental passages. Measures 7 - 19 exhibit in abundance both of the rhetorical features that frequently characterize the *continuation* phrase type: fragmentation, and harmonic acceleration.<sup>18</sup>

As shown in Figure 3, mm. 2-3 make up the *basic idea* (b.i.), mm. 4-7 the *contrasting idea* (c.i.), and mm. 7-19 the *continuation*, which is extended by techniques that will be described below. In measure 1, the lower strings provide an accompanimental bed that supports the 1st violin as it enters with the main theme in the following measure. The first measure is thus an initializing gesture of the *accompanimental figuration* (*rhythmic stream*) type.<sup>19</sup>

The first violin melody of measures 2 and 3 is not only the basic idea of P, but also the basic idea or *Grundgestalt* of the entire movement (in the sense of a collection of motives that falls in

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<sup>15</sup> Caplin, 61.

<sup>16</sup> Ibid., 59-70.

<sup>17</sup> Hepokoski and Darcy, 69.

<sup>18</sup> Caplin, 10.

<sup>19</sup> Hepokoski and Darcy, 86 - 87.

Figure 3. P in the Exposition: mm. 1-19

classification somewhere between the motif and the phrase).<sup>20</sup> It can be broken up into motives that form the basis of large parts of the movement; those parts not directly derived from the *Grundgestalt* can be seen as growing organically from it. János Kárpáti astutely divides the

<sup>20</sup> Joseph Rufer, *Composition with Twelve Tones*, trans. Humphrey Searle (London: Rockliff, 1954), vii-ix; or David Epstein, *Beyond Orpheus: Studies in Musical Structure* (Cambridge: MIT Press, 1979), 17-21.



*Grundgestalt* into three motives based on how they appear later in the movement, and his divisions will be employed in this analysis (see Figure 4).<sup>21</sup> The alpha motif, which Kárpáti calls "Auftakt," is repeated and developed extensively, beginning as early as the *continuation* phrase of P. Although it maintains the same basic contour and rhythmic structure (three ascending notes that function as an anacrusis), it does not maintain exactly the same interval content. An important function of the alpha motif is to open registral space through its consecutive leaps. By the end of P, the alpha motif dramatically grows into Gs spanning three octaves (1<sup>st</sup> violin, mm. 14-19).

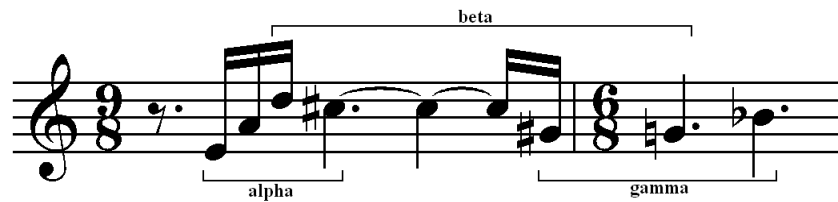


Figure 4. *Grundgestalt* Motives: mm. 2-3 (1<sup>st</sup> violin)

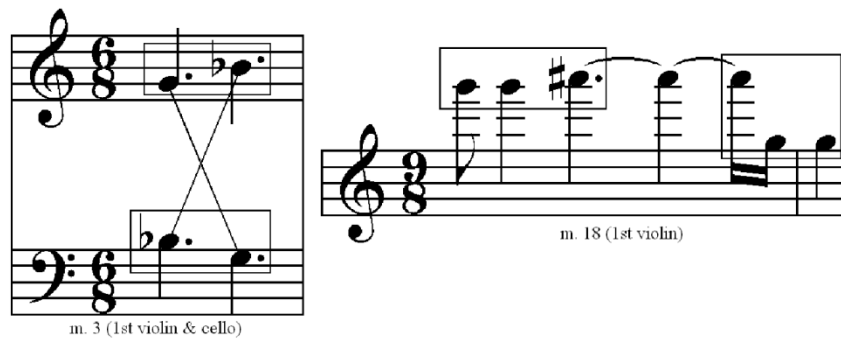


Figure 5. Minor Third (G – B<sup>b</sup>) Derived from the Gamma Motif: m. 3 and m. 18

The beta motif is identified not only by its melodic contour (which is susceptible to intervallic manipulation), but also by the intervallic content of its original form, the set class (0167). This set class is present as a harmonic unit in the development and will be asserted even more aggressively in the recapitulation as the octatonic collection (of which (0167) is a subset) takes on

<sup>21</sup> Kárpáti, 187.

greater importance (as we shall see in Chapter 5). The gamma motif is also treated in the development, but as a melodic idea with malleable intervallic content. In its original form, it contains the germ of a minor third, which plays a defining role in both S2 (the “triplet” theme) and in the closing theme. The gamma motif also provides balance to P in that it closes the *basic idea* (m. 3) and is also used as the cadential gesture of the first violin at the end of P (see Figure 5). Erno Lendvai also noticed the importance of the minor third, but extended its importance to the entire quartet, regarding it as the quartet's "tonic."<sup>22</sup>

The 1<sup>st</sup> violin helps to effect the division of the *compound basic idea* through its abundantly clear phrasing, particularly in its momentary rest on B<sup>b</sup> (mm. 3-4). The *contrasting idea* begins with a figure that recalls the alpha motif (m. 4), but should not be construed as a repetition of the basic idea. The end of measure 6 demands continuation, particularly in the striving downward motion of the cello, which achieves resolution on the D at measure 7, the beginning of the *continuation*, which is led by the *espressivo* cello. This break is also articulated by commas denoting caesuras and by rests in each part. There are matters of pitch that serve to reinforce this beautifully self-evident rhetorical form, but these will be engaged in Chapter 5.

Fragmentation is evident in measures 7-10 as the alpha motif is repeated in every measure, continuously widening its intervals while reaching upward. Harmonic acceleration is also quite salient. For example, while the harmony of the *compound basic idea* is relatively static, consisting of a prolonged augmented triad in the cello {B<sup>b</sup>, D, F#} (with neighbor note G), and a second augmented triad in the inner voices {G, B, D#} (see Chapter 5), the harmony of the *continuation* displays a great deal more motion. Following what Caplin calls the *model-sequence* technique, the major thirds in the inner voices begin to move up progressively: measure 11 is an almost complete

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<sup>22</sup> Lendvai, 565

transposition of measure 10 up a whole step.<sup>23</sup> This effect is intensified in measures 14-17 as the surging scales in the lower three voices create harmonies that change with every two eighth notes.

P has been dissected in detail in order to show how Bartók's music rhetorically conforms to what would be expected in a late-eighteenth century sonata. The introductory quote from Steven Walsh concerning the movement's "Mozartian balance of grace and controlled eloquence" is thus justified in light of the ease with which this music can be described with tools conceived for sonata forms of the late-eighteenth century. Contributing to its eloquence is the fact that the primary theme provides a template upon which much of the exposition is based. Each of the remaining formal units is constructed in a similar manner: a two-part or hybrid theme type ending with a moment of relative repose, a rhetorical "cadence." This, in part, is what makes the continuously developing nature of its exposition possible. The recapitulation, as we will see, is a different matter.

#### ● **Transition (TR) and Medial Caesura (MC)**

As noted above, the *moderato* of Bartók's Second String Quartet is an example of the most typical type of sonata form, which Darcy and Hepokoski's term the "Type 3 Sonata." This is the so-called textbook version of sonata form, containing an exposition, development, and recapitulation, often laid out in a binary design. In addition, the *moderato*'s exposition is an example of the most frequently employed exposition type of the late eighteenth century: the two-part exposition.<sup>24</sup> That is, it contains a *medial caesura* (MC), defined as "the brief, rhetorically reinforced break or gap that serves to divide an exposition into two parts," and serves to usher in a secondary theme.<sup>25</sup> The MC traditionally divides an exposition into key areas, generally between tonic and dominant (or tonic

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<sup>23</sup> Caplin, 11.

<sup>24</sup> Hepokoski and Darcy, 23.

<sup>25</sup> Ibid., 23-24.

and mediant in minor-key sonatas), but in Bartók's *moderato* it instead marks an important point in a gradual move away from a non-tonal pitch language (containing no clear pitch center) towards a diatonicism that is able to project a pitch center which functions analogously to the secondary key in a traditional sonata. In the case of the *moderato*, this pitch center is F#. Bartók's transition and MC serve the traditional function of preparing the launch of the secondary theme.

TR conforms to the traditional function of the transition, serving as the "continuation or advance toward the secondary theme," and also contains many associated rhetorical elements.<sup>26</sup> Figure 6 is a score of TR, showing its rhetorical parts and elements. It may be labeled, perhaps most importantly, as a *dependent* or *developmental* TR due to its use of P motives and its lack of a new independent TR theme, and also as *modulating*, but only in the sense that it moves towards a new tonal center, in the sense noted above. In Chapter 5, the possibility that Bartók's TR is modulating in terms of its non-tonal pitch organization will be thoroughly examined.

Measure 19 (not shown) is a preparatory measure that anticipates TR much like measure 1 anticipates the entrance of the primary theme. TR proper is one theme-like unit in two phrases. Each phrase begins with imitative treatment of the alpha motif (the *basic idea*). Both times, multiple statements at the same pitch level {C G C} are heard, but the motif is distributed among the instruments in a different order each time. A triplet motif that foreshadows S2 first occurs in measure 21 and leads into the *consequent* phrase (mm. 24-31), which after the same two ideas, extends into a subphrase (mm. 28-31) containing sustained triadic harmonies (major triads on A [m. 28] and D<sup>b</sup> [m. 30]). János Kárpáti has also noticed the foreshadowing of S2: "It is typical of the organic writing of the movement that this triplet extension of the principal theme later becomes

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<sup>26</sup> Ibid., 93.

joined to the secondary theme."<sup>27</sup> Indeed, this is the beginning of a process by which the *Grundgestalt* motives evolve into components of the secondary and closing themes.

The musical score is divided into two systems. The first system (measures 20-23) is labeled 'compound basic idea' and 'b.i.'. It features a melodic line in the upper staves and a bass line in the lower staves. The second system (measures 24-31) is labeled 'consequent' and 'b.i.'. It continues the melodic and bass lines, with dynamic markings such as *pp*, *p*, *mp*, *mf*, *cresc.*, and *mf espr.* indicating the progression of the music.

Figure 6. TR in the Exposition: mm. 20-31

The overall effect of TR is one of an initial attempt to arrive at an MC at measure 23, followed by a longer, extended attempt that proves more successful. In this way, its structure can be seen as a *compound basic idea* (mm. 20-23) followed by a two-part extended *consequent* phrase (mm. 24-31). The imitative treatment of the alpha motif may be considered its *basic idea* and the foreshadowing of S2 its *contrasting idea*. In this way, it conforms to the pattern set by P (its cadence will be considered below), but it also conforms to the traditionally expected functions of transition. Darcy and Hepokoski list several kinds of TR rhetoric, including "motivic

<sup>27</sup> Kárpáti, 187.

*Fortspinnung*," "accumulative rhetorical energy," and "a drive toward a structural dominant."<sup>28</sup>

"Motivic *Fortspinnung*" is clearly present here in the spinning forth of the alpha motif and its smooth extension into the triplet motif. "Accumulative rhetorical energy" is also present, first in the incessant repetition of the alpha motif and then, beginning in measure 25, in the crescendo that culminates in a *mf* in measure 31. It is a transition that seems always on the verge of spinning out of control and bursting forth into a new theme, as Bartók's *espressivo* markings hint.

More surprisingly, however, there is also rhetoric that can be seen as analogous to "a drive toward a structural dominant." If, as noted above, the pitch center of Part 2 of the exposition is F#, then one would expect the structural dominant to be C#. Indeed, there is a D<sup>b</sup> Major triad which is first sounded by the upper voices in measure 30, although it becomes somewhat clouded by the cello pitches there. Bartók's TR thus comes close to the modulating type frequently found in classical sonata forms. This, as well as further pitch center considerations, will be discussed in Chapter 3.

The end of measure 31 functions as the *medial caesura* (MC) of the *moderato* and it is emblematic of the developmental nature of this music that there is no clear moment of repose before S begins. However, a break is implied by the change in dynamics and the new *molto espressivo* marking, and it would be natural for string players to make a slight break in preparation for the bow change and new theme. In addition, the rising motion of the upper three voices in measure 31 employs one of the most common procedures leading up to or filling in a *medial caesura*: the "simple scalar connective figure."<sup>29</sup> The cello's material in measure 31 serves two functions: it continues the melodic momentum of TR while providing contrary motion to the rising line in the

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<sup>28</sup> Hepokoski and Darcy, 94.

<sup>29</sup> Ibid., 34.

upper three voices. All four voices move into S by stepwise chromatic motion, creating an almost seamless connection.

According to Darcy and Hepokoski, "If TR produces a notable HC that is immediately followed by an 'acceptable' new theme in the proper subordinate key, that HC may be interpreted as a medial caesura."<sup>30</sup> S certainly begins with a new theme in a new texture (violins in octaves accompanied by contrapuntal octave-leaping parallel sixths in viola and cello) and it is in the proper key given that measures 30 and 31 constitute an HC on C# (D<sup>b</sup>). In short, Bartók's MC is articulated quite well for a non-tonal, *sui generis*, 20th-century expression of sonata form. It is further strengthened by a scalar (in the most generic sense) connective figure in contrary motion (subsequently referred to as the contrary motion scalar motif), which will return as a cadential motif. As we will see, it is also a marker for EEC, *essential expositional closure*, in the recapitulation (see measure 60, Figure 7).<sup>31</sup>



Figure 7. Contrary Motion Scalar Motif: m .31 (leading to MC) & m. 60 (leading to EEC)

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<sup>30</sup> Ibid., 30.

<sup>31</sup> Ibid., 120 - 124.

- **The Secondary Theme (S) and Essential Expositional Closure (EEC)**

S is organized into three parts or phrases that, in a way similar to P and TR, correspond to a standard theme type. According to Caplin, "The constituent phrases of a subordinate theme frequently express an *initiating* function of some kind, a *medial* function, and a *concluding* function."<sup>32</sup> In Bartók's *moderato*, Caplin's *presentation*, *continuation*, and *cadential* functions are clearly evident. Measures 32-35 make up the *presentation*, organized as a two-bar statement followed by a two-bar response. These four bars make up S1, the "augmented" theme, named thus for the melodic idea in measures 32 and 34, which spells out an augmented triad (see Figure 8). It is arranged in two two-bar phrases, which serve as the first part of a larger sentence.



Figure 8. S1 in the Exposition: *Presentation* Module: mm. 32-35

Darcy and Hepokoski frequently find S themes consisting of three parts or *modules*, and thus speak of a *trimodular* S (TMS).<sup>33</sup> In Bartók's *moderato*, the first module (the *presentation*) dissolves smoothly into a *continuation* (mm. 36-49) and a *cadential* module (mm. 50-61). The *continuation*

<sup>32</sup> Caplin, 97.

<sup>33</sup> Hepokoski and Darcy, 139.



and *cadential* modules are themselves each structured as a *presentation* followed by a *continuation*, creating a nested structure. Both begin with S2 proper. In each module, the one-measure basic idea is presented three times rather than two (as is typical of looser-knit S material), which Caplin calls "additional repetition of the basic idea" (see Figure 9), and is followed by a continuation that is extended primarily through the *model-sequence* technique.<sup>34</sup>

Sonata Theory defines *essential expositional closure* as the first "satisfactory" perfect authentic cadence in S that moves on to new material. Darcy and Hepokoski go on to state that "it is toward the accomplishing of this PAC, marking the end of S-space, that we understand all of the preceding music to have been aiming."<sup>35</sup> This view of EEC will need to be modified slightly, as there are no PACs in Bartók's *moderato*. As before, EEC will need to be marked instead by rhetorical devices, and it is actually quite distinct. In measure 61, the arrival on a full F# major triad is marked both by the aforementioned contrary motion scalar motif and it is followed by new material: the closing theme. Rhetorically, this moment clearly marks the largest arrival of the exposition and is a powerful cadence in the terms of the quartet's musical language.

EEC is prepared by the final two modules of S, the longest stretch of loose-knit material of the exposition, which, in fact, Kárpáti labels a "long chromatic transition."<sup>36</sup> The contrary motion scalar motif is preceded by extensive use of the *model-sequence* technique, the quartet rising in register (much like at the end of P) and reaching *fortissimo* for the first and only time in the exposition in measure 59. In measure 61 the quartet rests on an F# triad and diminuendos to *piano* as the closing theme begins (see Figure 10).

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<sup>34</sup> Caplin, 99.

<sup>35</sup> Hepokoski and Darcy, 120.

<sup>36</sup> Kárpáti, 187.

**continuation**

statement                      restatement                      restatement

Figure 9a. S2 in the Exposition: *Continuation* Module: mm. 36-38

**cadential**

statement                      restatement                      restatement

Figure 9b. S2 in the Exposition: *Cadential* Module: mm. 50-52



Figure 10. EEC: mm. 60-61

### • The Closing Zone (C)

Erno Lendvai declined to label this theme as "closing," but rather labeled it as the "third" theme.<sup>37</sup> His explanation is highly intuitive and provides an interesting and enlightening view of the exposition:

The exposition follows, even in itself, the fundamental law of dramatic development--the principle of thesis-antithesis-synthesis. It is for this reason that the *third* theme now gets into the target of the construction. Here it becomes obvious: the conventional terms "principal, secondary and closing themes" are quite unsuitable--inadequate--for describing this musical form. It is the *third* theme that the threads of musical construction meet: the synthesis is brought about by *uniting the basic motifs of Themes I and II*; this melody carries virtually the "essence" of the movement, and as such it gives a unique expression to the basic feeling of the movement: the feeling of balance.<sup>38</sup>

In the *moderato*, then, the EEC is that toward which all of the preceding music has been aiming, but not in the sense of accomplishing a PAC, but rather in achieving the rhetorical goal that is the closing theme. EEC prepares the launch of C just as MC prepared the launch of S.

<sup>37</sup> Lendvai, 566-567.

<sup>38</sup> Ibid., 566-567.

C begins after the EEC at measure 63, but is preceded by an anticipatory prefix in measures 61-62, mirroring the beginning of the movement and the beginning of S (see Figure 11). This prefix is made up of the first five notes of the closing theme rising imitatively through the quartet, which as we have already seen in TR, is a common procedure here.

The musical score is presented in four staves. The first staff (treble clef) begins at measure 62 with a rising melodic line. The second staff (treble clef) enters in measure 63, mirroring the first staff. The third staff (alto clef) enters in measure 64, and the fourth staff (bass clef) enters in measure 65. The music is marked *p dolce*. The score is divided into sections: 'anticipation' (measures 62-63), 'statement' (measures 64-67), 'continuation' (measures 68-69), and 'restatement' (measure 66). The key signature has one sharp (F#).

Figure 11. Closing Theme in the Exposition: mm. 62-69

The closing theme is loosely sentential, made up of a two-fold *presentation* (mm. 63-67) and a *continuation* (mm. 67-69). The basic idea is five beats long (the beat being a dotted quarter),

initially rests on A at the downbeat of measure 65, and the slightly varied restatement reaches C# at the downbeat of measure 67. The *continuation* is eight beats long, making the theme asymmetrical. Its relative balance is magnified by the melodic C# arrival of measure 67 acting as a quasi-HC, which is resolved by the arrival on F# in measure 69, despite the final D#, which complicates the cadence. In addition, in the *presentation*, the accompaniment moves down to F# at the end of each phrase, and in the *continuation*, the accompaniment moves up to F#, neatly dividing the closing theme through this change in direction.

As noted above, the D#s in measure 69 complicates the cadence; were it not there, the exposition would come to rest on F# minor triad, and this repose would sound out of place in Bartók's music. With the possible exception of EEC (m. 61), there are no completely conclusive cadences to be found in the exposition. However, as will become evident in looking at the recapitulation, the stops in the exposition (m. 19, m. 32, m. 61, and m. 69) are conclusive enough in this context to serve as analogues to the caesuras and arrivals that punctuate classical sonata forms. They are all somewhat inconclusive, but this helps to propel the exposition forward. As we shall see, sections in the recapitulation end with abrupt climaxes and longer silences—creating not a need to move forward, but a sense of static loneliness.

## **2.2 Recapitulation**

The *moderato*'s recapitulation stands in sharp contrast to its exposition. While the exposition was continuously developing and easily defined in terms of traditional theme types and their functions, formal units in the recapitulation are isolated, lack connective transitions, and do not yield easily to being understood in terms of traditional theme types. Since formal balance is expressed in the exposition, perhaps "defining tight-knit organization need not be expressed yet

again."<sup>39</sup> As in the traditional sonata, pitch relationships are clarified and resolved, and motivic relationships are made explicit, but self-contained modules and brief interludes replace well-defined theme types and transitional sections. The cleanest evidence of this structural change is the length of each section: the exposition is 69 measures in length while the recapitulation is shortened by one third to just 45 measures.

#### • Primary Theme (P)

P is, however, not shortened. It is about one fourth longer in actual duration because it contains more 9/8 measures than the exposition. It begins much like the exposition: a measure of accompaniment prepares the entrance of the 1st violin, which begins the *Grundgestalt* at its original pitch level (see Figure 12). However, static harmony consisting of layered tritones immediately provides contrast to the dense and quickly shifting dissonances of the exposition. This static harmony and relative lack of motivic momentum is intensified by the *ma sempre molto tranquillo* marking. Instead of forming a *compound basic idea* as in the exposition, Bartók completely abandons the minor third tail (the gamma motif, see Figure 4) and instead develops the set class version of the beta motif (0167) in a *Fortspinnung* manner, reaching a resting point at measure 123, where the inner voices drop a semitone to {A<sup>b</sup> D} after having sustained {A D#} for the six measures up to that point.

The gamma motif is presumably abandoned here because it was employed extensively in the development. Measures 117-123 serve to isolate the beta motif, which then becomes the focus of the remainder of P, culminating in the climax of measure 135 (see Figure 13). P as a whole does not yield to analysis in terms of traditional theme types as readily as in the exposition. It consists of two

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<sup>39</sup> Caplin, 161.



Figure 12. First Phrase of P in the Recapitulation: mm. 117-123

Figure 13. The End of P in the Recapitulation: mm. 134-135

phrases: measures 117-123 and measures 124-135. These phrases make up three statements of the same beta motif idea (found in the 1st violin) and its tritone-based accompaniment. Each statement is at a different transposition level and leads into the next in a *tranquillo* succession containing little rhetorical momentum. The second phrase contains two of the transpositions: measures 124-127 and measure 127-135. The crescendo *poco a poco più agitato* in measures 132-135 is based on the final transposition (in all four parts starting at the stretto in measure 134). Measure 135 may be seen as a rhetorical caesura if not a cadence, particularly when compared to the reposeful ending of P in the exposition (m. 19).

Before moving on, there is one last important melodic detail within P that must be pointed out: through the gradual addition of notes (for example, the G<sup>b</sup> in m. 128) and subtle changes of contour, the violin melody recalls the closing theme in measure 129 (see Figure 14). This serves as a first attempt to combine themes, a strategy which intensifies as the recapitulation progresses. Bartók uses subtle manipulations such as this to reveal motivic relationships throughout the recapitulation and coda; these motivic relationships will be considered in greater detail at the end of this chapter.

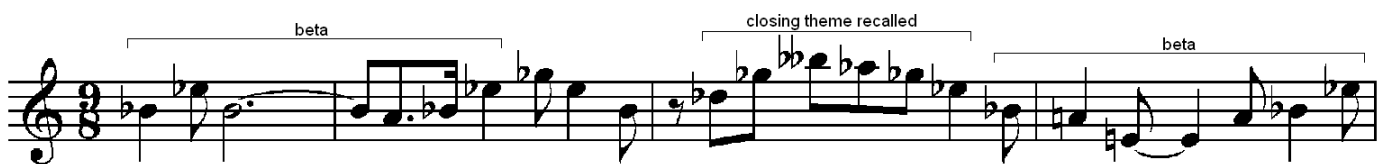


Figure 14. Recall of the Closing Theme: mm. 127-130 (1<sup>st</sup> violin)

#### • Transition (TR) and Medial Caesura (MC)

In the exposition, TR is a theme-like unit in two phrases that leads directly into S by stepwise motion through the contrary motion scalar motif. As we have seen, it functions rhetorically



as a transition in a highly normative fashion. TR in the recapitulation, on the other hand, lacks a continuation and is separated from S by a new interlude (m. 140) surrounded by a pair of commas denoting local caesuras, and thus expressing the aforementioned modularization of the recapitulation and recasting the role and rhetoric of the transition.

TR in the recapitulation runs only five measures compared to twelve in the exposition (see Figure 15):

The musical score for Figure 15 is presented in two systems. The first system, measures 136-137, is divided into a 'statement' (measure 136) and a 'restatement' (measure 137). The second system, measures 138-139, is labeled 'restatement'. The third system, measure 140, is labeled 'MC interlude'. The score is written for four staves in 3/8 time. The key signature has one flat (B-flat). The notation includes various musical symbols such as treble and bass clefs, key signatures, and dynamic markings. The 'statement' and 'restatement' sections are marked with brackets. The 'MC interlude' section is marked with a bracket and a comma. The score includes various musical notations such as treble and bass clefs, key signatures, and dynamic markings.

Figure 15. TR in the Recapitulation: mm. 136-140

This reduction in size is due to the fact that the imitative treatment of the alpha motif, the contrary motion scalar motif, and the final triadic section are all absent. Here TR consists solely of three repetitions of a slightly modified S2 in a sequential pattern. The last repetition is extended by one measure (m. 139) and then followed by the aforementioned isolated interlude (*molto tranquillo*, m. 140). The intriguing possibility that TR has been completely removed from the recapitulatory rotation and that this section is the beginning of an out-of-order S will be considered below.

TR may be seen as a “false start” of S2 due to its close resemblance to and assumption of its form. It gives the brief impression that TR and the S1 have been abandoned, creating a recapitulatory rotation different from that of the exposition.<sup>40</sup> By structuring TR as a false start of S2, Bartók eradicates its normative transitional qualities (energy gain and so on), and its rhetorical function as a link between the *Grundgestalt* and S1 and S2. S begins not as an arrival (as in the exposition), but as one in a succession of modules. In every way, the recapitulation has had its transitional and developmental qualities muted, leaving only thematic islands. As a completely disconnected interlude, measure 140 provides a perfect MC for the recapitulation.

#### ● The Secondary Theme (S) and Essential Sonata Closure (ESC)

S may again be understood as three modules (mm. 141-144, mm. 145-148, and mm. 148-154), but they no longer correspond to the *presentation*, *continuation*, and *cadential* phrases found in the exposition. This is due to the lack of a rhetorical cadence in measure 154, which instead resembles the climactic caesura at the end of P (m. 135) or the abrupt end of TR (m. 139). The three modules each follow the template already established for the recapitulation. That is, each consists of an idea that is stated several times. They may be understood then as three linked *presentation* modules, each leading into the next and ending with a climactic caesura (m. 154). This is in stark

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<sup>40</sup> Hepokoski and Darcy, 233-235.

contrast, once again, to the exposition, in which S was also trimodular, but contained *presentation*, *continuation*, and *cadential* modules, creating a large-scale closed theme type. In addition, internal fragmentation is intensified in S1 (module 1, mm. 141-144) due to each of its measures being separated by breath marks or by rests, and its containing only the one-measure augmented motif rather than the full two-measure S1 idea. For this reason, its final bar acts as an anacrusis into module 2 rather than an integral part (see Figure 16). Modules 2 and 3 are connected through measure 148, which will be discussed below as a failed attempt to achieve ESC (*essential sonata closure*).

The image shows a musical score for four staves in 3/8 time. The first measure is labeled 'statement' and the second and third measures are labeled 'restatement'. The music features a one-measure augmented motif in the first measure, which is repeated in the second and third measures. The notation includes various musical symbols such as notes, rests, and accidentals.

Figure 16. S1 in the Recapitulation: mm. 141-144

As noted above, measure 148 connects the second and third modules of S and may be seen as a false ESC due to its resemblance to the EEC (m. 61). EEC and ESC are typically similar (in a traditional sonata, the EEC is in the secondary key, while the ESC mirrors it in the tonic) and the resemblance of the *moderato*'s EEC (m. 61) to this false ESC is threefold. First of all, it arrives after S2 and is therefore in the proper place. Secondly, it is approached by a variant of the contrary motion scalar motif in measure 147, which corresponds to measure 60 in the exposition. Lastly, its

pitch content is the same as the EEC, only a semitone lower, a major triad on F rather than F#. This clear arrival on F is also the first unambiguous pitch center of the recapitulation (see Chapter 3).

The sense of ending is further enhanced by a *ritard*.

Figure 17. S2 in the Recapitulation: mm. 144-148

If measure 148 had been the ESC, one would expect the closing theme to follow in F, but this is not the case, for F is not the final pitch goal of Bartók's *moderato*. Rather, module 3 begins with the opening motives of the *Grundgestalt* in imitation, perhaps making up for the absence of imitative treatment of the alpha motif in TR. It then moves chromatically into an abrupt *forte* climax (measure 154), ending S in what can perhaps best be described as a cruel joke: another rhetorical caesura after an unsuccessful attempt at the ESC. It turns out that the ESC is as isolated as the MC: the *fortissimo* unison in *Largo* tempo (replacing the successive entrances leading to the closing theme in the exposition) of measures 154-155 cements the ultimate pitch center of A (and associated white-key pitches) by brute force. In terms of the recapitulatory rotation, module 3 of S may be considered a developmental interpolation and not a second statement of P or an out of order TR. The rotation order stays intact.

Figure 18. Module 3 of S in the Recapitulation: mm. 148-155

### • The Closing Zone (C)

According to Darcy and Hepokoski, "The attaining of the ESC is the most significant event within the sonata."<sup>41</sup> This holds true for the *moderato*, yet it is not just the ESC that is significant, but the closing theme itself, just as the closing theme was considered the target of the exposition. Therefore, these six *tranquillo* bars are the pitch and rhetorical goal of the entire movement. Structurally, C conforms to the recapitulatory template: two repeated statements of the *dolce* basic idea (measures 156-159) followed by an extension of two bars that ends with a caesura, which should not be surprising (see Figure 19). The closing theme could have been constructed as a

<sup>41</sup> Ibid., 232.

parallel period, ending with a PAC in A (if the cello had moved to an A chord in measure 160), but final resolution is deferred until the end of the coda. Instead, the cello moves down to D and then C, providing a foundation for the closing theme's *pianissimo* echo in the viola (mm. 160-161). Even though this is not a conclusive cadence tonally, it must be noticed that its repose stands in contrast to the abrupt climaxes that ended the other sections of the recapitulation, as does Bartók's decrescendo to *pianissimo*.

Figure 19. The Closing Theme in the Recapitulation: mm. 156-161

### 2.3 Development

No attempt will be made to examine the development in the detail afforded the exposition or the recapitulation, but the motives developed and the pitch centers established in its parts will be discussed. This will then lead an examination of the motivic development of the entire movement, including the coda. The development is divided into four sections, the last a retransition. These sections are as follows: measures 70-81, measures 82-93, measures 93-102, and measures 103-116. Unlike the exposition and the recapitulation, the development lacks a complete rotation of the

movement's component segments (P TR S C), but instead develops individual motives, including all three motives from the *Grundgestalt*, S1, and the contrary motion scalar motif.

The amount of motivic interplay and connection in section one is astounding. Bartók begins with imitative treatment of the entire *Grundgestalt* theme (mm. 70-72), which is then connected to and combined with an altered version of S1, here arising from the gamma motif (see Figure 20). The imitative treatment of the beginning of the *Grundgestalt* theme is then continued, briefly interrupted by a statement of the contrary motion scalar motif (m. 77), and then followed by two

The musical score for Figure 20, Section One of the Development: mm. 70-75, is presented in two systems of four staves each. The first system (mm. 70-72) shows the initial development of the *Grundgestalt* theme. The second system (mm. 73-75) continues the development with an augmented theme. Annotations include 'major 3rd' and 'perfect 4th' intervals, and 'augmented theme' labels.

Figure 20. Section One of the Development: mm. 70-75

more statements (mm. 80-81). This final statement of the contrary motion scalar motif leads into section 2 by the exact same expansion found at the beginning of each statement of S2 in the *cadential* module of S in the exposition (compare m. 81 moving to m. 82 to measures 49-50, see Figure 21).



Figure 21. End of Section One of the Development: mm. 80-82

Section two (mm. 82-93) develops the gamma motif exclusively, but also contains many workings-out of the idea of contrary motion expansion and contraction (see Chapter 5). Section three (mm. 93-102) develops the idea of parallel motion as accompaniment, which is a common procedure throughout the *moderato*, while the outer voices continue with an idea derived from the gamma motif. More important, however, is the C#/D<sup>b</sup> pedal established here in the cello; it will be examined below in connection with the movement's pitch centers. Section four begins with the climax of the development (mm. 103-10), which contains the verticalized beta motif, the gamma motif, and more expansion/contraction motion (see Figure 22). The retransition that follows



continues with the gamma motif in all four voices. Retransition is effected through a gradual diminuendo and a slowing of harmonic rhythm in order to match the soft, static beginning of the recapitulation. The extent to which it is a retransition regarding pitch will be examined in Chapter 5.

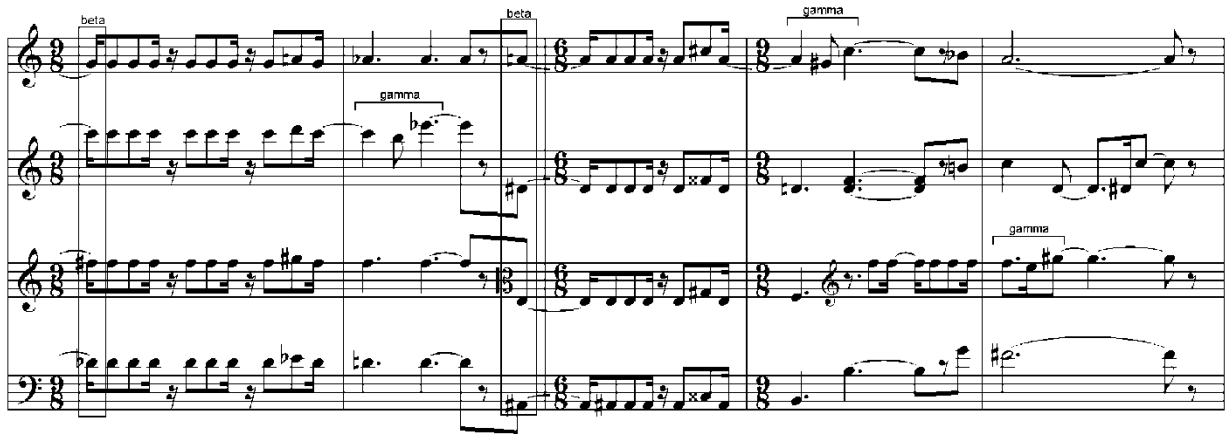


Figure 22. Climax of the Development: mm. 103-107

## 2.4 Motivic Relationships and Connections

The themes of Bartók's *moderato* are continuously linked and connected as the movement progresses, confirming the impression that they are interrelated by common qualities: melodic contours and textures practically saturated by minor and major thirds. Bartók uses motivic manipulation to enhance the seamless flow of his themes and to provide a coherent motivic trajectory for the movement. In this analysis, these links and connections will be demonstrated as they occur through the quartet and culminate in the thematic combinations found in the coda. Themes and motives are rarely exhibited in isolation, but rather in combination or connected through a process of virtuously continuous development. These will be displayed through graphic examples. The brackets denote common elements: contours, motifs, or intervals. Relationships discussed by prior analysts will be duly noted.

Figure 23 shows the way in which the main thematic ideas of the exposition are related: S1 and S2 are linked to the *Grundgestalt* through TR, and the closing theme, in turn, through S2. In Figure 23a, the brackets demonstrate the intervallic changes to the first part of the *Grundgestalt* (found in TR), which allow for a smooth transition to S2.<sup>42</sup> Figure 23b shows how the alpha motif is restated in TR, producing the basic idea of S2. In Figure 23c, the interval of a minor third (found in the initial gamma motif) and the contour of the beta and gamma motifs are combined in the closing theme.<sup>43</sup>



Figure 23a. Motivic Linkage of the *Grundgestalt* and S1 through TR



Figure 23b. Motivic Linkage of the *Grundgestalt* and S2 through TR

<sup>42</sup> George Perle, "Symmetrical Formations in the String Quartets of Bela Bartok," *Music Review* 16 (November 1955), 309; Elliott Antokoletz, *The Music of Béla Bartók* (Berkeley: University of California Press, 1984), 98.

<sup>43</sup> Lendvai, 567.



Figure 23c. Motivic Linkage of the *Grundgestalt* and Closing Themes through S2

In the development, we saw further relationships unfolded: the altered S1 (the augmented theme) flows directly from the gamma motif in measures 73 and 75 while in combination with the *Grundgestalt* (see Figure 24).

Figure 24. mm. 70-75

As noted above, a large part of the remainder of the development is dedicated to developing the gamma motif (which is comparatively neglected elsewhere in the movement), and in the recapitulation the themes are isolated, so further motivic connections are deferred until the coda. One exception, however, is the aforementioned recall of the closing theme during P. Here the contour relationship between the *Grundgestalt* and the closing theme shown in Figure 23 is made explicit.

In the coda, motives are not linked through development, but rather through combination. For example, the *Grundgestalt* theme is combined with both S1 (the augmented theme) and the closing theme, demonstrating the contour relationship shared by all three (mm. 162-166, see Figure 25). Note how the intervallic content changes as the closing theme is passed through all four instruments; when the 1<sup>st</sup> violin enters with the *Grundgestalt*, it sounds like another altered version. Each theme has the same contour: a rise followed by a descent. In the *Grundgestalt*, the gamma motif reverses this descent, a motion which has helped to rhetorically propel the movement. In measures 164-165, it again serves this purpose as it ushers in S1 in the 2<sup>nd</sup> violin.

The image displays a musical score for measures 162-166, featuring four staves. The notation includes various musical symbols such as notes, rests, and accidentals. Brackets and labels are used to identify specific themes: 'closing theme' is labeled above the first staff in measures 162-163 and below the third staff in measures 164-165; 'Grundgestalt' is labeled above the first staff in measures 164-165; and 'augmented theme' is labeled above the second staff in measure 166. Diagonal lines connect the 'closing theme' in the first staff to the 'closing theme' in the third staff, and the 'Grundgestalt' in the first staff to the 'augmented theme' in the second staff, illustrating the contour relationships discussed in the text.

Figure 25. mm. 162-166

In measures 174-180, S1 is combined directly with the closing theme, but the interest in these final bars is not only in this motivic relationship (revealing the contour connection again, see Figure 26), but also in the pitch relationships created. The final working out of the tonal pitch organization of the movement is found in these bars. The non-tonal aspects are also crucial, but will be examined in Chapters 4 and 5. How this working out fits into the larger picture, including the pitch centers established in the coda (the arrival on C minor in measure 168 and the final rest on A found in the final measures) will be examined in the following chapter.

The image displays two systems of musical notation, each consisting of four staves. The notation is in 3/8 time and features a key signature of one sharp (F#). The first system (measures 174-180) includes annotations: 'S1' is marked above the first staff in measures 174, 176, and 178, with brackets indicating specific melodic segments. 'closing theme' is marked below the fourth staff in measures 176 and 178, with brackets indicating specific melodic segments. The second system (measures 181-186) continues the musical material, with 'closing theme' marked below the fourth staff in measure 186, with a bracket indicating a specific melodic segment. The notation includes various musical symbols such as notes, rests, and accidentals.

Figure 26. mm. 174-180

### 3. ORGANIZATION OF PITCH CENTERS

Any discussion of the pitch centers in Bartók's *moderato* must begin with those most clearly expressed (in the closing theme in both the exposition and the recapitulation) and then attempt to explain how these centers are related. Ultimately, this approach should provide an account of key areas and pitch centers as the movement progresses and of the way in which the central pitch center, A, is expressed. A typical traditional key relationship is not being employed, given that the pitch center of the EEC is F# and the pitch center of the ESC is A; however, a coherent and logical system is at work.

#### 3.1 Exposition

The most strongly expressed pitch centers in the exposition are C (mm. 20-24 in TR) and F# (S1 and the closing theme), the latter prepared by very clear harmonies on A (mm. 28-29) and D<sup>b</sup> (mm. 30-31). Darcy and Hepokoski assert that "the structural dominant is often approached through a chromatically altered predominant harmony that contains #4."<sup>44</sup> Bartók's repeated entries of the alpha motif on C in TR might be viewed as a leading tone that leads to the C#/D<sup>b</sup> "dominant" of measures 30 and 31. C is present in four octaves in TR and is most strongly felt as a pitch center in measures 22 and 23 with the sustained C1 and C2 in the cello (see Figure 27). C moves to C# initially within the context of the A major triad in measures 28-29. A major and A minor triads create a mediant relationship to F#, which as we will see, is mirrored on a larger scale.

After being established in S1, F# is lost during the second S2 module, but reappears at the EEC as the center of the closing theme. In a traditional tonal sonata form, S would remain in the secondary key until EEC, perhaps avoiding PAC by the usual means. Bartók, however, moves from

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<sup>44</sup> Hepokoski and Darcy, 30.

20

26

C

C#

C

Db

Figure 27. TR in the Exposition: mm. 20-31

a loose pitch center on F# (S1) to a stronger pitch center on F# (the closing theme), and does not prolong this pitch center until the EEC, but moves through its non-centric *cadential* phrase. Loose pitch centers can be found in the *continuation* phrase, for after all, S2 is initially made up of only the "white key" notes, later adding C# and Bb. When viewed in isolation, the violins suggest A minor (mm. 36-39), D minor (mm. 40-42), and G minor (mm. 43-45—see Figure 28). However, the lower voices do not support these pitch centers.

In the first S2 module, the viola and cello are in parallel sixths, creating meandering triadic harmony with the violins. The cello line creates a symmetrical formation: {F# E D# C B A# G (F#-E)} with the ultimate effect of briefly prolonging the F# center of S1 (mm. 36-39—see Figure 28). This is achieved through its boundaries consisting of F# and E, the final pair {F# E} alternating until measure 40. The last F# chord to sound before this pitch centricity is effectively lost is that coinciding with the violins' C# in measure 40. The lower voices then rise chromatically until



Figure 28. S1 in the Exposition mm. 36-45

the cello reaches a peak at F# in measure 45 (again alternating between F# and E), while the violins continue, suggesting the pitch centers discussed above. In this way, there are several conflicting pitch centers (A, D, G, F#) within the *continuation* module. It epitomizes the idea of non-tonal diatonicism, which will be explored in Chapter 5. The concluding module projects no unambiguous pitch center, but leads into the closing theme through the EEC.

The center of the closing theme is clearly F# and is described variously as F# minor (Paul Griffiths and Steven Walsh), F# Dorian (David Gow), and as a "bitonal" combination of C# and F# minor (Kárpáti). This confusion stems from the fact that the melody (in the 1st violin and viola) seems to be centered on C#, and contains all seven pitches of a C# natural minor scale; however, it is accompanied by notes from an F# minor scale played with upper fifths, which engage both D and D#. This hint of bitonality is interesting, particularly in light of the changes the closing theme



undergoes in the recapitulation, but the centrality of F# in measures 67-69 seems very clear due to the descending and ascending gestures in the lower voice of the cello part (see Figure 29) and the sustained F#-C# fifths in measures 65, 67, and 68.



Figure 29. Closing Theme in the Exposition mm. 62-69

These observations raise several questions. What about P—is there any reasonably clear pitch center that contributes to the overall organization? How are all of these pitch centers related? In what way are they managed in the recapitulation? Is there a relationship analogous to the “sonata

principle” at work?<sup>45</sup> In relation to F#, C can function as #4 and D<sup>b</sup> as the dominant. With the addition of A, a mediant relationship unfolds: {F# A C C#}, with C and C# playing the roles of minor and major third to A (see mm. 28-29, Figure 27). In a traditional sonata, the secondary key is defined by its relation to the tonic, but the pitch center A is only fleetingly expressed before the EEC as a two-bar sonority (mm. 28-29), and therefore the relation of F# to A must wait until the recapitulation to be unfolded. How then does F# initially emerge?

Up to this point, P has been discussed as projecting no clear pitch center, but in fact, this it is not completely the case. There are no *strong* pitch centers, but there are gravitational pitches and reiterated pitches that will help shed light on how F# is ultimately gained. The first part of P is dominated by a collection of pitches (to be analyzed in Chapter 5) with no discernable center ({F# G B<sup>b</sup> B D E<sup>b</sup>}) expressed in the lower voices, but the 1<sup>st</sup> violin’s statement is bounded by the pitch C#/D<sup>b</sup> (see mm. 2-6, Figure 30). C# is reinforced by an agogic accent in measure 2 and oscillation motion between D<sup>b</sup> and F in measures 5-7 possibly suggesting D<sup>b</sup> major, the pitches of which continue into the *continuation* phrase ({D<sup>b</sup> E<sup>b</sup> F}, see mm. 5-11). Up until measure 14, the *model-sequence* technique employed here makes any other discernable pitch centers fleeting. But at measure 14, the 1<sup>st</sup> violin arrives on a pedal G while the lower voices present rising diatonic scales, ending in the final sonority of P: {B F# E G}.

This final sonority then resolves into the C pitch center of TR, F# resolving to G, B to C, and E to E<sup>b</sup> (see Figure 31), with G (raised to prominence by repetition) perhaps acting as dominant to C. In this way, the trajectory of the exposition up to the EEC can be seen as a conflict between C# and C: the C# in P moves to the C in TR, which then returns to C# in measure 28, and finally becomes the dominant of F# in measure 30. This large-scale motion from C# to F# might suggest a

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<sup>45</sup> Edward T. Cone, *Musical Form and Musical Performance* (New York: Norton, 1968), 76-77.

The musical score consists of three systems of four staves each. The first system (measures 1-5) begins with a treble clef and a key signature of one sharp (F#). The second system (measures 6-10) continues the melodic and harmonic development. The third system (measures 11-15) shows a change in the key signature to two sharps (F# and C#). The fourth system (measures 16-19) concludes the section with a final cadence. The notation includes various rhythmic values, accidentals, and dynamic markings.

Figure 30. P in the Exposition mm. 1-19

subdominant relationship that subverts the traditional dominant relationship found in sonata expositions, but this is not the case, for C# is only a loose pitch center that only later comes to take on the role of dominant to an actual key area, F#. As noted above, in S2, the pitch center of F# becomes temporarily lost; however, an pitch idea is introduced in the violins: the white-key diatonic

collection (see mm. 36-38—see Figure 28). This collection of pitches will gain importance in the recapitulation.



Figure 31. P Moving to TR in the Exposition: mm. 18-20

### 3.2 Development and Recapitulation

In the development, the conflict between C and C# continues. In measure 94, a prominent pitch center of C# is established in the cello, creating the pedal mentioned above. It is the only discernable “gravitational” pitch of the development. It continues until the climax of the development, measure 103, which then leads into the retransition. During these ten bars, C# alternates with C (see Figure 32), culminating in measure 103, where the verticalized beta motif



Figure 32. C# Pedal in the Development: mm. 94-103 (cello)

contains both C and D<sup>b</sup>. In the recapitulation, C# and C continue to be important pitches, but due to F's being the first strong pitch center (at the attempted ESC), C rather than C# attains the status of “dominant.”

P in the recapitulation is again somewhat inscrutable in terms of pitch centers due to Bartók's extensive use of the *model-sequence* technique, but several pitches are maintained and reiterated, primarily in the 1<sup>st</sup> violin. When the tritones in the lower voices are transposed there are no common tones, but the 1<sup>st</sup> violin's beta motif idea is another matter. Its first phrase is again bounded by C# (mm. 117-123, see Figure 33), and this note's status as a common tone with the second phrase is highlighted by the D<sup>b</sup> in measure 123, which is held over. D<sup>b</sup> then becomes a central pitch of the second phrase and is joined by its lower neighbor C, both part of this



Figure 33. First Phrase of P in the Recapitulation: mm. 117-123

transposition of the beta motif. In the third phrase, the beta motif is transposed to a form more in line with the ultimate pitch center A {E A B<sup>b</sup> E<sup>b</sup>}, and D<sup>b</sup> and C are relegated to the cello, alternating with the more salient pitch G. In this way, C# and C are carried over as important pitches into the recapitulation, but they are ultimately lost in the sequential motion, the final climax containing only the pitches E, A, B<sup>b</sup>, and E<sup>b</sup> (mm. 134-135—see Figure 34).



Figure 34. End of P in the Recapitulation: mm. 134-135

TR in the recapitulation is also unclear when compared to TR in the exposition. Measures 136-139 contain sustained tertian harmonies that recall the triadic section of measures 28-31 (mm. 137-139 over pedal tone B), but these harmonies are 7th chords ({E<sup>b</sup> G<sup>b</sup> B<sup>bb</sup> D<sup>b</sup>}, {G# B D F#}, and {B D# F# A}) with no relation to any perceived pitch center in the following S (see Figure 35). The 2nd violin in measure 138 and the entire quartet in the *molto tranquillo* (m. 140) interlude present white-key segments that recall its use in the exposition (mm. 36-38), but in isolation, no particular pitch center can be attached, and certainly no quasi-cadential function can be inferred as in the exposition.

Figure 35. TR in the Recapitulation: mm. 136-140

The pitch content of S is changed significantly in the recapitulation. S1 has nearly the same pitch content as in the exposition, but it has not retained F# as a pitch center. There is a brief sense of D as pitch center in measure 143 due to the prominent motion of A to D in the lower voices (mm. 142-143—see Figure 36a) and the doubling of D and F# at this arrival, but it is weakened by the prominent C naturals (B#) in measures 141 and 143. This pitch content is carried over into module 2 (S2 proper) in the upper voices, while the cello presents S2 in the white-key pitches (presumably carried over from TR, see Figure 36b). Clear centricity is eluded in these sections by shifting minor, major, diminished, and augmented triads, yet the note A is sustained in the 1st violin. This pitch

organization, in fact, is extremely important and will be discussed further in the last part of this chapter and in Chapter 5.



Figure 36a. S1 in the Recapitulation: mm. 141-144



Figure 36b. S2 in the Recapitulation: mm. 145-148



Compared to the closing theme in the exposition, the closing theme in the recapitulation more clearly expresses its single pitch center, A. This is accomplished through both the theme and the bottom voice of its accompaniment (in the cello) employing the same scale: A natural minor. The theme contains the notes {A B C D E} and the cello completes the scale with the notes {A C D E F G} in its bass line. The chords built upon this bass line are all major triads, which gives the A pitch center a somewhat bimodal flavor and again creates a tension (C against C#) that is germinal for the movement (see Figure 37).



Figure 37. Closing Theme in the Recapitulation: mm. 156-159

In measure 148, F is attained as a pitch center (the attempted ESC), only to submit to A seven measures later. This attainment of F and the significance of A are those aspects of the recapitulation that need to be explained. First, we must go back to TR; it begins with an anacrusis consisting of the final beta motif of P, and this uncertainty of pitch center is maintained throughout TR (as noted above). However, the B pedal in the cello (mm. 137-139), the reiterated note F# (maintained throughout TR), and the recurrence of the white-note collection in measure 140 (MC) suggest a resolution to C similar to that in the exposition (mm. 18-20). The MC then sounds like a

half cadence in the key of F, the pedal tone B in TR acting as #4. The sense of F: HC is reinforced by the 2<sup>nd</sup> violin in measures 138-139; its statement in measure 138 consists of the white-key collection, but in measure 139 B changes to B<sup>b</sup>, giving the sense of F major and strengthening the HC feel of the next measure.

### 3.3 The Movement as a Whole

With the addition of F, the pitch centers of the movement can be seen as {F F# A C C#}, symmetrically arranged around A. F# minor and F major have A in common as their third scale degree. This centrality of A is expressed in S1 and in S2 in the recapitulation (see Figures 36a and 36b). The first measure of S1 contains just those five symmetrically arranged pitches (other than the chromatic passing tones in the cello), combining F# minor with F major. The A# in measure 142 suggests F# Major and the D in measure 143 suggests both D major and D minor. All of these keys contain A. In S2, A is a pedal tone (1<sup>st</sup> violin) held until the end of measure 147 and becomes part of the F major in measure 149.

A is expressed as the pitch center of Bartók's *moderato* through its use as the third scale degree of F# minor and F major, the latter rejected as the final key by the assertion of A. The "sonata principle" can be seen at work in the sense that F major in the recapitulation completes the relationship of keys and that the arrival of the key of A cements its position at the center. The logical addition to this collection of pitches is D, and it has indeed been hinted at in the exposition's S2 and the recapitulation's S1, for example. It is expressed in abundance and is unquestionably the pitch center in the quartet's second movement. The coda of the *moderato*, as noted above, provides some harmonic clarity, but it also prepares a way for the expression of D in the second movement (see Figure 38).



Figure 38. mm. 167-169



Figure 39. Final Bars of the Movement: mm. 174-180

The first moment of harmonic clarity in the coda occurs in measure 168, in which C is expressed as a pitch center analogous to a key. This arrival recalls the hint of C minor at measure 19, but puts C in a more clear triadic context. The final harmony of the movement (F, A and C#) is prepared through harmony that suggests augmented-sixth-like movement (G# and B<sup>b</sup> resolving to A—see Figure 39), thus making the coda a preparation for the D pitch center of the second movement—transforming A from a tonic to a dominant. This will be discussed further in Chapter 5. In addition, {F A C#} succinctly expresses the relationship between pitch centers in the movement (the ramifications of this will be discussed below). In the last bar the cello ends on E, as if to allow the viola F to finally resolve, implying that the last harmony of the movement is a pure A major triad.

#### 4. REVIEW OF LITERATURE

In Chapter 2, the rhetorical/formal organization of the *moderato* was delineated according to the paradigm of Darcy and Hepokoski and William E. Caplin's theory of classical form, and Chapter 3, its pitch organization was examined in terms of traditional tonality and pitch centers. Along the way, prior analyses were consulted and their conclusions, when enlightening and useful, were referenced in order to augment and support the formal delineation. Rhetorically, the movement appears conformant; that is, sonata form is expressed clearly and completely through the organization of the thematic and motivic elements. However, the "tonal" pitch organization fails to achieve this level of conformity: large parts of the movement appear as blank spaces due to their non-tonality and/or lack of a clear and unambiguous pitch center. These sections can be connected to the others motivically and through loosely defined pitch centers, but what about their overall pitch organization? Can they be understood in a way that aids in articulating the sonata form and connects them to the pitch-centric aspects of the movement?

Several analysts have addressed the non-tonal organization of these parts of the movement and it seems appropriate in this case to look at them individually prior to moving on to analysis. This is due to the fact that they represent a progression, a narrative, which culminates in the analysis of Joseph Straus in *Remaking the Past*, which, as mentioned in the introduction, will serve as point of departure for my own analysis. The analysis of the movement's pitch organization presented in Chapter 5 primarily addresses the implications of several theoretical additions to Straus's analysis. This chapter aims to examine analyses by David Gow, George Perle, Elliott Anokoletz, Arnold Whittall, and finally, Joseph Straus, ending with an explanation of the need for theoretical additions to his analysis.

In an article entitled *Tonality and Structure in Bartók's First Two String Quartets*, David Gow argues for a process that he calls *emergent tonality*.<sup>46</sup> According to Gow, this is a process by which a work moves gradually from no clear tonal center towards traditional tonality, a process which is certainly at work in the *moderato*. Gow states that "Bartók's method is to explore the relationship between his ultimate tonality and some other specifically related region."<sup>47</sup> This region is, apparently, the non-tonal sections of the work. For Gow, the entirety of this region and its relation to the tonal areas is built around one interval: the tritone; E<sup>b</sup> thus becomes highly important due to its tritone relationship with the overall tone center of the quartet, A.

Gow claims that the A/E<sup>b</sup> tritone plays only a limited role in the first movement (becoming more important later on in the second and third movements), but that it appears at several crucial points: the beginning of the exposition, the beginning of the development, and the beginning of the recapitulation. He notes the tritone relationship between the C and F# tonal centers in the exposition and then concludes that they are standing in for A and E<sup>b</sup> (creating a system similar to Lendvai's axis system).<sup>48</sup> In addition to occurrence of this important tritone, he also pursues what he call the "red herring" of D minor throughout the movement, even finding its expression in the its first measures.<sup>49</sup> For Gow, the frequent hints of D minor throughout the movement distract the listener from the more central expressions of A and its tritone partner, E<sup>b</sup>.

It seems odd that Gow insists on locating and relating tonal centers that occur at the opening of a work that is supposed to exhibit *emergent tonality*; however, he soon moves away from

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<sup>46</sup> David Gow, "Tonality and Structure in Bartók's First Two String Quartets," *The Music Review* 34 (August-November 1973): 259 – 271.

<sup>47</sup> Ibid., 259.

<sup>48</sup> Lendvai, 269-318.

<sup>49</sup> Gow, 259.

relationships between tonal centers and isolates the tritone found in the beta motif of the *Grundgestalt*, noticing its double expression in the sonority of measure 103 in the development {D<sup>b</sup> F# C G}. Gow interprets this sonority as a simultaneous expression of the tonic and dominant of both F# and C, again finding relations between pitch centers and the non-tonal material of the movement. Thus, when the crescendo of measures 134 and 135, which contain the notes E, A, B<sup>b</sup>, and E, is sounded, Gow claims that the "*real* protagonists" (A and E<sup>b</sup>) have arrived.<sup>50</sup>

Gow's contribution to the understanding of the *moderato*'s non-tonal materials amounts to little more than an isolating of one interval, the tritone, but it is an interval that is undoubtedly important. His insistence on relating all of his observations to pitch centers and locating pitch centers even at the opening of the work contradicts his idea of *emergent tonality*. He doesn't actually address the structure of the atonal parts and goes so far as to attempt to understand the opening measures within the context of D minor. The tritone is, of course, an important interval, but it should not be understood as the generator of the entire movement. It is, rather, an important interval due to its prominence in the octatonic collection, as we will see below. But Gow's approach has been a common one: isolating certain intervals or collections and tracing their use throughout the quartet, in much the same way that, as demonstrated in Chapter 2, the minor third can be traced.

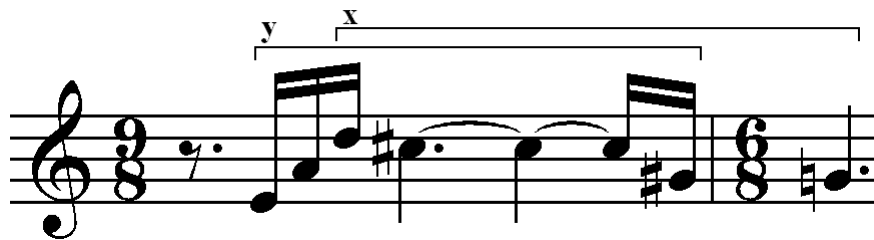


Figure 40. The X and Y Figures of Perle: mm. 2-3

<sup>50</sup> Ibid., 268.

In an article published nearly twenty years earlier than Gow's, George Perle isolated two "linear segments" from the *Grundgestalt* idea in order to demonstrate their inversive symmetry, either innate (as in "x", see Figure 40) or latent, awaiting transformation (as in "y").<sup>51</sup> Perle's "x" is the beta motif (the "c" motif of Kárpáti). Rather than isolating just a certain interval, Perle views "x" essentially as a pitch class collection (0167) and notes its reoccurrence in the development (m. 103) and at the beginning of the recapitulation. He treats this collection as a set class (similar to its treatment in Chapter 2), noting that its transpositions retain the same interval content. In addition, he also isolates the related set class (0268) (which contains two tritones) and charts its transpositions in the retransition and as accompanimental material at the beginning of the recapitulation.

The "y" segment of Figure 40 is the first five notes of the *Grundgestalt* and Perle traces its transformation into the "augmented" theme of S, a process demonstrated in Chapter 1. He finds "y" important because it moves from non-symmetry to symmetry, ultimately becoming a set-class that can be expressed both horizontally and vertically—for example, S1 at the end of the movement (mm. 177-180). It is no coincidence that Perle isolates (0167), a prominent octatonic subset, and (048), a prominent hexatonic subset, for the polarity between subsets of these collections is a major aspect of the movement's atonal pitch organization and plays a role in all the remaining analyses.

The analytical method of isolating certain intervals or set classes is pursued further in Elliott Antokoletz's analysis.<sup>52</sup> In addition to the beta motif, which he calls "cell Z" and pursues exhaustively throughout the entire movement, Antokoletz also isolates a "cell A" (015), which is found prominently as the first sonority of the movement {B<sup>b</sup> D E<sup>b</sup>} and at the beginning of the

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<sup>51</sup> Perle, 300 – 312.

<sup>52</sup> Antokoletz, 93 – 103.



*Grundgestalt* {A D C#}. (015) is, like Perle's "y," a hexatonic subset. Antokoletz finds practically every occurrence of cell Z, its variant (0268), and cell A throughout the quartet, and in this way, his analysis is an amplification of Perle's observations. In addition, Antokoletz provides, from early sketches of the movement, evidence to support Perle's assertion that the first five notes of the *Grundgestalt* are transformed into the first three notes of the "augmented" theme.

The analytical value of Perle's observations of symmetrical formations is indisputable, and Antokoletz's amplification provides a more complete look at a small number of important set classes. However, there is no connection to an overall pitch organization or to the form of the movement as a whole. His use of early sketches to demonstrate the relationship between the *Grundgestalt* and the "augmented" theme is useful in linking the thematic material motivically (as we saw in Chapter 2), but does not provide insight into the movement's pitch organization. Nevertheless, his method of linking the interval content of cell Z, its variant, and cell A through motivic connections may be useful in understanding the interplay between the octatonic and hexatonic collections.

Arnold Whittall begins his article "Bartók's Second String Quartet" with the following claim: "In the sense that it is not composed according to the principles of either the tonal or twelve-tone systems, Bartók's second string Quartet is not amenable to 'complete' analysis. All its chords cannot be codified: but its harmonic direction can be sensed and described; its thematic material can be identified and examined for similarities and contrasts."<sup>53</sup> This approach provides an alternative to the method of identifying and searching out certain intervals or set classes without placing them in context. Whittall begins by dividing Bartók's source material into two types, A and B (see Figure 41). Type A is an example of set class (0167) (the beta motif), and Whittall marks its important

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<sup>53</sup> Arnold Whittall, "Bartók's Second String Quartet," *The Music Review* 32/3 (August 1971): 265 – 270.

appearances throughout the movement; however, it is important that he recognizes that Type A is not an isolated set class, but rather a representative of a "type" or class of sonorities that involves primarily fourths and tritones.



Figure 41. Whittall's Type A, Link, and Type B

Though he does not say so, Whittall's Type A alludes to the octatonic collection. His Link and Type B are both examples of hexatonic collections, the Link divided into three (015)'s (Antokoletz's cell A) and Type B divided into three (034)'s. The Link is necessary in order to show the connection between the *Grundgestalt* and S1, a connection that, as we have seen, has been explicated by Perle, Antokoletz, Stevens, and others. Unfortunately, Whittall does not extensively relate the two Types to the formal organization of the *moderato*, other than noticing the Type A nature of the *Grundgestalt* and the Type B nature of S1.

The basis of Joseph Straus's brief analysis of the *moderato* is that the movement's sonata form is generated by the polarity between two fundamentally different groups of harmonies (subsets of octatonic and hexatonic collections). Straus examines P and S1 as they appear in both the exposition and the recapitulation. In addition, he examines the last ten bars of the movement, beginning at the *Poco più mosso* (m. 171). In Straus's view, the first theme is largely hexatonic in the exposition, but is dominated by octatonic harmonies in the recapitulation, where the violin's {C# G# G D}(0167) from measure 2 is emphatically realized, exposing the latent octatonic nature of the first theme.

S1 is, in his view, largely hexatonic in the exposition, and remains hexatonic in the recapitulation, the only change being an eventual shift in transpositional level at the end of the movement. The collection in the exposition {A B<sup>b</sup> C# D F F#} and the collection in the recapitulation {G# A C C# E F} share the same prominent augmented triad {A C# F}, which functions throughout the movement as a hexatonic signal, just as it epitomized Whittall's Type B. Straus's main point is that Bartók has reconceived sonata form through a working out of this polarity, the crucial moment being, for Straus, the last bars of the movement. His demonstration of the way octatonic harmonies (represented by (0167)) yield to hexatonic harmonies (represented by (0148)) is shown below (Figure 42).

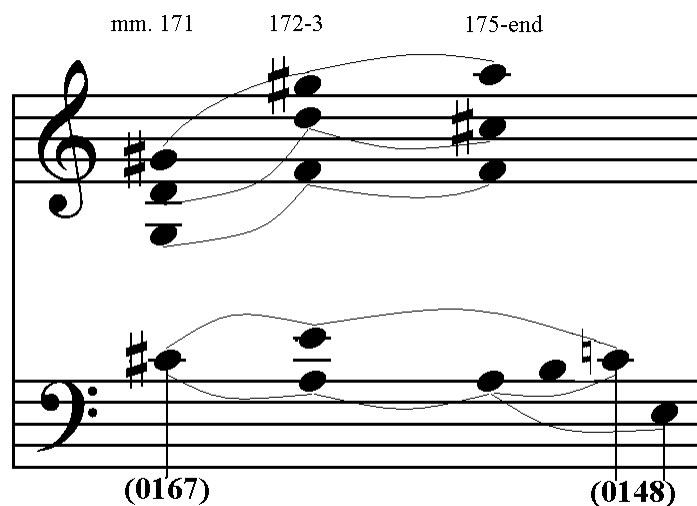


Figure 42. After Straus's Example 5-25: mm. 171-180<sup>54</sup>

The power in Straus's argument lies in the way that he demonstrates how the movement's complex pitch organization reinforces the form, which is so clearly articulated by the thematic organization. But more importantly, he also demonstrates how harmonic polarity and its eventual working-out "captures the essential feature of the traditional sonata." An attempt to expand his

<sup>54</sup> Straus, 120.

analysis must apply this analytical approach to the remainder of the movement, that is, the transitions, the coda, the development, and the remainder of the first and second theme groups.

However, in order to flesh out his argument fully by including these sections, an additional group of harmonies must be considered: subsets of the diatonic collection--including a particularly important subset, the pentatonic collection.

A consideration of the diatonic collection and its subsets is necessary for both empirical and theoretical reasons. For example, a thorough examination of the entire movement reveals that large portions of the music are, while not tonal, certainly composed of diatonic materials, that is, diatonic collections and triadic harmonies. The closing theme is one exemplar; in both the exposition and the recapitulation it is dominated by both diatonic melody and harmony (see mm. 156-161). In addition, the diatonic collection provides a way to move between the octatonic and hexatonic collections, and in this way, it mediates between them. This is not merely a theoretical matter, but rather an evident process within the movement.

Bartók achieves this interaction between and movement among the three collections through a variety of means; however, the most ubiquitous way is through a process of symmetrical chromatic expansion and contraction, a feature that can be found in virtually all of Bartók's music. In the second string quartet, it is found especially often at important structural moments, but is present at many points where there is motion between the subsets of two or more of the collections.

Chapter 5 aims to expand on Straus's ideas of pitch organization and to identify how this pitch organization helps to articulate the form as understood in Chapter 2. It also aims to reveal the way that the pitch center organization (as understood in Chapter 3) relates to the set-class organization. These aims will be accomplished through an examination of the way the octatonic and hexatonic subsets relate to the diatonic subsets and, ultimately, to the movement's pitch centers.

## 5. SET-CLASS ORGANIZATION

The aim of Chapter 5 is to provide an account of the *moderato*'s non-tonal pitch organization and to examine the way in which this organization aids in articulating the movement's formal structure (as delineated in Chapter 2). Formal sections, themes, motives, and individual sonorities or figures will be described in terms of three families of pitch organization: subsets of an octatonic collection (0134679a), subsets of a hexatonic collection (014589), and subsets of a diatonic collection (013568a). There will also be reference to other related families, namely subsets of pentatonic and whole-tone collections. These families (sets of subsets) of pitch organization are not merely abstractions, but distinctive sound-worlds that are readily audible in the *moderato*. They are represented in the music by both particular set classes that function as emblems or markers of their family of harmonies and by complete (or nearly complete) statements of the defining collections.

Appendix A is a chart listing all of the subsets belonging to each family, with those set classes functioning as emblems of their families marked. The emblematic set classes were chosen using several criteria. First of all, an emblematic set class must be exclusive to its family of harmonies. Secondly, in order to effectively serve as an emblem, a set class must have a cardinality larger than three. Set classes of cardinality three are widely shared among the collections and, even when exclusive, are simply too ambiguous. There are, however, small exceptions that will be discussed below. Tetrachords serve as the smallest and most ubiquitous suitable emblems, for they unambiguously suggest their family and, due mainly to the texture of the string quartet, are found in great abundance in the *moderato*. This is the last criteria; that is, a set class must be used often in order to be emblematic; there are several set classes that could function well as markers, but have been rejected because they are not found frequently in the movement.

The most frequent emblematic set classes of the hexatonic family of harmonies are (0148) and (01458). (0148) is by far the most common (as previously noted by Straus), occurring frequently as a vertical sonority and as a melodic figure. (048), the augmented triad, is important thematically, but it typically occurs in conjunction with larger, more emblematic harmonies. The diatonic family is represented by several tetrachords: (0257), (0156), (0157), (0237), and (0247). (0257), due to its status as a segment of the cycle of fourths or fifths, and (0156) (a tritone and its resolution together) are particularly important and appear frequently. The emblematic markers of the octatonic family of harmonies have been discussed by Perle, Antokoletz, and Straus (see Chapter 4) and are as follows: (0167), (0268), (0369), and (0134). It is important to note that other subsets will also be referenced when needed and when useful; for example, subsets that are shared by two or three of the families (such as (037)) will be important tools in discussing the linking and contrasting of families.

Chapter 5 is divided into three parts. Part 5.1 is devoted to demonstrating Bartók's use of each family of pitch materials by isolating formal areas and themes that are defined by one particular family and, in addition, isolating the most demonstrable use of each complete collection within the movement. For example, S1 in both the exposition and in the recapitulation is defined by subsets of a hexatonic collection, but the point where a complete hexatonic collection is most clearly employed is found at the beginning of the coda. Part 5.2 is devoted to examining the transitional material and the development and demonstrating the ways in which each family of pitch materials is employed, but particularly the way in which two or more families are employed together, linked, or set in opposition to one another. Part 5.3 provides an overview of the movement's pitch organization--an attempt to understand the pitch organization as a whole and in relation to the movement's formal organization.

## 5.1 The Three Families of Pitch Organization

The pitch organization of the movement is not as simple as Joseph Straus suggests: his octatonic/hexatonic polarity is only one of the forces at work. For example, the second phrase of the primary theme in the exposition is diatonic, not hexatonic, making it impossible to characterize this entire formal area as solely hexatonic. In addition, S2 appears primarily in two different forms (octatonic and diatonic), and for that reason, will be considered in Part Two of this chapter along with the transitional material. It is also important to note that only S1 is hexatonic, not the entire second theme group. Large formal areas cannot be so neatly characterized. However, the three families of pitch materials *are* demonstrably at work: even though entire formal sections do not often yield easily to being understood in terms of just one family, thematic areas and phrases *can* be understood in this way. The interplay between these three families is powerful and fascinating, particularly the way in which the diatonic family relates to the others.

As demonstrated by Straus, the first phrase (mm. 1-6) of the primary theme in the exposition is hexatonic, but in the recapitulation is octatonic (in its entirety). Furthermore, Straus demonstrates that S1 is hexatonic in both the exposition and recapitulation. He places the eventual working out of this polarity in the coda.<sup>55</sup> These findings will not be challenged here, but rather refined, amplified, and augmented. As noted above, the movement cannot be understood as simply a polarity between octatonic and hexatonic; the addition of the diatonic family shows how Bartók may have employed its emblematic subsets to mediate between those of the hexatonic and octatonic families.

A close look at the primary theme in the exposition will begin to reveal this extraordinary pitch organization. In fact, the opening phrase provides a neat exposition of the pitch materials in much the same way that the *Grundgestalt* provides a seed for the melodic motives of the movement.

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<sup>55</sup> Straus, 113-121.

For this reason, this analysis will also serve as an exposition of the analytical method being employed and will thus be in greater detail than those analyses for the remainder of the movement. Figure 43 illustrates an analysis of the primary theme in the exposition and Figure 44 is a reduction of measures 1-7. Hexatonic emblems are preceded by “H,” octatonic emblems by “O,” and diatonic emblems by “D” (later on “W” will be employed for whole-tone emblems).

The musical score for Figure 43, measures 1-19, is presented in 3/8 time. It consists of four staves: a top treble staff, two middle staves (one treble, one bass), and a bottom bass staff. The notation includes various musical symbols such as notes, rests, and accidentals. Analysis labels are placed above and below the staves to identify specific musical elements:

- Measure 1: O(01367) above the first staff, (015) below the first staff.
- Measure 2: (015) below the first staff.
- Measure 3: (026) below the first staff.
- Measure 4: D(0257) D(0257) below the first staff.
- Measure 5: H(0148) below the first staff.
- Measure 6: H(0148) below the first staff.
- Measure 7: H(0148) below the first staff.
- Measure 8: H(0148) below the first staff.
- Measure 9: H(0148) below the first staff.
- Measure 10: H(0148) below the first staff.
- Measure 11: H(0148) below the first staff.
- Measure 12: H(0148) below the first staff.
- Measure 13: H(0148) below the first staff.
- Measure 14: H(0148) below the first staff.
- Measure 15: H(0148) below the first staff.
- Measure 16: H(0148) below the first staff.
- Measure 17: H(0148) below the first staff.
- Measure 18: H(0148) below the first staff.
- Measure 19: H(0148) below the first staff.

Figure 43. P in the Exposition: mm. 1-19



The overall organization of the primary theme in the exposition is as follows: measures 4-7 are strongly hexatonic, evidenced by the prominent statements of (0148) and by the expression of a complete hexatonic collection in the lower three voices ( $\{D E^b F\# G B^b B\}$ , see Figure 44). Measures 7-13 are somewhat fragmentary in a harmonic sense, but coalesce into diatonicism at measure 14, which continues up to the arrival of measure 18. The diatonic family of harmonies is expressed in these measures through diatonic scales (complete diatonic collections) in the lower three voices and the tetrachords (0157) and (0237) in measure 18. The opening three measures, which are also fragmentary in terms of harmony, will be examined closely below.

The accompaniment in measure 1 presents (015), which is then echoed melodically in the 1<sup>st</sup> violin. This is an ambiguous trichord; it is a subset of both the hexatonic and diatonic collections. The 1<sup>st</sup> violin then briefly suggests the octatonic family through a statement of (01367) in measures 2-3  $\{D C\# G\# G B^b\}$ . However, this is a fleeting glimpse of the octatonic—an octatonic "seed" made up largely of the beta motif (0167)  $\{D C\# G\# G\}$ . Measure three presents (0257) twice in a comparatively strong expression of the diatonic family, highlighted by the voice exchange in the outer voices (G and  $B^b$ ). In this way, the first three measures project an introduction of the pitch organization of the movement, moving from ambiguity in measure 1 to a clear expression of the hexatonic family of harmonies in measures 4 - 6 and passing through a fleeting glimpse of the octatonic and a stronger sense of the diatonic (see Figure 44).

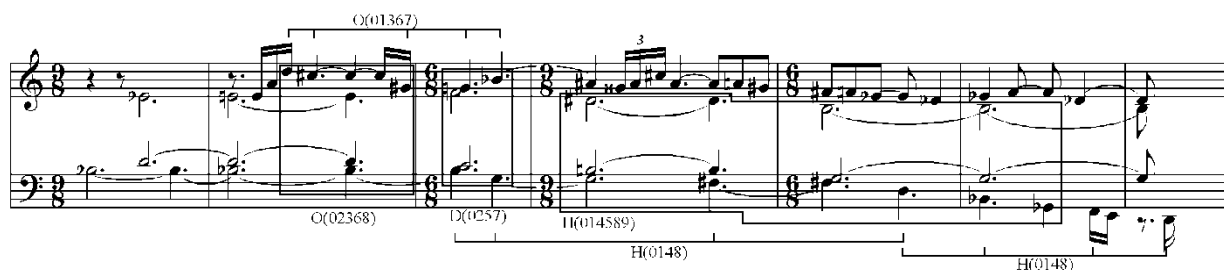


Figure 44. Reduction of the Part One of P in the Exposition: mm. 1-7

As discussed in Chapter 2, Part Two of P is dominated initially by the *model-sequence* technique and the progressive expansion of intervals. The perfect fifth in the 1st violin in measure 9 is progressively expanded until it reaches an octave at the end of measure 13 (see brackets above the staff in Figure 43). The intervals that make up the *model-sequence* technique also progressively expand, from a major second to a perfect fourth (see brackets below the staff in Figure 43). As noted above, the lower three voices begin to state diatonic scales in measure 14. The 2<sup>nd</sup> violin and viola/cello scales contain the diatonic collections {C# D# E# F# G# A# B#} and {B C# D# E F# G# A#} respectively; they are arranged as six-four chords moving in parallel. Furthermore, the arrival in the lower strings in measure 18 makes up (027), which recalls the (0257) of measure 3. When the 1st violin restates the minor third from the gamma motif of measure 3 (G - B<sup>b</sup>) two octaves higher, the G and B<sup>b</sup> create the exclusively diatonic tetrachords mentioned above (0157) and (0237), cementing this move to the diatonic.

The primary theme in the exposition is therefore not only hexatonic, but also diatonic. However, there is also a small kernel of the octatonic in the original statement of the beta motif (0167) and the accompanying harmony of measure 2. Other hints of octatonic harmonies (for example, in the fragmentary measures 7-13) are quickly abandoned. On the contrary, in the recapitulation, the primary theme is nearly exclusively octatonic--so much so that it can there function as the thematic representative of the octatonic family of pitch organization.

### • Octatonic Family

As noted in Chapter 4, the octatonic nature of the primary theme in the recapitulation has been described by Straus.<sup>56</sup> Its saturation with set classes (0167) and (0268) has been described by

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<sup>56</sup> Straus, 116-118.

Perle and Antokoletz.<sup>57</sup> Figure 45 is an analysis of the primary theme in the recapitulation (mm. 117-134) that combines these observations and several important additions. The primary theme is supported here with octatonic harmony (0268), but the 1st violin begins as in the exposition, not reaching octatonic content until the beta motif (0167); however, after this point it remains in the octatonic sound-world (with few exceptions) throughout. In fact, the 1st violin not only remains octatonic, but most of its content is derived from (0167), which undergoes two transpositions. As noted in Chapter 2, P is divided into three parts that are organized through large-scale *model-sequence* technique. The three pitch levels, as represented by the 1st violin's (0167), are as follows: {D C# G# G} (measures 117-122), {D<sup>b</sup> C A<sup>bb</sup> G<sup>b</sup>} (measures 123-126), and {B<sup>b</sup> A E E<sup>b</sup>} (measures 127-135).

There are two important additions that need to be made to the observations of the previous analysts. First of all, it should be noted that a complete octatonic collection is expressed beginning in measure 130 (that is, {E<sup>b</sup> E F#G A B<sup>b</sup> C D<sup>b</sup>}), discounting the neighbor notes F and B. Secondly, there is also a short move to the diatonic family, both harmonically and melodically. The hint of the closing theme in measure 129 that was discussed in Chapter 2 is prepared by a slight shift in the cello that creates set classes (0157) and (0156) in measures 127 and 128. The figure that recalls the closing theme (0237) is also diatonic of course, and gives a fleeting impression of G<sup>b</sup> minor, recalling the F# minor of the exposition. This quick move to the diatonic family and back does not pose any problems for this analytical system--the primary theme in the recapitulation can still be considered representative of the octatonic family. The fact that the harmony changes to diatonic in anticipation of the diatonic closing theme in fact strengthens the analytical argument and provides further proof that the diatonic collection is integral to understanding this music.

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<sup>57</sup> Perle 300-312; Antokoletz, 93-103.

117 O(0167)

O(0167) O(0167)

124 O(0268) O(0167) D(0237)

D(0157)

130 O(0268) O(0167) D(0156)

O(0167)

O(0134679a)

Figure 45. P in the Recapitulation: mm. 117 -135

Before moving on to the hexatonic family, there is one other instance of a complete octatonic collection that should be examined: measures 103-105 in the development (see Figure 46). As noted in Chapter 4, several analysts have observed that these sonorities are vertical statements of the original pitch content of the original beta motif (O167). But together they also form a complete octatonic collection and therefore are another confirmation of octatonic harmony. It is no coincidence that these measures form an important climax within the development.

The image shows a musical score for measures 103-105. It consists of four staves. The first staff is in treble clef with a key signature of one sharp (F#) and a time signature of 3/8. The second staff is in treble clef with a key signature of one sharp (F#) and a time signature of 3/8. The third staff is in treble clef with a key signature of one sharp (F#) and a time signature of 3/8. The fourth staff is in bass clef with a key signature of one sharp (F#) and a time signature of 3/8. The score includes various musical notations such as notes, rests, and accidentals. Labels O(0167) and O(0134679a) are placed below the staves, with lines pointing to specific notes in the music.

Figure 46. The Climax of the Development: mm. 103-105

#### • Hexatonic Family

Straus states that "the beginning of the second theme in the exposition is drawn entirely from a single form of 6-20 (014589): A, B-flat, C-sharp, D, F, F-sharp. The only note from outside the collection is easily heard as an appoggiatura."<sup>58</sup> In fact, there is also a B in the viola in measure

<sup>58</sup> Straus, 118.

32 that can be understood as a neighbor note, but this hardly reduces the hexatonic nature of S1 (see Figure 47). Straus does not consider measures 34 and 35, perhaps because the cello deviates from hexatonic here (it simply is positioning itself in sixths with the viola in preparation for their parallel sixths accompaniment in S2). Although the final C makes a departure from the prevailing hexatonic collection, the climactic tetrachord {C# E# A C} is a member of the emblematic tetrachord (0148), and this aids in keeping the four measures grounded in the hexatonic. Another force in articulating the hexatonic is simply the augmented triad (048) stated in octaves in measures 32 and 34; it is, as noted above, an emblematic marker of the hexatonic when combined with other markers, such as (0148).

Figure 47. S1 in the Exposition: mm. 32-35

S1 in the recapitulation presents the same hexatonic collection as in the exposition, and also has additional notes outside of the collection, in this case primarily the neighbor-note C in measures 141 and 143 and several passing tones (see Figure 48). The hexatonic family is reinforced here by the three statements of the augmented triad {C# F A} combined with the strong arrival on D and F# in measure 143—the removal of the second part of the theme (see Chapter 2) aids in this clarification. As noted above, another projection of the hexatonic collection can be found at the

opening of the coda (mm. 162-164, see Figure 49). The first pitch of each successive imitative entrance of the closing theme spells out a complete hexatonic collection: {C A<sup>b</sup> E G B D<sup>#</sup>}.



Figure 48. S1 in the Recapitulation: mm. 141-144



Figure 49. Opening of the Coda: mm. 162-164

### • Diatonic Family

The closing theme represents formal areas that are defined completely by diatonic collections and is thus the most demonstrable use of diatonic music within the movement. In both the exposition and the recapitulation, its diatonic nature hardly needs extensive explanation. As

discussed in Chapter 3, the closing theme in the exposition is composed of two different diatonic collections (013568a) expressed melodically (see Figure 50): the theme contains the collection {C# D# E F# G# A B} and the bass of its accompaniment the collection {F# G# A B C# D E}. In the recapitulation (see Figure 51), the theme contains only 5 notes, creating a diatonic pentachord (02357). The accompaniment is made up of parallel major triads built on the white-note diatonic collection {A C D E F G}.

The musical score for Figure 50 is presented in two systems. The first system consists of four staves: two treble staves and two bass staves. The melody is primarily in the upper staves, and the accompaniment is in the lower staves. The second system also consists of four staves. The music is in D major (one sharp). The first system is labeled 'D(013568a)' at the top and bottom. The second system is labeled 'D(013568a)' at the bottom. The melody is primarily in the upper staves, and the accompaniment is in the lower staves.

Figure 50. The Closing Theme in the Exposition: mm.61-69





Figure 51. The Closing Theme in the Recapitulation: mm. 156-161

## 5.2 Transitions and the Development

### • Transitions

The transition in the exposition is a fascinating example of all three families of pitch organization expressed simultaneously and with shared tones (see Figure 52). This relationship is expressed succinctly in measures 20-23, the first phrase. The imitative treatment of the alpha motif is made up of statements of the hexatonic emblem (0148) {B C E<sup>b</sup> G}. Repetition of C cements the pitch center of the phrase (construed as #4 in Chapter 3), and the augmented triad {G B E<sup>b</sup>} aids in the motivic transition to S1. The foreshadowing of S2 in the 2nd violin presents a complete diatonic collection {B C D E F# G A}, sharing C, B, and G with the (0148). The viola's accompanimental line presents (01347), an octatonic pentachord {D E<sup>b</sup> F F# A} that belongs to the octatonic collection containing B and C (not counting the G, the viola line presents (0134679)—one pitch short of an octatonic collection). The octave C's in the cello reinforce C as a pitch center.

The image displays a musical score for measures 20 through 31. The score is written for four staves, likely representing different instruments. The key signature is one flat (B-flat), and the time signature is 8/8. The notation includes various musical symbols such as notes, rests, and accidentals. Several pitch collections are labeled with numbers in parentheses: H(0148) appears on the first, third, and fourth staves; D(013568a) is labeled on the second staff; O(01347) is labeled on the third staff; and W(02468) is labeled on the first staff in measure 27. The score shows a progression of musical ideas, with some measures containing complex rhythmic patterns and others featuring more melodic lines.

Figure 52. TR in the Exposition: mm. 20-31

The second phrase continues in the same vein until measure 28, in which the triadic motion from A major to D<sup>b</sup> major described in Chapters 2 and 3 begins, accompanied by rather vague melodic lines in the viola and cello. Of particular importance is (02468) in the 1st violin (measure 27), which is a brief whole-tone pentachord created by the flattening of B in order to move stepwise into A at measure 28. The whole-tone collection attains a greater importance in the transition of the recapitulation (see Figure 53). As a pitch collection related to, but separate from those that dominate the *moderato*, it has the ability to express ambiguity similar to that attained by combining the other families, as in the exposition. It is most similar to the diatonic and hexatonic (sharing the same cardinality). A whole-tone collection is related to a hexatonic collection in precisely the same way that (0268) is related to (0167).

Figure 53. TR in the Recapitulation: mm.135-140

In the recapitulation, the transition is only five measures long and rather than simply foreshadowing S2 as in the exposition, also takes its form from S2's first phrase: that is, three repetitions in a sequential pattern (see Chapter 2). Its organization is shown in Figure 53 (mm. 136 - 140). Each measure (mm. 136-138) is constructed as a statement of an ambiguous tetrachord (0258) (in this case also foreshadowing a harmony of the second theme, see below) accompanied by a statement of the foreshadowed S2. In Chapter 3 these (0258)s were discussed as seventh chords. The first two statements present one of the two whole-tone collections (and an (016) tail); however, the third statement is a diatonic collection (the white-key collection), which is reinforced in the *molto tranquillo* unison interlude of measure 140, also containing a white-key pentatonic collection. In measure 139, the 2<sup>nd</sup> violin presents a different diatonic collection (1 flat, see Chapter 3).

As would be expected, the pitch organization of the transitions is not as clear as that of each of the thematic areas. Ambiguity is created by the combination of several clear markers of different families, harmonies and melodic figures that belong to two or all three families, and sets that are outside the system, relating tangentially to the families of harmony, such as the whole-tone collection. Juxtaposition of the whole-tone and the diatonic is the continuation of a story (comparing various collections to the diatonic family) that began in the secondary theme group in the exposition. It is being told through different manifestations of S2 and is one of the primary ways that the relationship between the diatonic family and the others is worked out, as we will see below.

- **S2**

S2 is stated in two distinct forms in the exposition; in Chapter 2, these statements were referred to as *modules*. Figures 54a and 54b show only the first three measures of each presentation (their continuations simply extend the pitch organization of their respective modules). S2 in the exposition contains both diatonic and octatonic materials, in that order. Figure 54a presents measures 36-38, the first presentation of S2. The theme itself is in octaves in the violins, and projects the white-key diatonic collection. The viola and cello are in parallel sixths, the cello beginning the symmetrical formation noted in Chapter 3.

The second S2 module (mm. 50-61, see Figure 54b) presents the theme in an octatonic guise; the implications of the contrast will be discussed below. In this case, the cello takes the theme, presenting it in sequential statements of the emblematic (0134), each one from a different octatonic collection. In addition, the downbeat of each measure is also a statement of (0134) (making the combined octatonic pitch content of (013467)). The 1st violin, however, does not cooperate; it recalls S1 (primarily the rising major third) in overlapping statements of (0135) and

(037), which further highlights the contrast between diatonic and octatonic discussed below and fleetingly suggests various keys.

**D(013568a)**

Figure 54a. First Module of S2 in the Exposition: mm. 36-38

Figure 54b. Second Module of S2 in the Exposition: mm. 50-52

Figure 55 is S2 in the recapitulation (measures 145-147). It is primarily diatonic due to the fact that the statement in the cello contains the white-key diatonic collection (the downbeats matching those of the first module in the exposition: {B C F}--see Fig 54a). The upper three voices in this case present trichords (037), (036), and (048) (with the pedal A in the 1st violin), which create statements of (0258) (as noted above, foreshadowed in the transition of the recapitulation) and (0136), tetrachords shared by the diatonic and octatonic families. This one statement may perhaps replace the separate diatonic and octatonic statements of the exposition. In any case, S2 combines the diatonic and octatonic families in both the exposition and the recapitulation. Measure 148 and the *Molto sostenuto* interlude will be discussed below in conjunction with the linking and contrasting of families.

Figure 55. S2 in the Recapitulation: mm. 144-147

### • The Development

It would not be useful for our purposes to analyze every measure of the development in fine detail; however, there are many moments that will prove enlightening, particularly in defining the relationships between families. For this reason, this section will serve as a means of beginning the

process of understanding how the pitch families are linked and contrasted. As noted in Chapter 2, measures 70-81 present imitative statements of the *Grundgestalt* idea (in its entire form and also missing the gamma motif) interpolated with S1 and the contrary motion scalar motif. The notable moments in this section are those statements of motives in which the interval content has changed and measures 79-82, which are a fascinating juxtaposition of the diatonic and the octatonic families.

To begin, the first two statements of the *Grundgestalt* idea are changed within their alpha and gamma motives: the alpha motif is changed as in the transition of the exposition (the first interval being a fifth rather than a fourth) and the last interval of the gamma motif is a major third rather than a minor third, as in its initial form. However, the (0167) of the beta motif is unchanged. In the third statement, the beta motif is expanded, becoming an (0145), a marker of the hexatonic collection. This change was effected by an expansion of the inner interval from a fourth to a fifth (see Figure 56). Measures 73-75 contain the interpolations of S1, yet it is no longer hexatonic; rather, it is now diatonic. This change is exemplified in the interval change of the theme (noted in Chapter 2): interval class 4 has expanded to interval class 5 (the (048) becomes (027), see Figure 56). These moves to the diatonic family prepare for the diatonic harmony in measures 73-75.

The figure displays two staves of musical notation. The top staff shows a melodic line with two specific intervals highlighted: H(0145) and D(027). The bottom staff shows a series of chords, each enclosed in a box. From left to right, the boxes are labeled: 'Expected O(0167)', 'O(0167)', 'H(0145)', 'Expected H(048)', 'H(048)', and 'D(027)'. Arrows point from the 'O(0167)' box to the 'H(0145)' box, and from the 'H(048)' box to the 'D(027)' box, both labeled 'Expansion Relationship'.

Figure 56. Expansion between Families: mm. 72-73 (2<sup>nd</sup> violin)

The expansion that enables motion between the three pitch families is itself expanded into a motif, the contrary motion scalar motif noticed at the important structural points in the exposition: the *medial caesura* and *essential expositional closure*. The motif appears again in measure 77, but its appearance in measures 80-81 is far more enlightening (see Figure 57). Measure 80 is a clear example of the motif with all four voices stating the white-key diatonic collection. However, in measure 81, this collection is joined by statements that suggest other diatonic collections. In terms of major keys, each voice expresses the following: a C major scale in the 1st violin, a C# major scale in the 2nd violin, a C major triad in the viola, and a D major triad in the cello. This creates an (012) at the end of measure 81, which expands to (0134) at measure 82 (noted in Chapter 2, this exact expanding motion was previously seen in the second module S2 in the exposition--see Figure 54b, mm.49-50). The (0156) at the end of measure 80 expands to (0146).

The image displays a musical score for measures 80, 81, and 82, featuring four staves: 1st Violin (treble clef), 2nd Violin (treble clef), Viola (alto clef), and Cello (bass clef). The time signature is 3/8. Measure 80 shows all four voices playing a white-key diatonic collection. Measure 81 introduces new diatonic collections: C major in the 1st violin, C# major in the 2nd violin, C major triad in the viola, and D major triad in the cello. Measure 82 continues the expansion. Annotations include:

- D(013568a)** in the 1st violin staff at the start of measure 80.
- D(0156)** in the 2nd violin staff at the start of measure 81.
- O(0146)** in the 2nd violin staff at the end of measure 81.
- (037)** in the viola staff at the end of measure 81.
- (012)** in the cello staff at the end of measure 81.
- O(0134)** in the cello staff at the end of measure 82.
- Expansion Relationship** labels with arrows pointing to the transitions between measures 80-81 and 81-82.

Figure 57. Contrary Motion Scalar Motif and Expansion: mm. 80-82



The next section of the development (measures 82-93) develops the gamma motif extensively. More interesting in terms of pitch organization are the many examples of motion between the pitch families within the section's voice leading. These occur due to the extensive development of the idea of expansion and contraction (as mentioned in Chapter 2). The following section (measures 94-107, see Figure 58) develops the recurring idea of parallel motion as accompaniment that first occurs in the opening section of the movement and is found throughout. It also helps to effect the move to the octatonic as the interval between the inner voices expands from a minor third to a tritone at measure 100. In addition to the pedal C# here, the inner voices create the emblematic octatonic tetrachords here when moving in parallel: (0134), (0268), and (0167).

The figure displays three systems of musical notation for the inner voices (viola and 2nd violin) in measures 94-102. The notation is in 3/8 time. The first system (measures 94-96) shows a 3rd interval between the voices, with labels O(0134), (0235), and D(0135). The second system (measures 97-99) shows a widening interval, with labels W(0246) and II(0145). The third system (measures 100-102) shows a tritone interval, with labels O(0167), O(013679), D(0156), O(0167), O(0268), and O(0268).

Figure 58. Inner Voices in Parallel Motion: mm. 94-102 (viola and 2<sup>nd</sup> violin)

Note how after the viola and 2<sup>nd</sup> violin move into a tritone relationship the harmonies all change to octatonic. This is not surprising, for at measure 103 complete octatonic collections begin to be employed, as noted above. This section (mm. 94-102) cements the move to the octatonic family that began earlier.

The last section (measures 107-116) can be regarded as a retransition, and for this reason deserves a closer look. Perhaps a good place to start investigating how it works is at measure 108 (see Figure 59), for here is the point at which the texture of the recapitulation arrives: a separate melodic 1st violin line accompanied by the lower three voices. The lower three voices state parallel (036) trichords, creating octatonic hexachord (023568) {E F# G A A# C} in measure 108, and a complete octatonic collection in measure 109 {D D# F F# G# A B C}. The lower three voices arrive on (026), the initial harmony of the recapitulation, at measure 111. They move in parallel, creating the octatonic septachord {G G# B C# D E F}. The first sonority of the recapitulation {B A E<sup>b</sup>} is previewed at measure 115.

Ultimately, the move to the octatonic family in the development can be traced all the way back to measures 80-81 (Figure 57) in which the white-key diatonic collection moves into (012) as expressed by major keys (measure 81) and then expands into (0134). The pivotal moment is in measures 80 and 81, as diatonicism is replaced by octatonicism. The entire following section then wavers harmonically until measure 100, where the octatonic collection is clearly arrived (Figure 58). The first notes of the 1st violin in the recapitulation, however, form {E A D} (027), a decidedly diatonic trichord, and the re-transition prepares this as well. The 1st violin states (01469), an octatonic pentachord, melodically from measure 109 to measure 114, but in the middle of that measure, switches to a white-key diatonic collection (02357), preparing for the initial statement of

the recapitulation. The first pitch E is further prepared by its omission in the final measure of the development (see Figure 59).

Figure 59. Retransition: mm. 108-118

### 5.3 Relationships/Overview

#### • Diatonic/Octatonic

This final section is meant to cement the relationships between each pair of pitch families. The relationship between the diatonic and octatonic families is particularly important and begins in the opening measures as the octatonic statement in the 1<sup>st</sup> violin of measures 2-3 is juxtaposed with the (0257) diatonic harmony of measure 3. The transition in the exposition further explores the relationship, providing two collections with as many common tones as possible (5): {B C D E F# A} against {B C D E<sup>b</sup> F F# A}. In the recapitulation of the primary theme, these common tones are exploited when the closing theme is recalled amidst strong octatonic harmony. Only one pitch

outside the octatonic collection (implied in the outer voices) is needed to create the  $G^b$  minor statement of the closing theme:  $A^b$ . It is also this  $A^b$  that transforms the expected (0167) in the cello  $\{C D^b F\# G\}$  into the diatonic tetrachord (0156)  $\{C D^b G A^b\}$ .

The S2 modules in the exposition provide the best example of Bartók's exploring the implications of using each pitch family. The first module begins with a contraction ((014) moving to (037)), and the second module begins the same way ((012) moving to (0134)). The important difference is that the second is symmetrical about an axis and the first is not. Symmetry is one of the prime differences between the collections, and Bartók is exploring this difference. Furthermore, each module is structured as a sequence moving in fourths; however, the first module moves by augmented fourth and then by perfect fourth. The second module is able to move by perfect fourths each time, due to the symmetry of the octatonic collection. Bartók could have chosen to structure the first module so that it too moved by a perfect fourth each time, but perhaps chose rather to emphasize the difference between the diatonic and octatonic families (see Figure 54).

#### • **Diatonic/Hexatonic**

This relationship too begins in the opening measures as the (0257) at the end of measure 3 moves to the (0148) of measure 4. This move is brought about by the now familiar expansion of the inner voices from  $\{C D\}$  to  $\{B D\# \}$ . However, the greatest relationship between the diatonic and hexatonic families is the sharing of harmonies when the diatonic is skewed through the prism of minor tonality. For example, the (0148) presented in the transition in the exposition can easily be interpreted in the context of C minor, particularly since the pitch center here is unmistakably C. The  $\{B C E^b G\}$  can easily be seen as a C minor triad with its leading tone. It is worth noting that (0148) can come in many forms, not all so easily construed within a minor tonality.

The pitch center F# of S1 in the exposition and the fleeting suggestion of D in S1 in the recapitulation are made clear due to this ambiguity. The (0148) harmonies {F# A C# E#} and {D F A C#} may suggest F# and D respectively as tonal centers. However, the note A# is prominent in the exposition S1 and F# in that of the recapitulation. Thus the tonal centers can become bimodal; for example, the hexatonic pentachord (01458) can suggest D major/minor when spelled {D F F# A C#}. In fact, this ambiguity is exploited in the *moderato*. At the EEC (m. 61), the cadential harmony is (01458) {F# A A# C# E#}, but is here understood in terms of F# minor, the tonal area of the closing theme. The preceding measure contains diatonic scales within the contrary motion scalar motif and ends with (0347) (the major/minor tetrachord, suggesting C major/minor), moving by contraction into the EEC. A second example of (01458) suggesting a tonal area is in the “false” ESC of the recapitulation (mm. 148-154). The F Major that is strongly suggested here is found within a statement of (01458) {F A<sup>b</sup> A C E} (m. 148). Finally, the closing theme in the recapitulation recalls this relationship in its bimodality (A major/minor).

### • Octatonic/Hexatonic

This relationship is the original polarity proposed by Straus; its working out was noted in the coda, but as we will see, the coda functions not only as the working out of the octatonic/hexatonic relationship, but also as the working out of the relationship between all three families. This particular relationship stands out due to the prominence of the hexatonic family in the primary theme and S1 in the exposition and the prominence of the octatonic in the development and in the primary theme of the recapitulation. However well they function in delineating the form of the *moderato*, they aren't found juxtaposed, linked, or contrasted directly in a way analogous to the above descriptions until the coda. The diatonic family provides a link between the other families: both are constantly related to diatonic music. This is further proof that in order to fully understand the movement's pitch organization, the diatonic family is necessary. The following section will

present an amplified understanding of the coda and an overview of the pitch organization's relationship to the *moderato*'s overall form.

### • Overview

Figure 60 is a diagram showing the pitch organization of the *moderato* in terms of the three families of pitch materials (X represents inconclusive organization, “/” denotes simultaneous families, and “>” motion from one to another). It should be readily apparent that all of the thematic areas (P, S1, and C) may be understood unambiguously in terms of one or more of the families. The transitions, the development, and the coda are a different matter, but their ambiguity may be seen as analogous to the modulatory nature of these sections in a traditional sonata. In a traditional sonata these sections would not normally have one clear key area and would rather aid in moving between keys. These sections in the *moderato* may also be understood as modulatory, and as we have seen, they function well in this capacity. The transition in the exposition connects the diatonic (at the end of the primary theme) to the hexatonic (S1) both harmonically and motivically while relating both to the octatonic collection. The transition in the recapitulation connects the octatonic to the hexatonic in a similar fashion. And the development explores and works out relationships, just as it would in a traditional sonata.

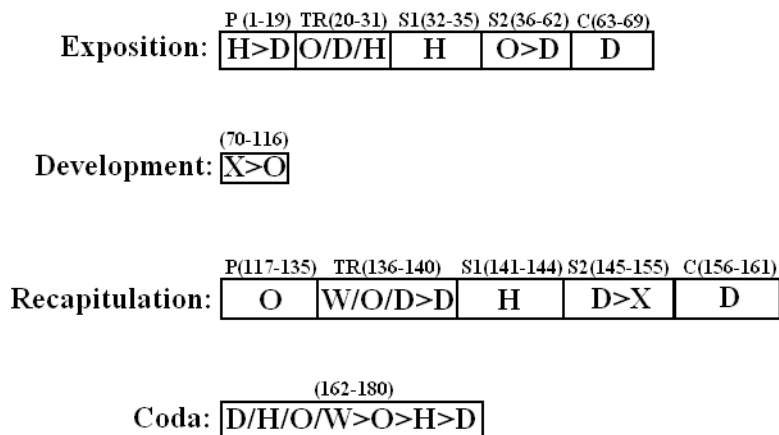


Figure 60. Set-Class Organization in Terms of The Three Families

The sections and their local functions are well defined by the three families. However, it remains to explore the way in which they are organized. Is there something analogous to the “sonata principle” or a traditional tonal polarity at work? In a traditional sonata, one can see the way in which the form is articulated by looking at how the recapitulation is different from the exposition--the conflict between the primary and secondary key (tonal polarity) is resolved as the secondary theme is recapitulated in the primary key (the “sonata principle”). The same procedure can be used in examining the *moderato*. First of all, the primary theme has moved from containing all three families (in particular the hexatonic and diatonic) to being largely octatonic. In addition, the hexatonic nature of S1 has become more clearly expressed but without a clear pitch center, eliminating any diatonic connotation that might bring.

If S2 is considered transitional material, then the resolution created by the recapitulation comes into view: in addition to recapitulating the closing theme in the primary key, the octatonic and hexatonic natures of the primary and secondary themes are made explicit. This is highlighted by the rhetorical isolation found in the recapitulation. The recapitulation therefore reveals the three families of harmonies as the basis for the movement’s pitch organization. The primary theme is octatonic, S1 is hexatonic, and the closing theme is diatonic. The polarity between the octatonic and hexatonic collections is certainly at work, but the addition of the diatonic family makes things a little more complex. Rather than two poles, there are three: the octatonic and hexatonic families are mediated by and point at (highlight) the diatonic collection.

- **The Coda**

A close look at the coda will reveal the ultimate working out of the relationship between the three families. The coda is not simply the final working out of the polarity between octatonic and hexatonic subsets, but the working out of all three families and a preparation for the second

movement, the *Allegro molto capriccioso*. Figure 61 is a reduction of measures 169-180 that demonstrates this working out. It is an amplification of Straus's diagram. Measures 169-170 contain octatonic harmonies ((0167) and (0236)) that have risen above the harmonically ambiguous combination of motivic materials that was described in Chapter 2. Ultimately, the (0167) of measure 170 ( $\{D^b G D G^\#\}$ ) resolves into the statements of (0148) created by the (048) in the upper strings ( $\{A C^\# F\}$ ) combining with various pitches in the cello line. This is the yielding of the octatonic to the hexatonic as described by Straus.

m. 169	170	172-173	174 (176)	175 (177)	178-180
O(0167)	O(0236) O(0167)	O(0236)	(0358)	(048) (H(0148))	(037) (D(024579))

Figure 61. Octatonic yielding to Hexatonic yielding to Diatonic: mm. 169-180

However, there is an important sonority found in measures 174 and 176:  $\{B^b C^\# F G^\#\}$ . The expansion that allows the diminished triad  $\{D F G^\#\}$  to resolve into the augmented triad  $\{C^\# F A\}$  is mediated by this sonority, which here acts in an augmented-sixth role, the  $G^\#$  and  $B^b$  resolving outward to  $A$ . Each time,  $D$  resolves to  $C^\#$  before  $G^\#$  resolves to  $A$ , heightening the stepwise motion and the resultant tension. In Straus's diagram, the movement ends with  $A$ ,  $C^\#$ , and  $F$  creating (0148)s with the cello; the movement ends in the hexatonic family. However, the cello line ends on  $E$  after the upper stings have ceased playing, giving the impression of  $F$  resolving to  $E$



rather than F and E continuing to the movement's end. The last sonority is an A triad (as noted in Chapter 2) and the final statement in the cello makes up a diatonic hexachord (024579). The augmented-sixth motion is made complete and is strengthened when the second movement begins firmly in D. After the octatonic yields to the hexatonic, the hexatonic yields to the diatonic: A as the dominant to the key of the second movement. This motion mirrors the succession found in the rest of the quartet and clarified in the recapitulation: octatonic→hexatonic→diatonic.

## 6. SYNTHESIS

In the preceding chapters, the thematic, pitch-center, and set-theoretical organizations of Bartók's *moderato* were presented, for the most part, in isolation. This final chapter aims to synthesize succinctly the two systems of pitch organization in order to provide a more complete account of the relationship between the movement's pitch organization and its form. As noted in Chapter 3, the pitch centers of the movement are constructed symmetrically around A ({F F# A C C#}--see Figure 62).

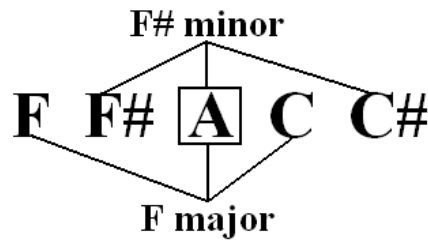


Figure 62. Pitch Centers of the *Moderato*

This construction can also be used to represent the hexatonic and octatonic families and their relationships to the diatonic family and to each other (the diatonic family's being represented by the above key areas and the closing theme):

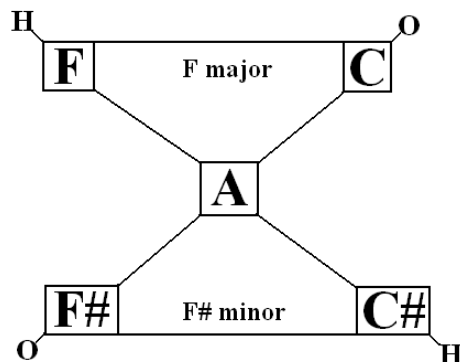


Figure 63. Hexatonic and Octatonic Families as represented by Pitch Centers

The augmented triad {F A C#} (048) is a salient marker of the hexatonic family, defining S1 in both the exposition and the recapitulation, and appearing both melodically and harmonically in measures 175-180 in the coda. For these reasons, it can strongly and concisely represent the entire hexatonic family as employed in Bartók's *moderato*. The fact that it can be arranged symmetrically around A (fitting into diagrams such as Figure 63) is no coincidence—by using the same small collection of pitches, Bartók can best explore the implications of the differences between hexatonic and diatonic (symmetry and non-symmetry) and the possibilities of their intersection (such as (01458) implying minor tonality, see Chapter 5). Both of the hexatonic collections containing {F A C#} are employed, {F F# A A# C# D} in the expression of F# minor (see the EEC, m. 61) and {E F A<sup>b</sup> A C C#} in the expression of F major (see the attempt at ESC, m. 148).

In a similar way, {F# A C} may represent the octatonic collection. The trichord itself is not as salient as {F A C#}, but may function analogously. For example, the fully diminished seventh chord defines the octatonic collection in much the same way as the augmented triad defines the hexatonic collection: two placed a semitone apart complete a collection and each is shared by two collections. In the same way that {F A C#} is shared by {F F# A A# C# D} and {E F A<sup>b</sup> A C C#}, {F# A C E<sup>b</sup>} is shared by {F# G A B<sup>b</sup> C C# E<sup>b</sup> E} and {F F# G# A B C D E<sup>b</sup>}. Each of these collections contains four of the pitch centers of the movement: {F# A C} and one of the remaining two. Given this, one would expect these two octatonic collections to dominate Bartók's *moderato*. This is indeed the case.

The octatonic family is first expressed by the beta motif (0167) in measure 2, a subset of the octatonic collection that does not contain {F# A C}: {C# D E F G G# A# B} (henceforth referred to

as OCT<sub>1,2</sub>, following Straus).<sup>59</sup> OCT<sub>1,2</sub> is again expressed in measures 117-123 in the recapitulation, but here yields to OCT<sub>0,1</sub>, the final transposition of P containing all five pitches of {F F# A C C#} (see Figure 64). In P, the octatonic family makes a clear move towards those collections containing {F# A C}, ending in the beta motif {A B<sup>b</sup> E<sup>b</sup> E}, which prominently contains A.



Figure 64. mm. 130-133

In addition, in the development, the octatonic climax at measures 103-107 is made up of OCT<sub>0,1</sub>, preceded and followed by clear statements of OCT<sub>2,3</sub> (the other octatonic collection containing {F# A C}). In measure 109, Bartók divides OCT<sub>2,3</sub> into {F# A C E<sup>b</sup>} and {F G# B D} (see Figure 65), providing the clearest statement of {F# A C} in the movement. Not only does P make a clear move towards the octatonic collections containing {F# A C} in the recapitulation, but the development also makes a clear move towards these collections, perhaps preparing for the recapitulation. All of the complete statements of octatonic collections in the *moderato* are made up of either OCT<sub>2,3</sub> or OCT<sub>0,1</sub>, most prominently in P in the recapitulation and in the development.

<sup>59</sup> Joseph Straus, *Introduction to Post-Tonal Theory* (Upper Saddle River, New Jersey: Pearson, 2005), 144-147.

OCT 2,3: {F# A C Eb}      {F G# B D}      {F# A C Eb}

Figure 65. m. 109 (2<sup>nd</sup> violin, viola, and cello)

In the coda, all three octatonic collections are represented, but the final remnant of octatonic harmony is the diminished triad {D F G#} first attained in measure 172 (see Figure 61). It is preceded by rising diminished triads that resemble the rising augmented triads of measures 178-179, which juxtaposes the octatonic family with the hexatonic and highlights the yielding of octatonic to hexatonic. In this way, the diminished triad (not necessarily {F# A C}) represents the octatonic family in the coda in much the same way that the augmented triad represents the hexatonic family.

The expansion motion that connects {D F G#} to {C# F A} (mm. 172-175, see Figure 61) succinctly expresses the movement's relationship between octatonic and hexatonic (symmetrical collections that are connected through the diatonic family) and exposes the seed of the contraction/expansion motion that fills the movement. F is made the common tone in the coda in order to create the augmented-sixth motion into A that prepares for the second movement. When A is the common tone (as it is before the coda), the diagram of Figure 63 neatly represents the pitch organization of the movement. Elements of this organization make up the thematic material, which is made complete through the various motions in the recapitulation. Thus, the beautifully succinct

organization of Bartók's music comes into view. It is a combination of elements, old and new, that proves enchanting both at the surface and at a deeper level.

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## APPENDIX: SUBSETS OF THE PITCH FAMILIES

\* Emblematic Subsets

### Subsets of the Hexatonic Family

2-note subsets

(01)

(03)

(04)

(05)

3-note subsets

(014)

(015)

(037)

(048)

4-note subsets

(0145)\*

(0347)

(0148)\*

(0158)

5-note subsets

(01458)\*

6-note subsets

(014589)\*

### Subsets of the Diatonic Family

2-note subsets

(01)

(02)

(03)

(04)

(05)

(06)

3-note subsets

(013)

(024)

(015)

(025)

(016)

(026)

(036)

(027)

(037)

4-note subsets

(0135)\*

(0235)  
(0136)  
(0246)  
(0156)\*  
(0137)  
(0237)\*  
(0247)\*  
(0157)\*  
(0257)\*  
(0158)  
(0258)  
(0358)

5-note subsets

(01356)  
(01357)  
(02357)\*  
(01358)  
(02358)  
(01368)  
(01568)  
(02469)  
(02479)\*

6-note subsets

(013568)  
(013578)  
(023579)  
(024579)\*

7-note subsets

(013568a)\*

**Subsets of the Octatonic Family**

2-note subsets

(01)  
(02)  
(03)  
(04)  
(05)  
(06)

3-note subsets

(013)  
(014)  
(025)  
(016)  
(026)  
(036)  
(037)

4-note subsets

(0134)\*  
(0235)  
(0136)  
(0236)\*  
(0146)\*  
(0137)  
(0147)\*  
(0347)  
(0167)\*  
(0258)  
(0358)  
(0268)\*  
(0369)\*

5-note subsets

(01346)  
(01347)\*  
(01367)\*  
(02358)  
(02368)  
(01369)  
(01469)\*

6-note subsets

(013467)\*  
(023568)\*  
(013469)  
(013479)  
(013679)\*  
(014679)

7-note subsets

(0134679)\*

8-note subsets

(0134679a)\*

## VITA

James N. Bennett was born in Snellville, Georgia, on January 8, 1980. He began studying the cello in 1992 and joined the Atlanta Symphony Youth Orchestra in 1996, becoming principal cellist in 1997. He continued his cello studies at Vanderbilt University, earning a Bachelor of Music in cello performance in 2002. During this time he performed extensively as a soloist, as a member of string quartets, and with the Vanderbilt New Music Ensemble.

James's interest in music theory began in high school and continued at Vanderbilt, where in addition to the cello, he studied composition. In 2005, he began his studies in music theory at Louisiana State University, where he was also a teaching assistant (aural skills). In the summer of 2006, he began his thesis research under the guidance of Dr. David Smyth. His current interests are 20<sup>th</sup>-century reinterpretations of classical forms and materials and form and structure in popular music. He is continuing his studies at the University of Wisconsin—Madison, beginning in the fall of 2007.