Semitonal Succession-Classes in Prokofiev's Music and Their Influence on Diatonic Voice-leading Backgrounds in the Op. 94 Scherzo

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The second movement of Prokofiev's Sonata for flute (or violin) and piano, Op. 94, is a frenetic scherzo that showcases the composer's fiendish wit. It is rich in jarring mid-phrase tonal shifts, hypermetric distortions, and triads with biting added dissonances.[1] The movement's conglomeration of tonal cues with surface dissonance has already sparked significant critical discussion. A recurring analytical strategy in these discussions is to focus on how dissonances form non-tonal motives that recur on the surface and are writ large as tonal centers throughout the work.[2] By contrast, comparatively little attention has been given to how many of these striking chromatic events highlight a recurring type of surface-level triadic succession: that of semitone-related minor triads.

This harmonic feature of the scherzo can be situated in Prokofiev's broader harmonic practice: successions between semitone-related major or minor triads, which in this article are labeled SEM-class (semitone-class) successions, are a recurring gesture in some of his pieces. These successions have been noted by both Russian and American theorists, but less attention has been given to how they influence background voice leading. SEM-class successions are prevalent in Prokofiev's music, but they are not functionally uniform; instead, they can be categorized by their role in a formal unfolding of a phrase. This article first defines and discusses various types of SEM-class successions that appear in Prokofiev's music. Some of these embellish other types of

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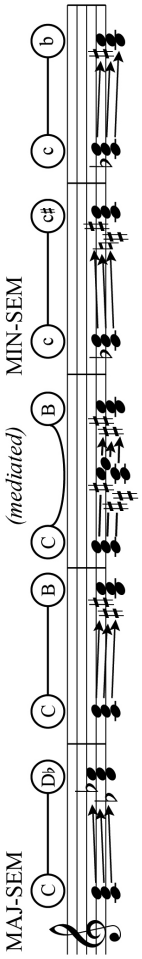
[1] Several writers have also remarked on these characteristics as general features of Prokofiev's style. Bass (1988, 199) describes mid-phrase modulations as a key element of Prokofiev's music, and Minturn (1997, 54) discusses the composer's penchant for triads with added dissonance. Minturn (1997, 149–151) also provides a hypermetric analysis of mm. 1–83 of the movement, showing how the composer employs rhythmic acceleration, while maintaining a strict hypermeter, to lead to significant arrival points.

[2] Minturn (1997, 145–149) and Rifkin (2000, 71–76).

progressions, while others occur in conjunction with tonal and rhetorical cues that indicate a cadence or key-defining progression. This article then discusses the pivotal role SEM-classes play in the Op. 94 scherzo, demonstrating that SEM-class successions create deformational voice-leading backgrounds whose tension with diatonic norms help to create the movement's alternating frantic and sarcastic moods.

Example 1: SEM-Class Successions



For the purpose of this article, a SEM-class triadic succession involves a T_1 or T_{11} relation between two major or minor triads. As shown in Example 1, there are two subclasses of SEM-class successions, depending on the triad type involved: MAJ-SEM and MIN-SEM are defined by an initial triad type and a uniform semitonal voice-leading vector that leads either up or down to another triad of the same type. Triadic roots are shown as circled letters above the score, and those involved in a SEM-class succession are connected by a solid line.[3] The direction of the semitonal motion is undefined: both an ascending and descending semitonal root motion qualify a progression for inclusion into the MIN-SEM or MAJ-SEM category. The first triad in each of the examples has the root C, but the succession could be transposed to any pitch level. In addition, a succession still qualifies as a SEM-class if the triads are inverted, revoiced, or have notes doubled.[4]

While the SEM-classes shown in Example 1 recall neo-Riemannian operations, they differ from them in a few respects. First, they restrict the mode of the initial triad, so that MIN-SEM or MAJ-SEM can be defined for only 12 of the 24 consonant triads.[5] In addition, the direction of root motion can be either up or down, so the classes do not meet the requirements for a mathematical group. In that they restrict the mode of the triads, the SEM-classes more closely resemble the Tonal-Triadic Progression Classes defined by Murphy in relation to film music, with the

[3] In the examples, major triads are indicated with upper-case letters, and minor triads with lower-case letters. In the text of of this article, major and minor triads are indicated by bold upper- or lower-case letters; e.g., "a **c♯** triad" is "a C♯ -minor triad," while a "a **C♯** triad" is "a C♯ -major triad." Bold letters separated by a dash indicate a triadic succession; e.g., "**c♯ –d**" is "a C♯ -minor triad moving to a D-minor triad."

[4] In the language of Tymoczko (2011b, 38–40), the SEM-class successions display symmetry by octave change, permutation (i.e., reordering), transposition, and cardinality change (that is, duplication of a pitch). In addition, they are inversionally symmetrical with regard to the direction of voice leading, a feature of late romantic harmony discussed in Tymoczko (2011a, 252–254).

[5] Hook's uniform triadic transformations (UTTs), a generalization of neo-Riemannian operations, allow for transformations that preserve the mode of the initial triad. Unlike UTTs, the progression classes do not specify root direction and act only upon one mode.

distinctions that the triadic succession does not necessarily imply a tonic, and the voice-leading can proceed either upward or downward.[6] Finally, while neo-Riemannian operations have been marshaled to describe both paradigmatic and syntagmatic relations—the former consisting of alterations to tonal-functional pillars in a tonal system,[7] the latter moment-to-moment triadic progressions—SEM-classes describes only syntagmatic relations, identifying salient triadic successions that occur in the surface stream of events.

The transposition of a major or minor triad by semitone in Prokofiev's music has already received analytical attention. The most immediate precedent for this study is Gollin's non-traditional triadic space, which is characteristic of some of Prokofiev's compositions. Gollin enacts the hyper-transformation $<M_5>$ on the set of transformations that Hyer uses to show fundamental tonal relations: P, L, R, and the D (dominant) and D^{-1} transformations, which map any triad to one of the same mode whose root is a perfect fifth higher or lower.[8] The result of $<M_5>$ is an "alternate" tonal space that is automorphic to Hyer's and consists of L, P, SLIDE, and the pair of transformations D_{11} and D_1, which map a triad to one of the same mode whose root is a *semitone* lower or higher.[9] Gollin demonstrates that this alternate space can reflect "certain normative relations and gestures" in Prokofiev's music, showing semitonal relations within chord

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[6] Murphy (2014, 483-86).

[7] An example of a paradigmatic use of triadic transformations occurs in Riemann (1895, 71–74).

[8] Hyer (1995, 117-125).

[9] Gollin (2000, 300–324). In Gollin's definition, a DOMINANT D_x is a triadic transformation that preserves the triad's quality and moves the root *x* semitones up or down. An automorphism was originally defined as a relation between two Klumpenhouwer networks or K-nets (discussed in Klumpenhouwer 1991 and Lewin 1990), but it can also act on a space created by triadic transformations. M_5 is one of the 48 canonical twelve-tone operators defined in Morris (1987, 65–66) and multiplies a pitch-class value by 5 mod 12. Because Morris is primarily interested in operators that permute the twelve pitch classes, he uses M to stand for M_5, and expresses the other multiplication operations (M_1, M_7, and M_{11}) as combinations of M, T, and I. Gollin's hyper-M, or <M>, acts on the value *x* in a D_x transformation, rather than on a pitch class.

successions and key areas in excerpts from *War and Peace*, *Romeo and Juliet,* and *Cinderella*.[10]

The transposition of a triad by semitone also recalls Bass's concept of *chromatic displacement*, in which part of a texture is displaced by semitone from a hypothetical diatonic original, and in which listeners recognize both a shift and understand the displacement as representative of the diatonic original.[11] But chromatic displacement, while a useful descriptive term, implies that semitone-related pitches are static in their function in the background, an assumption that is in some cases belied by context.[12]

One transformation in Gollin's theory, D_{11}, resembles Soviet theorists' concept of a "Prokofiev Dominant."[13] Poszowski defines a Prokofiev dominant as a major or minor triad whose root leads up by semitone to the first or fifth scale degree—that is, **B**, **b**, **F♯**, or **f♯** in the key of C major—and suggests that the chord is representative of the broader trend of twentieth-century composers to find distinctive harmonies by creating altered dominant sonorities (37–40).[14] Although Poszowski states that the root of a

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[10] Gollin (2000, 310). An analogy between semitone- and fifth-related keys is also suggested by Yuri Kholopov's analyses of Scriabin (Ewell 2012, [3.9]–[3.10]). Kholopov argues that the tritone transpositions of the dominant and subdominant chords form their "doubles," a view that derives from the tritone's twofold possible resolution. Because Kholopov's view of tonal relations has a different conceptual origin than Gollin's and is not based on triadic transformations, the resemblance between their views is best regarded as fortuitous, barring further investigation.

[11] See Bass (1988). Fankhauser (2008) also expands the concept of displacement to intervals beyond a semitone.

[12] Gollin (2000, 304) makes a similar critique.

[13] Segall (2013, 108–109). In the theories of Yuri Kholopov, the second half of the "Prokofiev dominant" label is a misnomer: he stresses that chords can have multiple functions and it is not essential to give them traditional labels such as "dominant" or "subdominant"; instead, "we must define precisely the *relationship* [e.g., of contextual stability and instability] of one chord… to another" (translated in Sologub 2013). For another study of semitone-related triads in Prokofiev's music, see Heetderks (2011, 77–132).

[14] Poszowski (1973, 37-40). Cohn (2012) also suggests that L and P provide a set of transformations to basic harmonic functions, so that the "Prokofiev dominant" can be viewed as an LP transformation of diatonic V. Segall suggests that the

Prokofiev dominant can neighbor either the first or fifth scale degree, his musical examples, all drawn from *Romeo and Juliet*, feature only the first type—that is, those types that form SEM-class successions. He identifies several brief passages where the chord leads directly to the tonic, substituting for the dominant, and also states that the chord can appear either before or simultaneously with a standard dominant.[15] Although the chord is given a harmonic label, Poszowski believes that its origin is melodic, since it harmonizes with parallel triads a leading-tone resolution. Kholopov discusses the Prokofiev dominant briefly, suggesting that in some cases it can replace the traditional tonic–dominant polarity.[16] Soviet theory also attributes a dominant function to the D_1 transformation: Sologub has made Kholopov-influenced analyses of Prokofiev's Fourth and Eighth Piano Sonatas that identify complex dominant sonorities that combine descending-fifth with descending-semitone root motion—that is, that combine the classical dominant and D_1.[17]

Like Gollin's analyses and those influenced by Russian theorists, this article affirms the significance of semitone-related triads in Prokofiev's compositions and their potential for alternate harmonic syntax. But rather than determining harmonic relations by examining the two chords' automorphic relation to traditional tonal space, it ascertains the role of a SEM-class succession by considering its formal location and placement in the larger voice leading of an individual phrase, and by examining the scale-degree tendencies of each chord's notes. Different SEM-class successions are of different hierarchical importance, and this hierarchy can be reflected through voice-leading reduction. Gollin's automorphism suggests that one SEM-class succession is a transformation of the

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"Prokofiev dominant" built on $\hat{7}$ in a major key can be heard as a functional substitute from the SLIDE-related key (2013, 110), building on some Soviet theorists' practice of viewing SLIDE-related keys as potential substitutes for one another.

[15] Poszowski (1973, 41-43).

[16] Kholopov (1988, 241). I am grateful to Ildar Khannanov for answering my questions about Kholopov's theories.

[17] Sologub (2013).The dominant potential of D_1 is discussed in greater detail later in this article in relation to the Op. 94 Scherzo.

authentic V–I, the other of the plagal IV–I; my study, by contrast, shows that both SEM-class successions can, given the right context, either substitute for an authentic cadential progression or play an auxiliary role to some other harmonic progression of greater structural importance.[18]

SEM-class successions frequently recur in Prokofiev's pieces, forming an interopus *idée fixe*, and they show that Prokofiev's harmonic practice, in some respects, grows out of late romanticism's tendency to, in Peter H. Smith's words, employ "unusual progressions … [that] acquire a characteristic identity comparable to that of a Leitmotiv."[19] To reverse Smith's statement, identifying instances of a MIN- or MAJ-SEM in Prokofiev's compositions is restricted to situations where these successions are "characteristic" of a movement or section thereof—that is, where they acquire a special status through repetition, marked placement, and prominence. Thus, a SEM-class succession is potentially important in a passage where it is associated with the beginning or end of a main self-contained theme, or where it occurs prominently and more than once.[20] In addition, a work may underscore the importance of a SEM-class succession by immediately reversing it or by presenting the semitonal voice leading prominently in pitch space as well as pitch-class space.

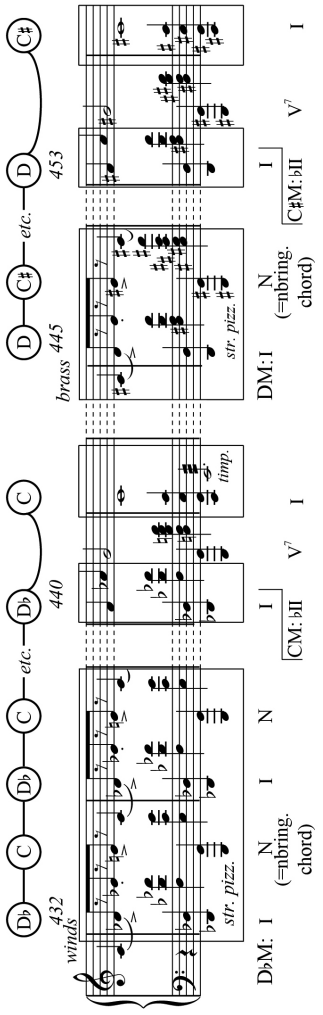
[18] For a discussion of how ascending or descending semitonal progressions substitute for V–I in pop/rock styles, see Everett (2008, 162).

[19] Smith (2009, 63).

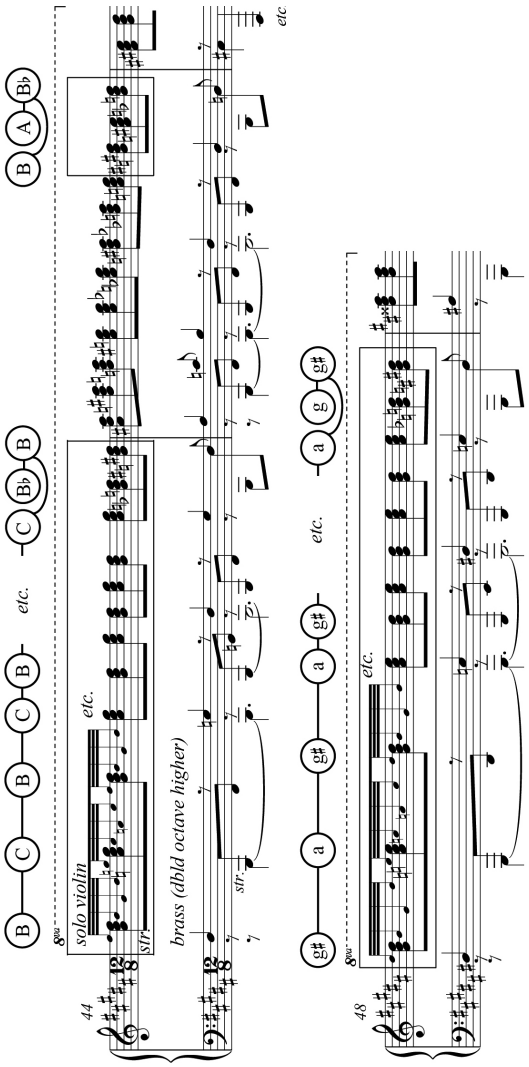
[20] A similar mode of thinking was applied by Cohn (2012, 145–148) to Wagner's *Parsifal*. Cohn identifies several instances of the hexatonic-pole progression in order to assert that it has "motivic value" in the opera.

Example 2: SEM-Class Successions at Thematic Beginnings

(a): Excerpts from "Hunters' Theme, Peter and the Wolf Story and Music by Sergei Prokofiev Copyright © 1937 (Renewed) by G. Schirmer, Inc. (ASCAP), publisher and copyright owner. International Copyright Secured. All Rights Reserved. Reprinted by Permission.



(b): Excerpts from Interior Theme, Violin Concerto #2, ii



Examples 2a and 2b provide examples of SEM-class successions that occur at the beginning of an important theme. The "Hunters' Theme" from *Peter and the Wolf*, shown in Example 2a, begins with an "oom-pah" accompaniment pattern (shown on the lower staff) that alternates between a **D**♭ triad in root position and a **C** triad in second inversion, two semitone-related major triads. The bass line is semitonally displaced from $\hat{1}$–$\hat{5}$, giving a skewed presentation of the accompaniment pattern in a march.[21] The main theme, shown on the upper staff, arpeggiates through the **D**♭ and **C** triads, adding some passing and neighbor notes. Whether the **C** triad is a substitute for V or is more easily reduced to a purely contrapuntal neighboring function is undetermined; [22] more broadly, it serves to prolong the **D**♭ triad until the cadential progression at m. 441. When the theme returns at m. 445, the triadic relation between **D**♭ and **C** is itself shifted up by semitone, creating an alternation between **D** and **C**♯.

Example 2b shows the beginning of the main interior theme from the Violin Concerto No. 2. The solo violin arpeggiates through **B** and **C**, two semitone-related major triads, in root position; its chords are doubled by the high strings playing eighth notes. The solo violin continues its arpeggiation pattern throughout

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[21] Minturn (1997, 30–31) identifies a similar semitonal displacement of a $\hat{1}$–$\hat{5}$ bass line in the "March" from *Love for Three Oranges*, and he cites this tonal distortion, as well as the others in the movement, as exemplars of Prokofiev's so-called "grotesque" line of composition. There is also a contrapuntal motivation for the D♭ –G bass line. The melodic line contains either E or C on the third beat, and the G bass is the only member of the **C** triad that avoids an octave between the outer voices, which would sound thin. I am grateful to Scott Murphy for this observation.

[22] The C triad might be heard as a substitute for V because it contains the leading tone. But the other two notes, ♯$\hat{2}$ and ♯$\hat{4}$, are also part of the common-tone diminished seventh chord. Evidence in support of an altered common-tone diminished seventh can be found in the first section of the Sonata for Cello and Piano Op. 119, ii. This section begins several phrases with tonic-prolonging chords containing ♯$\hat{4}$ (see, for example, mm. 1, 2, and 14), and they include both the "Prokofiev dominant" and the common-tone diminished seventh, suggesting an affinity between them. An example of two semitone-related major triads in which the lower notes appear as chromatic lower neighbors to the tonic occurs in the Piano Sonata No. 4, iii, mm. 4–5.

the theme, even though it is not shown in the reduction. This alternation repeats for three full beats at beginning of the theme and reappears with each chord change, underscoring its importance. In m. 48, the violin alternates between **g♯** and **a**, creating a MIN-SEM succession.

If a SEM-class succession is important in a movement, it can also have a *mediated* or *embedded* instance. Both types have precedents in neo-Riemannian analysis. In addition, given the correct context, a SEM-class succession can receive an incomplete, *partial* instance. As shown in Example 1, a *mediated* instance of a SEM-class succession occurs when an intervening chord (such as an applied V) appears between the two semitone-related triads. Nonetheless, because of the chords' temporal proximity, the relation can be perceived.[23] A mediated succession is indicated above the staff by a curved line connecting the two circled letters. The "Hunters' Theme," shown in Example 2a, contains an example of a mediated MAJ-SEM. The **D♭–C** alteration is reinforced at the end of the phrase when the D♭-major tonic is reinterpreted as ♭II and prepares an authentic cadence in the key of C major.[24] Another mediated instance occurs in Example 2b, m. 44, from the Violin Concerto No. 2. A **C** triad moves to **B** via an intervening **B♭**, forming a figure that resembles a double neighbor. Similar instances occur in mm. 45 and 48.

In an *embedded* occurrence, the triads that form the SEM-class succession are subsets of chords of greater cardinality. An embedded instance of a SEM-class is indicated above the staff by a dotted circle enclosing the letter-name of the triad that is a subset of a larger chord. In this article, an embedded succession can occur if it meets one or the other of the following conditions: (1) the triad is the *unique* consonant subset of the larger chord, or (2) the triad occurs within a single, self-contained strand of the musical texture.

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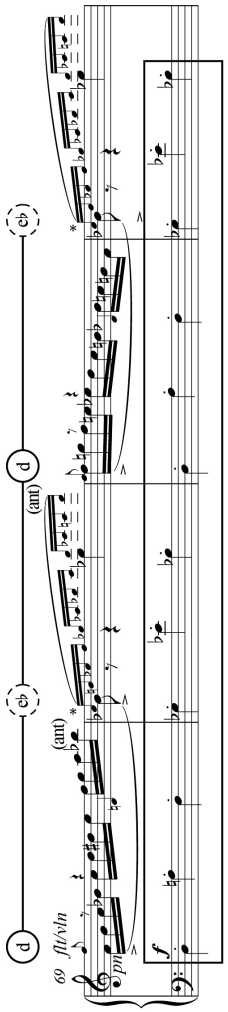
[23] Cohn (2012, 145) identifies a similar mediated instance of a triadic relation.

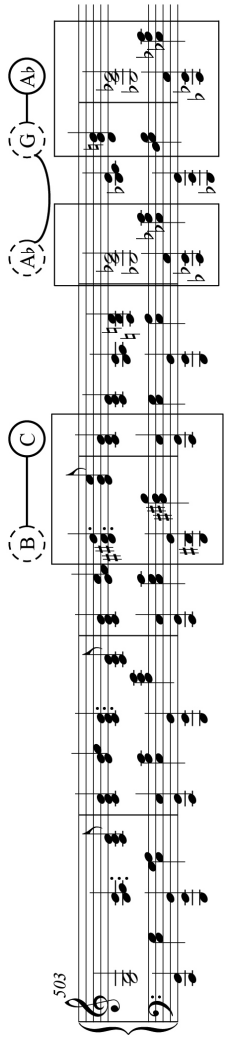
[24] The interpretation of tonic as ♭II in order to tonicize a semitone-related key recurs with some frequency in Prokofiev's music: a similar device occurs in mm. 18–21 of the First Piano Concerto Op. 10, although it lacks the rich network of motivic associations found in *Peter and the Wolf*.

Example 3: Examples of Embedded SEM-Class Successions

(a): Sonata Op. 94, ii, mm. 69-72



(b): "Triumphant Procession" from Peter and the Wolf, mm. 503-508



(c): "Grand Waltz" from Cinderella, mm. 25-27
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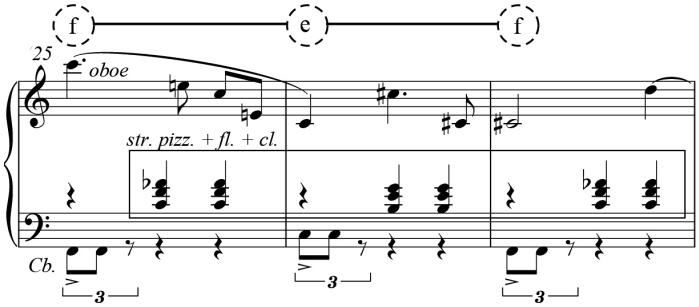


Condition (1) recalls a method for reducing seventh chords that dates back to Rameau,[25] which maps dominant sevenths to the major triads and half-diminished sevenths to the minor triads they contain. Examples 3a and 3b show examples of embedded SEM-class successions in which the triads are unique consonant subsets. Example 3a is excerpted from the scherzo movement of the Op.

[25] Christensen (1993, 98–102) provides a thorough account of Rameau's view of dissonant chords. Cohn (2012, 142–148) also discusses various techniques that have been used historically for reducing dissonant seventh chords, which include reduction to consonant subset. In the special case of set-class [0258] (i.e., Mm7s and ø7s), Hook (2002, 118–118) has developed a similar method of relating seventh chords to triads by creating a "cross-type transformation," which maps a seventh chord to the unique major or minor triad that it contains as a subset, and vice versa. In a later article, Hook (2007, 5–25) provides further examples of cross-type transformations, defining them as a homomorphism between two mathematical groups. The relation between Mm7s and major triads, and ø7s and minor triads, was a recurring idea in dualist theories of the nineteenth century, although its conceptual origin is the construction of major triads upward upward and minor triads downward, as well as from characteristic dissonances drawn from chords of the opposite function (Riemann 1895, 55–56). Hearing a ø7 as a minor triad with an "under-third" came under criticism in the twentieth century—most notably from Dahlhaus (1990, 56)—but Cohn (2012, 143–144) points out that the conceptualization is not always outlandish, especially in plagal progressions in which a putative ii^{o6}_{5} is most easily interpreted as iv with an added sixth. Harrison (1994, 65), in attributing a mixed function to V^7, also revives the view.

94 Sonata. A **d** triad occurs in the first measure: the left hand arpeggiates this chord, and the right hand plays an ascending scale that outlines the same chord with added passing notes. The B♭5 on the last sixteenth of the measure is an anticipation of the chord in the following measure, as is the last sixteenth in the ascending run (F6) in m. 70. In the second measure of the excerpt, the pianist's left hand arpeggiates an **e**♭ triad in first inversion, but the flute/violin begins its run with a C (marked with an asterisk on the figure), forming a C^{o}§. Nonetheless, the unique consonant triadic subset of C^{o}§ is **e**♭, so that the passage outlines an embedded MIN-SEM succession. Condition (2) reinforces this hearing, since the piano's left-hand part presents both triads in their pure form in a single strand of texture. Reduction to unique consonant subset is not limited to chords of set-class [0258]; other dissonant sonorities can be reduced according to the same logic. As an example, Example 3b, from *Peter and the Wolf*, shows a chord of set-class [0148] that is reduced to a triad.[26] In the second half of m. 505, a **B** triad occurs over a G bass in the context of a $\hat{1}$–$\hat{5}$ bass alternation in C major. The **B** triad is the unique consonant subset of the chord, and it leads by semitone to a **C** triad on the downbeat of m. 516, forming a MAJ-SEM. Another embedded and mediated MAJ-SEM occurs from mm. 507–508.

By contrast, condition (1) above cannot provide a basis for the reduction of the excerpt shown in Example 3c, which is from the *Cinderella* "Grand Waltz." In m. 26/beat 2, the bass line and accompanying parts form a chord containing the pitches {C C♯ E G B}. This chord does not have a single consonant subset; rather it has two: **C** and **e**. But condition (2) can be invoked to identify a MIN-SEM. The texture divides into three strands: the bass line, played by the contrabasses, the melody, played by the oboe, and the inner voices, played by the *pizzicato* strings and other wind instruments.[27] A MIN-SEM, boxed in the figure, is evident in the

[26] Cohn (2012, 145–148) also reduces chords of set-class [0148] in *Parsifal*.

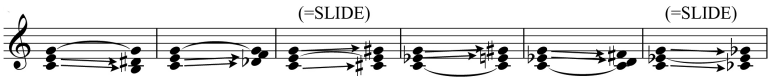
[27] Division of a texture into various strands in order to identify triads is a technique that has also been employed by Bass (1988, 209–210), Segall (2013,

inner voices; indeed, the parallels between the excerpt and Example 3b, which involves a MAJ-SEM over a $\hat{1}$–$\hat{5}$ bass alternation, are striking. Repetition underscores the significance of the succession, since it occurs at the beginning of each of the main theme's phrases.

If a particular SEM-class succession is significant in a movement, it can also receive a *partial* statement that acts as a foreshadowing or echo of a complete statement that occurs elsewhere.[28] In a partial statement, two of the voices, one of which must be the root of a major triad or the fifth of a minor triad, follow the voice-leading vector of a SEM-class succession, while the third remains stationary, as shown in Example 4a. For the connection between the full and partial statements to be explicit, the partial statement should appear in a marked location at the same pitch-class level of the complete statement, or it must occur in a formally parallel location as a complete statement.

Example 4: Partial Statements of SEM-Class Successions

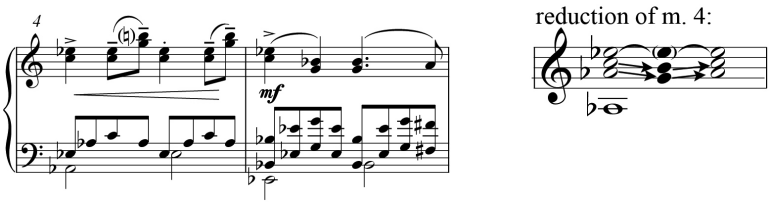
(a): Partial SEM-Class Successions



130–132), and Poszowski (1973, 43). The concluding two chords of "Masks," No. 12 from Prokofiev's *Romeo and Juliet,* are similar to the "Grand Waltz."

[28] The partial statements of MIN-SEM might be viewed as constrained versions of what Straus terms "fuzzy operations," in which a strict pitch-class transposition or inversion is displaced by a relatively small number of semitones (2003, 320).

(b): Partial MAJ-SEM in "Peter's Theme" from Peter and the Wolf Story and Music by Sergei Prokofiev Copyright © 1937 (Renewed) by G. Schirmer, Inc. (ASCAP), publisher and copyright owner. International Copyright Secured. All Rights Reserved. Reprinted by Permission.



An example of a dialogue between partial and full statements can be found in *Peter and the Wolf*. Example 4b shows an excerpt from the first appearance of "Peter's Theme." This appearance contains a partial instance of the **A♭–G–A♭** MAJ-SEMs that appear when the same theme is restated in the original key within the "Triumphant Procession" (see Example 3b). A voice-leading reduction to the right of the theme shows that it uses a voice-leading pattern similar to the later statement—specifically, transposition down by semitone from members of a major triad and up by semitone back to the original. But in the first statement of "Peter's Theme," it appears in inchoate and partial form: only some triadic members follow MAJ-SEM's voice-leading vector.[29] The full voice-leading first appears in the accompaniment to the "Hunters' Theme," and when Peter's theme is restated within the "Triumphant Procession" (see Example 3b), the **A♭–G–A♭** MAJ-SEMs are presented in their full glory. Another MAJ-SEM, **B–C**, occurs within the same theme. At the same time, the hunters' bass

[29] The ascent by eight semitones from E♭ to B♮ in the uppermost melodic line in Peter's theme also has motivic value, since the same ascending interval reappears, transposed and with a different contrapuntal function, in the parallel portion of the consequent phrase (see m. 8). These two notes are an example of an overdetermined musical unit, since they participate in two types of motivic relationship: one defined by a recurring voice-leading vector, the other by interval, rhythm, and contour.

line, which leaps by tritone, is corrected to leap by perfect fourth between $\hat{1}$ and $\hat{5}$ in the "Triumphant Procession," giving a pure version of the march topic. One might construct a narrative thread that ties together the associations between these themes: the full MAJ-SEM within the latter statement of Peter's theme reflects, at least momentarily, his achievement of full manhood on par with the hunters, and the march topic elevates him to a mock-heroic status.

One partial SEM-class succession shown in Example 4a requires special discussion: the third and sixth examples are equivalent to the SLIDE transformation. Both Russian and American theorists have noted the importance of SLIDE in music by Prokofiev and other Russian composers.[30] In many pieces, SLIDE plays a significant role independently of a SEM-class succession, but in the scherzo from the Op. 94 sonata, analyzed at the end of this article, it is the MIN-SEM succession that is the prototypical voice-leading motion, while the SLIDE is viewed as a partial iteration thereof based on its resemblance to this prototype. As in *Peter and the Wolf*, SLIDEs in the movement are later "corrected" to become complete MIN-SEMs.

Having defined SEM-class successions and shown how they can appear in a work, we now turn to how these successions interact with a passage's larger form and harmonic structure. SEM-class successions generally fall into two categories, though there may be gray area between them: (1) *surface*-level and (2) *key-defining*. In addition, SEM-class successions can be reinforced by broader *associational* relations. A *surface-level* SEM-class succession serves to embellish or prolong other harmonies of greater structural importance. By contrast, a *key-defining* SEM-class succession occurs in conjunction with other factors, such as thematic design or broader harmonic context, that create an expectation for a cadence

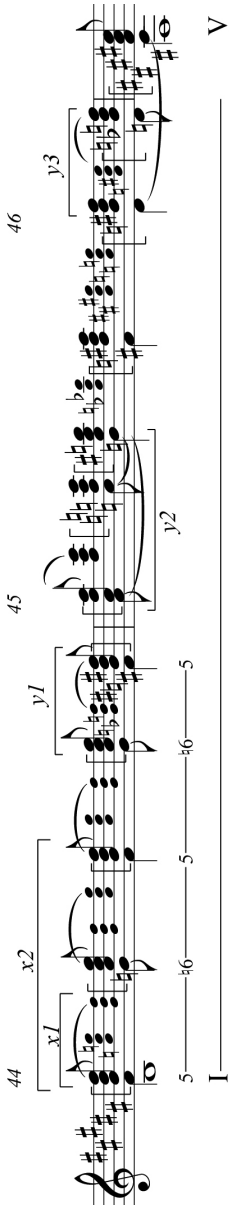
[30] For example, Minturn (1997, 57–58) defines a "triadic flip," which is equivalent to the SLIDE, as a recurring progression in several Prokofiev compositions. Segall (2013, 79–104) demonstrates that the "common-third" relationship, also equivalent to SLIDE, is discussed by several twentieth-century Russian theorists; he notes that while American theorists tend to focus on local chord successions, Russian theorists take a broader view incorporating tonal context, long-term relations, and individual scale degrees.

or a key-defining harmonic relation. Finally, *associational* SEM-class relations occur between salient events or key areas. Because associational relations do not occur between contiguous or nearly contiguous events, they are not, strictly speaking, SEM-class successions. But an associational relation can reinforce a SEM-class succession. For example, the "Hunters' Theme" from *Peter and the Wolf*, excerpted above in Example 2a, has an associational relation between the two keys (C major and C♯ major) tonicized at the end of each statement of the theme, reversing the theme's opening alternation between **D**♭ and **C** triads. The "Grand Waltz" from *Cinderella*, excerpted in Example 3c, first presents the theme in E minor at m. 11, and then in F minor at m. 25, reversing the **f**–**e** alternation in the accompaniment.

In a *surface-level* SEM-class succession, semitone-related triads occur as embellishment of a harmonic progression that otherwise follows common-practice norms, or they serve a local neighboring function and do not appear at deeper levels of voice leading. An example of a surface-level MAJ-SEM is seen in Example 2b, which shows the beginning of the interior theme of the Second Violin Concerto, ii. The rapid SEM-class successions in this theme, played by the solo violin and upper strings, embellish a slower-moving main melody, played by the brass. If the passage's voice-leading were reduced any further, all of the MAJ-SEMs would vanish; nevertheless, the successions help establish the passage's enigmatic and playful tone, fulfilling Smith's observation that events that are "incidental to a Schenkerian voice-leading framework" can nonetheless achieve an "alternate ontology."[31] The voice-leading reduction shown in Example 5 clarifies the specific type of

[31] Smith (2009, 68).

Example 5: Reduction of Violin Concerto No. 2, ii, mm. 44-46



embellishment each MAJ-SEM effects. The principal melody is shown with downward stems, and the upper voices use parallel-motion major triads; each contains one member that doubles the main melody. The vertical brackets in Example 5 show this doubling: in m. 44 the melody is doubled by the triads' fifths; in m. 45 the melody is doubled sometimes by their thirds, sometimes by their fifths. The brackets labeled with an *x* show a rudimentary motivic enlargement—the pattern created by the first three chords in the upper strings (**B**–**C**–**B**) reappears in each chord that occurs on the beat and accompanies the melodic note in the brass. The three-chord figure on the last beat of m. 44, marked *y*, consists of a direct and mediated MAJ-SEM that resemble a double-neighbor figure in contour. The *y* figure recurs in the following measure, but it serves a different voice-leading function. In *y1*, the first and last triads (**C** and **B**) move from a neighboring note to a member of the tonic triad. In *y3*, the triads' relative hierarchy is reversed: the first triad (**B**) doubles a member of the tonic, while the last (**B**♭) doubles a chromatic passing note.[32]

In a *key-defining* SEM-class succession, the surrounding harmonic and formal context suggests the occurrence of a cadential progression or a key-defining V–I relation. A key-defining SEM-class is aided by the discharge of a dominant or subdominant leading tone present in the first chord, which suggests a dominant or subdominant function even though it is not a diatonic IV or V. Substitution of a significant motivic idea at a cadential progression has also been identified by Rifkin: she notes that some of Prokofiev's phrases end with "non-functional harmonies" that arrive on the tonic. She labels these instances "implied cadences" and states that the repetition of an ordered pitch-class motive at the

[32] Analysts might identify associational relations that reinforce the MAJ-SEM in this passage. For example, the B-major interior theme shown in Example 4 results from a enharmonically respelled deceptive cadence (V–♭VI) in the key of E♭ major over mm. 43–44 (the same progression, leading to a briefer B-major passage, occurs over mm. 10–11). At the end of the interior theme, the semitonal relation between a dominant and the following key is reversed: the theme ends at m. 50 with a **D**♯ triad, which locally functions as V in the key of G♯ minor, but rather than resolving deceptively, it leads *down* by semitone to a new section in D major at m. 53.

end of a phrase, often in conjunction with a scale-degree discharge associated with the dominant function, "can fill the cadential void... by creating closure using non-harmonic means."[33] This article furthers Rifkin's study by identifying a different form of repetition, defined by the motion of multiple voices within a triad, and by examining the role of this repetition at other marked formal boundaries that do not include cadences.

When a key-defining SEM-class succession substitutes for V–I, especially at a formal location that could be construed as a cadence, the progression has two potential ramifications for voice-leading reduction. The first ramification stems from the fact that a single musical phrase, at least in Schenkerian theory, is often taken as a statement of fundamental tonal motion (i.e., the *Ursatz*) in its most compact form. Many of Schenker's analyses of individual phrases represent, in miniature, the fundamental structure; these phrases represent a transference of the fundamental structure to an individual harmony at the foreground. To reverse these two observations, a phrase's formal boundaries and cadential progression inform an analyst's reduction, and the cadential V–I is often interpreted as the final two elements of a transferred fundamental structure. When a SEM-class succession substitutes for a final cadential progression, Schenkerian-style closure at the level of the phrase is either distorted, or it is erased in favor of differing means of conclusion.[34] If tonal rhetoric affords cadence-

[33] Rifkin (2000, 77). A dominant scale-degree discharge is $\hat{7}$–$\hat{1}$. $\hat{7}$, the third of V, is labeled as the dominant agent in Harrison's theory, since it uniquely projects the dominant function. Its stepwise motion to another scale degree represents the discharge and completion of this function.

[34] To be sure, it is not necessary to impose absolute confluence between form and voice-leading structure, and several theorists have identified instances of "constructive conflict" between these two modes of analysis that are integral to a passage's beauty and momentum—Cohn (1992) provides a summary of their views. Rifkin (2000, 87–88) takes the position that an analyst must assume total separation between the two modes. She argues that in the examples of implied cadences she has discovered, there is no interaction between (Schenkerian) tonal structure, which achieves closure through a background I–V–I motion, and networks of motivic repetition. Tonal rhetoric may highlight either a tonal background or a motivic repetition, but this rhetoric implies no link between the two. This article argues, by contrast, that parsing tonal rhetoric from deeper structure can be difficult in practice. Smith adopts a similar viewpoint in his

defining power to a SEM-class succession, an analyst should consider that it might participate in an alternate voice-leading pattern that permeates deeper structural levels. Several alternate voice-leading backgrounds are already on the intellectual market: revisions of Schenker's theories have proposed structures that arise through melodic patterns that do not feature a stepwise descent from a tonic-triad member to Î,[35] or through cadential progressions characteristic of the diatonic modes.[36] The second ramification for voice-leading reduction is that the chords involved in SEM-class successions themselves become goals of larger linear spans.

Examples 6 and 7 provide two examples of key-defining SEM-class successions. The opening of the second theme in the Sonata for Cello and Piano, Op. 119, iii (mm. 32–39), shown in Example 6, is organized as a *compound basic idea* + *consequent*, a hybrid theme-type that closely resembles the period.[37] Mm. 32–35 form a compound basic idea, a four-measure pair of melodic ideas that prolong the tonic through a plagal progression, but lack the cadential progression required of an antecedent. In m. 36, the cello restates the same opening basic idea, beginning the consequent

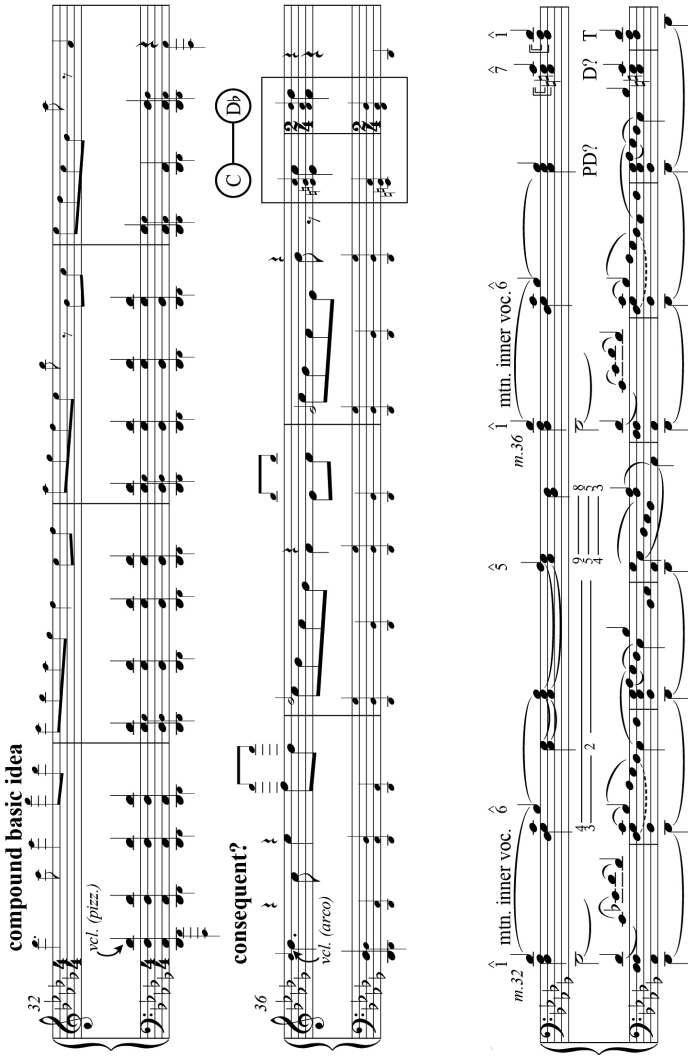
analyses of Brahms's chamber music: he states that in chromatic music, "formal signals are … indispensible to Schenkerian interpretation, despite Schenker's dismissive comments about the heuristic value of traditional *Formenlehre*" (2009, 70).

[35] For example, Neumeyer (2009) provides a system, based on structuralist theories of Shcheglov and Zholkovsky, detailing how analysts might expand the range of backgrounds. Neumeyer suggests that the tonic-triad intervals form a "non-expressive" (that is, non-directed) proto-background, and that applications of the LINE and N(eighbor) functions create an "expressive theme," which functions as a structural background. Pau (2013) has reduced passages from Bizet's *Carmen* to voice-leading skeletons that cohere through a primary ascending semitonal line; these often culminate in "upshifts" in which all voices ascend by semitone.

[36] Burns (1993, 1994, and 1995), for example, has explored modal progressions and their influence on the structural background in J.S. Bach's chorales. Burns (2000) also considers the effect of modal progressions on structural background in rock music.

[37] Caplin (1998, 61–63).

Example 6: Sonata for Cello and Piano Op. 119, iii, mm. 32-39
(Voice-leading reduction below score)

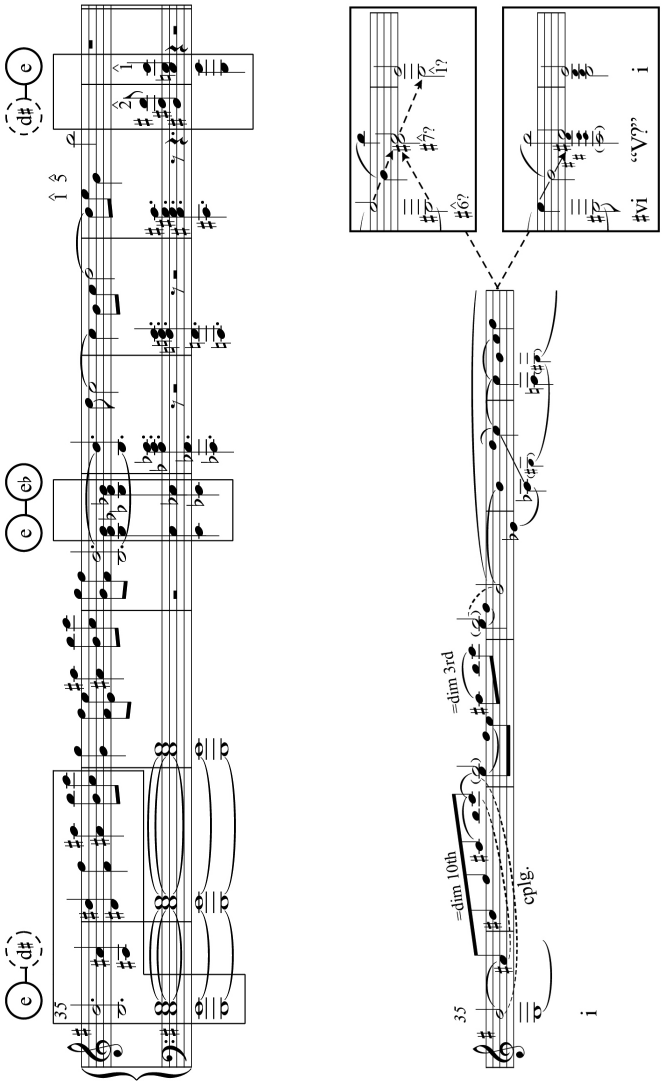


subphrase. As in a consequent from the common-practice era, the original ending of the subphrase is adjusted to create a stronger tonic arrival. But rather than an authentic cadence, the subphrase ends in mm. 38–39 with a "Prokofiev dominant" that resolves to the tonic—that is, the MAJ-SEM **C**–**D**♭. Both hands of the pianist and the cello underscore the progression by playing it in unison, and Mstislav Rostropovich's edited edition of the score assigns the cello a double down-bow to give the two chords extra rhetorical flourish.[38] The MAJ-SEM occurs where common-practice formal norms dictate an authentic cadential progression, and the progression partially fulfills these formal dictates even though it is not V–I. The **C** triad places $\hat{7}$, the dominant leading tone, in the uppermost voice, and this note resolves to the tonic in the following beat. The other notes in the progression, as in the example from the Second Violin Concerto, can be heard as parallel-motion accompaniments that embellish this primary scale-degree discharge. These formal and scale-degree features give a suggestion of a dominant function to the **C** triad, and the MAJ-SEM progression that ends the phrase is the best option for the closing progression in the secondary thematic zone's (mm. 32–59) key of D♭ major; a diatonic V never appears.

The occurrence of a MAJ-SEM where a cadence is expected has ramifications for the background voice leading of the theme, as shown in the two-level reduction below the score in Example 6. The opening compound basic idea outlines a compound melody whose uppermost line first moves from $\hat{1}$ to $\hat{6}$ in an inner voice. $\hat{6}$ falls to $\hat{5}$ in m. 34, completing a tonic prolongation. During the same timespan, the inner voices undertake a series of downward-resolving suspensions over a tonic pedal. In the consequent phrase, the MAJ-SEM creates an almost forcible change in direction in the primary melodic line: it now ascends back to $\hat{1}$. The parallel ascending motion in the inner voices forestall any hint of descent and yank the theme out of its otherwise diatonic context, giving it an exuberant character that is intensified all the more by shaving two beats off the four-bar hypermeter. The final two chords also

[38] Prokofiev (2001).

Example 7: Cinderella, Introduction, mm. 35-42
(Voice-leading reduction below score)



suggest a new meaning for the **e**♭ triad that appears in m. 38. What was a preparation for two downward-resolving suspensions now suggests a predominant chord that prepares the substitute cadential progression in the final two beats. To be sure, these aforementioned events are softened in impact by a tonic pedal that occurs underneath all of them: it is literally present from m. 37 to m. 38/beat 3, and it is, arguably, implied in m. 39. Nonetheless, the formal and cadential structures are present.

Example 7, which is from the introduction to *Cinderella*, shows an example of a MIN-SEM that Gollin identifies as an example of Prokofiev's alternate harmonic space that is automorphic by <M_5> to traditional tonal space.[39] In Gollin's reading, the succession of the **e** triad in the accompaniment and the arpeggiated **d**♯ triad at the opening of the phrase (mm. 35–36) is an <M_5> automorphism of the DOMINANT relation **e**–**b**. The same melodic figure appears in mm. 1–2 and 12–13 of the same movement. Mm. 7–9 (not shown in the figure) briefly tonicize F minor, so that when this tonicization is considered in conjunction with the **d**♯ triads, it creates a set of relations (**f**-**e**-**d**♯) that is automorphic to the common-practice trio of primary triads **a**-**e**-**b** or iv–i–v.

Valuable as Gollin's insights are, a deeper understanding of the passage can be found by identifying the different categories of SEM-class successions that appear and clarifying their role in the large-scale voice leading. The final phrase begins with two surface-level MIN-SEM successions in mm. 35–36 and 38, which are of a different order than the associational relation that results from the tonicization of F minor. In addition, the first **d**♯ triad is embedded in the arpeggiation of the enharmonic equivalent of a $C^{o\frac{4}{3}}$ chord, which complicates Gollin's reading of this triad as a simple <M_5> of the dominant transformation. The presence of D♯, the dominant leading tone, in the $C^{o\frac{4}{3}}$ suggests a dominant function, but the outermost notes of this chord—A♯4 and C6—form a diminished tenth that attaches ♯$\hat{4}$ to ♮$\hat{6}$, the subdominant agent, suggesting a subdominant-functioning augmented-sixth chord.[40] Over m. 37/beats 3–4, the melody reinforces the significance of

[39] Gollin (2000, 316–318).

[40] Harrison (1995, 177–178).

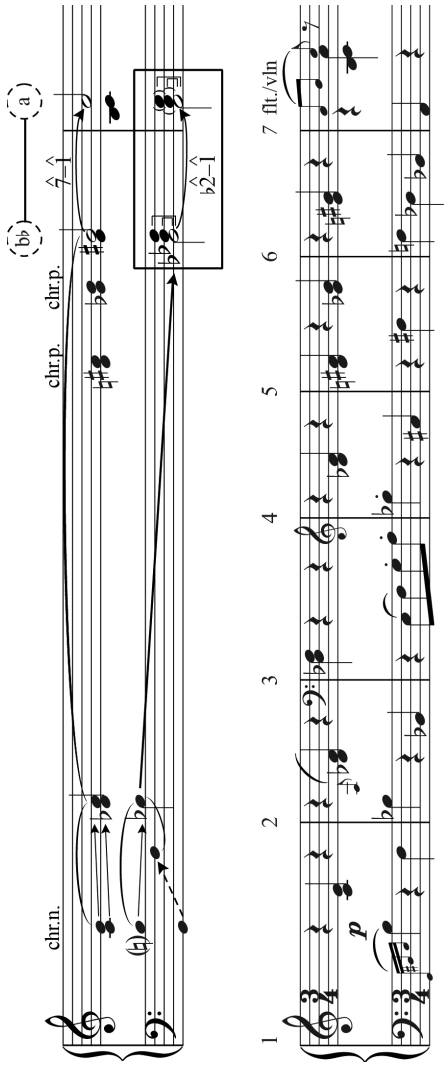
this diminished tenth by tracing its compound equivalent, a diminished third, labeled in the reduction of the passage. The diminished tenth neighbors the B4–B5 octave, and the higher B5, which is implied over mm. 35–38, is explicitly stated at m. 41. At the very least, the melody outlines a functionally mixed or ambiguous chord over mm. 35–36.

The MIN-SEM in mm. 41–42 occurs in conjunction with melodic and rhetorical cues that suggest a cadential progression. In this final MIN-SEM, the upper fifth is implied in the final **e** triad; since the key of E minor is clearly established in the excerpt and since the chord is the final tonic, this is a reasonable assumption. The melody's descending fourth $\hat{1}$–$\hat{5}$ in m. 41 recalls classical-era *recitative* passages that use the same figure to indicate a cadential six-four harmony, preparing the final two cadential chords. In the upbeat to m. 42, a $\hat{2}$–$\hat{1}$ in the second-highest voice, combined with a resolution of $\sharp\hat{7}$ in a lower voice, is reminiscent of an authentic cadence.

The MIN-SEM at the cadence creates two options for the voice-leading reduction, shown in the two boxes at the end of the outer-voice reduction in Example 7b. In the upper box, the bass line states a melodic close ($\sharp\hat{6}$–$\sharp\hat{7}$–$\hat{1}$) in the final two measures, and it is counterpointed by the $\hat{2}$–$\hat{1}$ in the melody and a B5 cover tone. This reading is coherent, but it requires several transfers of register in the bass part, shown by the dotted arrows. In the lower box, a single bass note ($\hat{5}$) is displaced into the melodic register, and when register is normalized, the outer voices trace the final two events in a classical *Ursatz*. The possibility for both backgrounds shows the ability of key-defining SEM-class successions to deform or obscure normative voice-leading reductions.

In the Op. 94 Scherzo, a MIN-SEM substitutes for several common-practice key-defining progressions and occurs prominently in two other sections. MIN-SEMs create two forms of harmonic conflict in the movement. First, they engender altered

Example 8: Op. 94, ii, mm. 1-7, with reduction and functional analysis



voice-leading backgrounds that bump against common-practice backgrounds. Second, they conflict with the partial SLIDE form defined above in Example 4a.

The six-measure introduction, shown in Example 8, presents one of the primary MIN-SEMs in the movement: **b♭–a**. In addition, this passage associates the progression with a tonic arrival. The first six measures suggest an off-tonic introduction and contain several ambiguities of both key and meter, but at the conclusion these ambiguities coalesce into a **b♭** triad that resolves to the home key of A minor. The movement begins on the first beat with the pianist arpeggiating a first-inversion **e** triad (with a lower chromatic neighbor to E), which might in retrospect be heard as minor v. On beat 2, the pianist plays the third C/E; the C might be heard as an upper neighbor or as part of an inverted major seventh chord. As shown on the reduction above the staff, this chord is interpreted as a set of chromatic neighbors to a **b♭** triad. For the next ten beats (through m. 4), the piano plays notes of the **b♭** triad in various registers with some embellishing notes and enharmonic respellings: the A3 grace note in m. 2 can be interpreted as an unresolved lower neighbor to B♭, echoing the D♯ lower neighbor in m. 1; m. 3 contains a neighboring note (E) and two passing notes (G and A); and in m. 4/beat 3, D♭ is enharmonically respelled as C♯. In m. 5, the pianist's right hand plays chromatic ascending passing notes in parallel thirds to lead in m. 6 to E/G♯, the root and third of the dominant triad. In the same measure, the **b♭** triad is transferred entirely to the left hand.

When the scherzo theme enters at m. 7, it begins on a hypermetric downbeat and follows a regular four-measure hypermeter until m. 26. Measures 1–6 therefore function as an extended gestural and hypermetric upbeat.[41] Upbeat gestures from the classical repertory typically contain a $\hat{5}$–$\hat{1}$ motion or scalar descent to the tonic, but in this movement, a statement of MIN-SEM in the lower voices, combined the resolution to the tonic note

[41] These types of upbeats are discussed in McClelland (2006, 29). They contrast with gestural upbeats, in which "one momentarily infers an extended hypermetric upbeat, but it quickly becomes clear that the minuet's first downbeat was a hyperdownbeat" (25).

in the uppermost voice, substitutes for this norm. The embedded MIN-SEM is indicated above the score; identifying it requires an implied E, the fifth of the tonic harmony, at m. 7; this assumption is supported by the fact that when the same tonic chord appears in mm. 9 and 11 (not shown), it in fact includes an E.

Despite their lack of a diatonic scalar descent or $\hat{5}$–$\hat{1}$ motion, mm. 6–7 retain a sense of tonic arrival. The reduction on the upper staves of Example 8 shows a functional analysis that supports this sense. The uppermost note in m. 6 is G♯, the dominant agent, and in the following measure this note discharges to A, as shown by the arrow labeled $\hat{7}$–$\hat{1}$. E, the root of V, sounds with the leading tone in the right hand, reinforcing the dominant functional interpretation.[42] The bass line moves in exact contrary motion to the soprano to also land on the tonic; the other voices on the lower staff move in parallel motion to the bass and can be interpreted as parallel-motion accompaniments, without a strong functional tendency of their own.[43] The chord in m. 6 can be interpreted as a dominant-functioning augmented sixth; the B♭ reinforces, through semitone contrary motion, the dominant agent's resolution.[44]

Russian music theories provide alternate ways to interpret the harmonic motion in mm. 6–7, although their explanations are partially at odds with the voice-leading tendencies of the passage. Boleslav Yavorsky's theory of tonality, which identifies the resolution of the tritone as the basis of harmony, would interpret the active notes the chord at m. 6 as the"leading tone" (F) and two "inversely conjunctive tones" (D♭ and G♯).[45] The E, as the fifth of the tonic triad, provides a stable tone, and the B♭, the fifth of the tritone-transposed tonic, results from a "duplex" system that takes

[42] Harrison (1994, 460). Rifkin (2000, 71–73) also interprets mm. 1–6 as unfolding a dominant chord, although she invokes a different theory to explain its origin. In her view, the B♭ is an altered fifth of the dominant triad, which is then transferred to the bass and tonicized while the soprano unfolds the root and third of V.

[43] Harrison (1994, 102–106).

[44] Harrison (1995, 179).

[45] McQuere (1983, 114–115).

into account the twofold possible resolution of a tritone.[46] This interpretation, notably, identifies harmonic motion in the inner-voice succession D♭/G♯–C/A, which Western theory finds more unwieldy.[47] But in other respects it is awkward: an E♭-minor tonic, which is implied in the duplex system, does not appear in the excerpt; in addition, the interpretation imputes a static function to the B♭ that is at odds with its strong tendency towards A.[48]

Whichever harmonic interpretation one favors, the MIN-SEM is, in my analysis, the primary event in the movement's introduction. This relation resurfaces at several significant moments in the rest of the first part of the movement and impels many of its jarring key shifts. This view complements other analyses of the movement, which similarly regard the six-measure introduction as foundational, but identify chromatic motives in the passage, rather than triadic successions. Minturn identifies four set classes that provide coherence to the introduction and remain structurally significant.[49] Rifkin identifies in an inner voice the pitch-class succession <C–D♭–D♮> in an inner voice, which she deems one of the movement's significant non-tonal motives, since it is writ large in chromatic key shifts that occur later in the

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[46] McQuere (1983, 118); Ewell (2012, [2.14]). As a chord that combines both stable tones and both types of unstable tones, it is an example of a class VI in Yavorsky's theory (McQuere 1983, 121–122).

[47] The resolution of the doubly augmented 4th D♭/G♯ is a resolution of a harmonic incomplete subdominant, as opposed to the natural incomplete subdominant D/A (McQuere 1983, 114).

[48] The chord in Op. 94 also resembles the "tritone substitution" chord, a major-minor seventh chord built on ♭$\hat{2}$, but because it does not contain the exact same scale degrees, and because later iterations of MIN-SEM do not as strongly suggest tritone substitution, I will not use the concept in this article. A more detailed discussion of the relation between dominant-functioning augmented sixth chords and tritone substitution chords appears in Biamonte (2008). Kholopov also argues that a dominant transposed by tritone can be thought of as "a different form of the same chord" (translated and quoted in Ewell 2012, [3.3]–[3.4]), but this view is contingent on the dominant as containing at least a root, major third, and minor seventh, which is not the case in the Op. 94 scherzo.

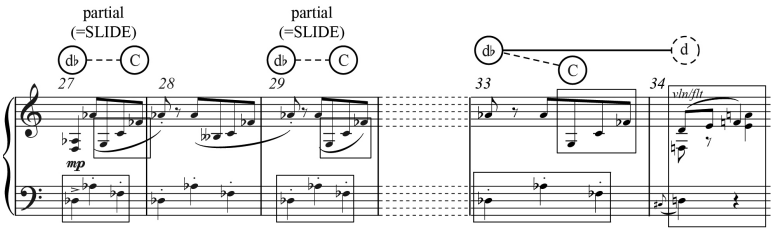
[49] Minturn (1997, 145–149). The set-classes are 4-19 [0148], 4-7 [0145], and their subsets 3-3 [014] and 3-4 [015]. They are stated in multiple forms over mm. 1–7 and later recur as the relationship among tonalities over mm. 7–123

movement.[50] These two analyses provide a valuable account of many of the movement's significant events, but they leave others unexplained. Identifying MIN-SEM, along with its partial iterations, links many of the unusual progressions in the movement with the thunderous arrival on the major tonic that first occurs at m. 83, as well as the conflict between the major and minor modes that is played out over the two primary scherzo themes.

After the six-measure introduction, the first scherzo theme (mm. 7–83) consists of two large periods whose antecedent and

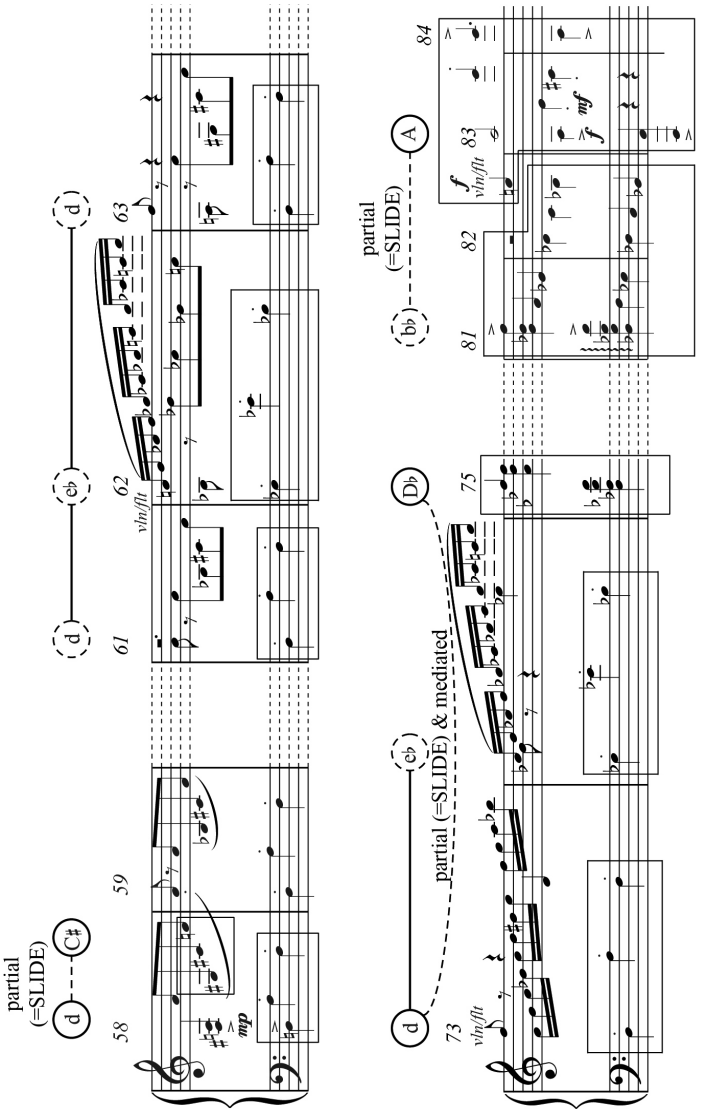
Example 9: Other MIN-SEM Successions in Op. 94, ii

(a): from ostinato beginning at m. 27



[50] Rifkin (2000, 71–76). The pitch-class succession appears in the bass line in the motion from C major (m. 15) to D♭ minor (m. 27) to D minor (m. 34) and in an inner voice in the motion from A♭ major (m. 103) to G♭ major (m. 113) to D minor (m. 123).

(b): from ostinato beginning at m. 58



consequent phrases are in sentential form.[51] But rather than ending with a firm cadence, the consequent phrases of both periods end with ostinato passages that prolong a single minor triad. Both passages, because of their departure from formal expectations, relative harmonic stasis, and high amount of dissonance, are marked for attention. In addition, these passages highlight MIN-SEM successions, both internally and as they lead to the next formal unit. Example 9a shows excerpts from the first ostinato passage. Beginning at m. 27, a chromatic SLIDE progression is compressed into a simultaneity. The piano's left hand arpeggiates a **d**♭ triad, while the right hand arpeggiates a chord that combines members of this triad with chromatic neighbors: the upper two notes in the right-hand pattern are the third and fifth of the **d**♭ triad, while the lower two notes (G3 and C4) are chromatic lower neighbors to its root and fifth. In m. 26, the lowest note switches to B♭♭3, the chromatic upper neighbor to the **d**♭ triad's fifth. Prokofiev's spelling reinforces the neighboring status of the pitches G, C, and B♭♭, since all could resolve by diatonic semitone. In addition, when a similar texture repeats at m. 73, the neighbor notes are absent, confirming their ancillary status. But in the first ostinato the neighbor notes never actually resolve; instead they sound simultaneously with their notes of resolution, creating a bitingly dissonant passage. The clash between the neighbors and their resolution highlights their semitonal relation, and if the F♭ in the right hand were respelled as E♮, a SLIDE relation is apparent between the left hand and the lower notes of the right hand, which form a **C** triad.[52] Arguably, the stasis in all other musical

[51] The model for the first scherzo theme is the compound sixteen-measure period, although the consequent is expanded and lengthens the phrase far beyond its prototypical length. The sixteen-measure period is discussed in Caplin (1998, 63–69). Rifkin (2006) has also noted that much twentieth-century music uses classical phrase design, only to add chromatic events that thwart the expectation for tonal continuity that these designs engender.

[52] Segall (2013, 130–132) has identified similar "slide-related" polychords—that is, two SLIDE-related chords sounding simultaneously—in Alfred Schnittke's music from 1974–1985. Unlike the examples in Schnittke's music, the polychord in Prokofiev's Op. 94 Scherzo retains a tonal orientation; nonetheless, the close similarity between the two Russian composers' harmonies might suggest a line of

parameters—the passage displays no rhythmic, melodic, or harmonic change—allows listeners to focus on the SLIDE relation ensconced within the pattern, despite its maximal dissonance in comparison with the rest of the movement. The first ostinato pattern leads directly to the second period, which begins at m. 34 with a restatement of the opening motive of the scherzo theme. As shown in Example 9a, an embedded MIN-SEM occurs between the **d**♭ triad and **d** triad that begin the restatement.

The second ostinato pattern, shown in Example 9b, forms an associational relation with the first, and it ends with two prominent SLIDE successions that represent partial iterations of previous MIN-SEMs. A large-scale associational relation between the openings of each section reinforces the **d**♭**–d** succession over mm. 33–34, since the first section begins in D♭ minor, and the second in D minor. Like the first ostinato passage, the second ostinato passage begins by compressing the SLIDE relation **d–C**♯ into a simultaneity. In addition, in mm. 61–63 (and several times following), the **d** triad is punctuated by a neighboring C^{o4}_{3}, creating an embedded iteration of MIN-SEM discussed above in relation to Example 3a. The ostinato ends at m. 75 with a **D**♭ triad, forming a mediated SLIDE with the **d** triad at m. 73. This succession represents a reversal and partial iteration of the **d**♭**–d** that ended the previous section. A long upbeat gesture follows that ends with an embedded succession **b**♭**–A** (mm. 81–83), forming another SLIDE progression, and the second triad marks the beginning of the second scherzo theme, which is in A major. This second SLIDE recalls the MIN-SEM **b**♭**–a** at the end of the introduction that led to the scherzo theme, and these two SLIDE successions create a tension between complete and partial MIN-SEMs that is not resolved until the coda.

Merely pointing out the MIN-SEMs in the movement is, arguably, only of mild interest, but their significance is compounded when they play cardinal roles in defining the

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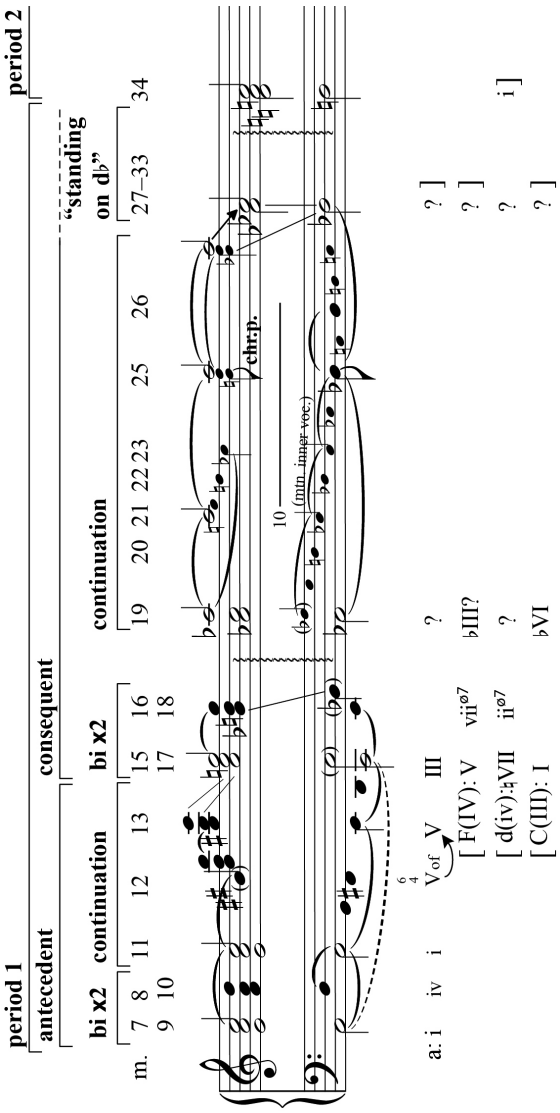
influence. The polychords also resemble Gollin's (2011, 390–393) *Doppelklänge*, a concept revived from Riemann's *Skizze* that views dissonant chords as the combinations of consonant ones, allowing an analyst to impart functional orientation to the entire dissonant formation.

movement's major key areas. Example 10a shows a foreground reduction of the first period, along with a formal analysis above the staff. The antecedent phrase (mm. 7–14) is a tight-knit eight-measure sentence that ends with a half cadence on V. By contrast, the consequent sentence (mm. 19–33) has a new and vastly expanded continuation section that introduces the tonal centers of A♭ and D♭. Vertical wavy lines on the reduction show where these two foreign tonal centers intrude onto the diatonic voice leading. Rather than ending with a common-practice cadence, the sentence ends with the seven-measure ostinato in D♭ minor (excerpted in Example 9a), labeled "standing on **d**♭."

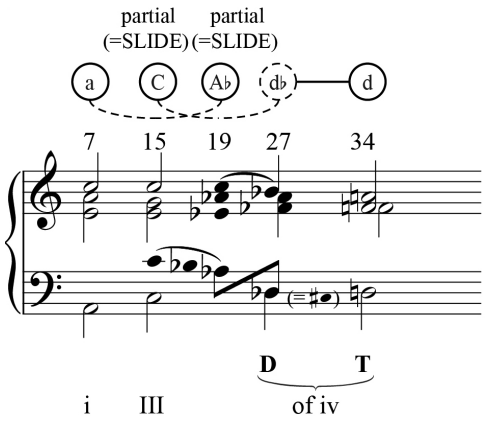
At least at the foreground, the two foreign tonal centers appear to create a distinct voice-leading structure that sounds arbitrarily inserted into the middle of the original. At the same time, the MIN-SEM relation plays a cardinal role in departing from the foreign tonalities, and it compensates for the lack of cadential closure in the second phrase. The first foreign tonal center is introduced gradually. The antecedent phrase begins with a conventional progression: the presentation prolongs the tonic through i–iv–i. The consequent, which begins with an identical melody, begins at m. 15 by tonicizing C major (III), but an $E^{ø7}$ chord (appearing at mm. 16 & 18) replaces the iv that occurred in the previous presentation. This $E^{ø7}$ has an ambiguous function, and prepares the rupture with common-practice harmonic syntax that shortly follows. Formal parallelism would stipulate that the openings of the antecedent and consequent outline an identical series of functions, suggesting that the $E^{ø7}$ prolongs the local tonic C. It fulfills this function through a combination of tonic arpeggiation in the bass with lower neighbor notes (D and B♭) in the two inner voices. This hearing, however, does not account for the incongruity of the B♭, which is outside the C-major scale. This note suggests a turn toward the key of F major or D minor (the latter is fulfilled at m. 34). This hearing is shown in brackets underneath the primary Roman-numeral analysis.

Example 10: Analysis of Sonata, Op. 94, ii, mm. 7-34

(a): Voice-leading sketch and formal diagram



(b): Second-level voice-leading sketch



These tonal interpretations are unconfirmed with the continuation at m. 19, which begins with an **A**♭ triad. This chord could be heard as ♭VI in the local C-major tonality, as shown in the bracketed analysis in the third row under the staff, and in retrospect, the B♭ in the previous chord suggests a displaced bass note, shown in parentheses in Example 10a.[53] But when a **d**♭ triad is introduced at m. 27, a C-major reading also becomes untenable.[54] Example 10a shows that the **d**♭ triad is introduced through an elaborate voice-leading pattern over mm. 19–26, whose principal notes are given stems in the reduction. In the second-highest voice,

[53] A progression with a $\hat{1}$–$\flat\hat{7}$– $\flat\hat{6}$ bass, with the ♭7 displaced to an inner voice, also occurs in mm. 1–3 of the first movement of Op. 94. An anonymous reviewer also suggested that the root and seventh of the E$^{\circ 7}$ might function as an enharmonic augmented sixth that resolves by semitones to octave E♭s, and the E and G as an enharmonic diminished seventh (E-G) that resolves by semitones to E♭ and A♭. I am grateful to an anonymous reviewer for this interpretation.

[54] The remote tonal areas are also where the scherzo departs from a regular four-bar hypermeter and becomes less clear as to the formal function of its sections, showing a close relationship between adherence to classical norms of harmony and classical norms of formal functions and meter. A detailed discussion of hypermeter in the scherzo can be found in Minturn (1997, 149–151).

the progression E♭5–D5–D♭5 connects the **A**♭ and **d**♭ triads. In the bass, a B♭2 provides consonant support for the chromatic passing note D. The stemless notes in Example 10a are interpreted as motion from an inner voice to the bass, passing notes, and a parallel-tenths linear pattern.

While the motion toward the two foreign tonal centers is introduced gradually, the motion back to D minor—the diatonic subdominant of the original key—is sudden enough to sound like a non sequitur. The two keys are juxtaposed over mm. 33 and 34 without any preparation, forcing yet a new interpretation of the movement's tonal areas. Example 10b shows a second-level reduction of period 1. The **A**♭ triad, as the upper fifth of the following **d**♭ triad, is grouped with it, revealing an unfolding of the **d**♭ triad over mm. 19–33. The entire chromatic episode can be heard as a prolongation of a chromatic passing chord between III and iv. Because D♭ is enharmonically equivalent to C♯, the dominant agent in D minor, the functional analysis in Example 10b shows that a dominant-to-tonic relation, which also iterates MIN-SEM, accrues between the final two chords.[55] The **d**♭ triad can thus be heard as a "dominant arrival," partially compensating for the lack of a cadence at the end of the second sentence, which is what common-practice convention would lead a listener to expect.[56]

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[55] Rifkin (2000, 76) makes a similar observation about the D♭-minor ostinato. The reader may have noticed that I am arguing that root motion by the same interval in opposite directions expresses the same harmonic function: in mm. 6–7, a minor triad *descending* by semitone expresses a dominant-to-tonic progression, and in mm. 33–34, a minor triad *ascending* by semitone suggests the same series of harmonic functions. While making the same functional reading of opposite root motion might appear self-contradictory, it is supported by the scale-degree content of each chord and the formal and rhetorical features that favor hearing the second chord as tonic in each case. Miller (2008, 96–111) argues that, if function is defined strictly in reference to chord behavior (one of four aspects that has historically been attached to the term), then root motion both up and down by step represents the dominant function.

[56] The attribution of a dominant function to a bass note recalls Rifkin's (2004, 274) "functional pitch-class motives," which are characterized by repeating patterns of pitch classes that, by virtue of their implied scale-degree discharge, are imbued with a particular sequence of harmonic functions. My study continues the

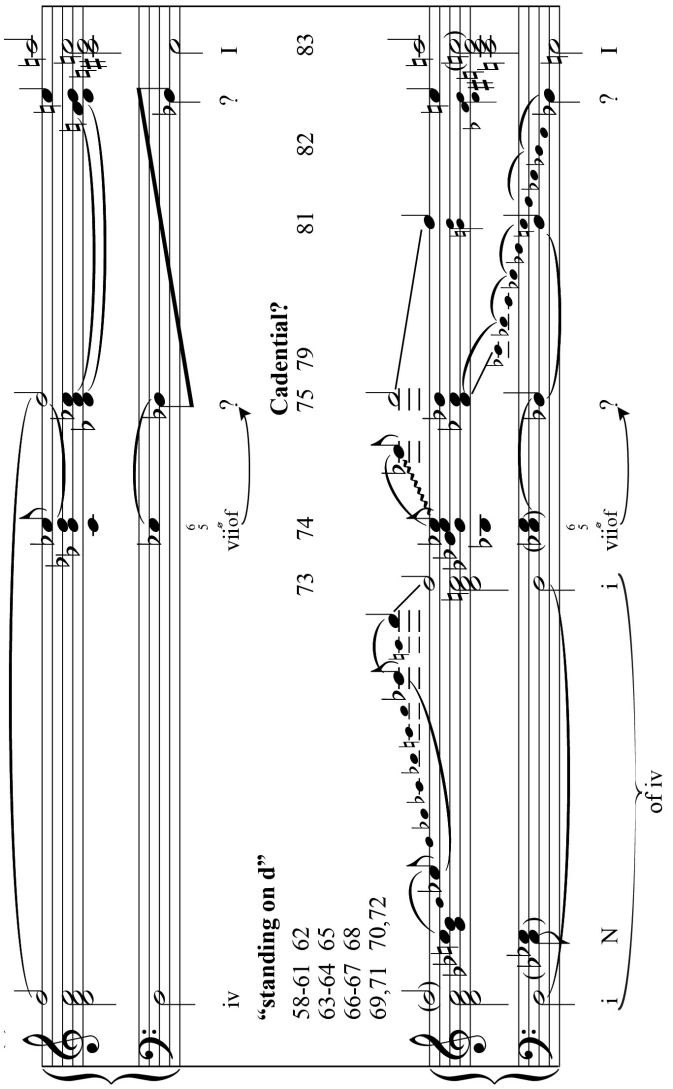
The reduction in Example 10b shows associational MIN-SEM relations between the prolonged harmonies. A SLIDE relation is evident in the motion from the initial A-minor key area and the prolonged **A**♭ triad that occurs at the beginning of the second continuation. Another SLIDE is evident between the C-major key area triad at the beginning of the consequent and the prolonged **d**♭ triad at its conclusion; the same relation appears as a simultaneity at m. 27, as discussed in reference to Example 9a. These associational relations underscore the significance of the local MIN-SEM successions in the movement.

The second period (mm. 34–83) transposes the antecedent phrase to the key of D minor and adjusts the consequent phrase to lead from D minor to a strongly emphasized arrival on A major. Example 11a shows a reduction of the events that lead to the A-major arrival, beginning at m. 58. The consequent phrase ends with an ostinato pattern, labeled "standing on **d**." As discussed in reference to Example 9b, the ostinato is repeatedly punctuated by a neighboring chord whose motion back to D minor iterates MIN-SEM. At m. 75, this neighboring chord leads to a **D**♭ triad in second inversion; the E♭$^{o6}_{5}$ can be heard locally as vii$^{o6}_{5}$ in the key of D♭ major.

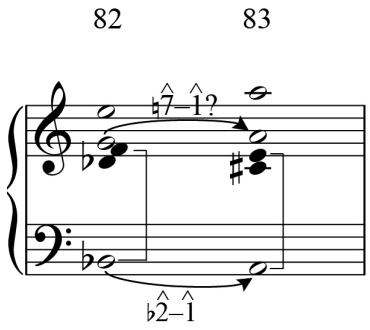
exploration of functional motives in Prokofiev's music, but focuses on a particular class of triadic successions rather than a single pitch class. The term "dominant arrival" is drawn from Caplin (1998, 79) and refers to an arrival on a dominant harmony that is too unstable to function as the goal of a half cadence because, for example, it is inverted or has a dissonant seventh added.

Example 11: Analysis of Sonata, Op. 94, ii, mm. 58-83

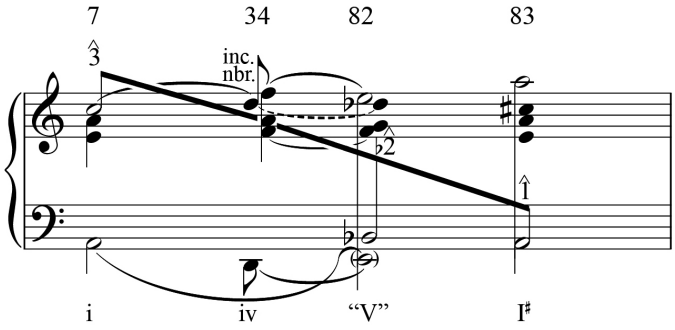
(a): Voice-leading sketch and formal diagram



(b): Functional analysis of mm. 82-83



(c): Voice-leading sketch for the first Scherzo theme (mm.7-83)



In mm. 77–82, a descending scale in the piano leads from the **D**♭ triad to a **b**♭ triad with an added sixth, and this chord leads to A major at m. 83 (shown in Example 9b). Several rhetorical devices ensure that the **A** triad at m. 83 enters with a splash: the long descending scale in the piano that functions as a large-scale upbeat, the repeated fortissimo chords in m.75 that serve as the dynamic climax of the section; and finally, the arrival on A major at m. 83 that overlaps with the beginning of a new theme stated by the flute/violin.

These formal and rhetorical features, as in mm. 6–7, suggest a discharge onto the tonic over mm. 82–83, and a dominant function is suggested in the first chord. Example 11b provides a scale-degree analysis of this point of resolution. Although the chord in m. 82 does not contain G♯, the raised leading tone, it does contain G♮,

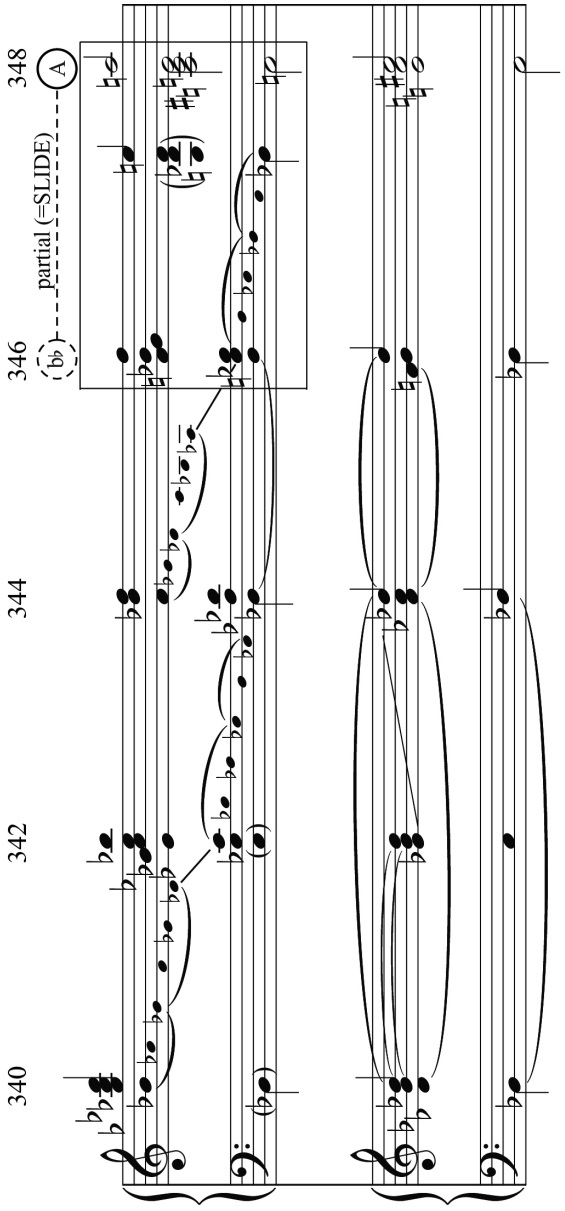
the lowered or "modally unmatched" leading tone. While this scale degree does not discharge with as much urgency due to its lack of semitone relation, it can still weakly signal a dominant function.[57] In addition, from the upbeat of m. 83 to the following downbeat, the flute/violin plays E5–A5, imitating in the highest voice the $\hat{5}$–$\hat{1}$ bass line that is present in an authentic cadence. Unlike at the end of the introduction, the bass line $\flat\hat{2}$–$\hat{1}$ does not move in semitonal contrary motion with the resolution of a raised leading tone, so the chord cannot be labeled a dominant-functioning augmented sixth. But the chord at m. 82 is otherwise identical, and both passages can be interpreted as effecting tonic arrival. Because $\flat\hat{2}$–$\hat{1}$ is stated in the bass line in both progressions, regardless of the strength of the dominant-functioning scale degrees in the upper voices, its centrality in effecting tonic arrival in the section is underscored, along with its accompanying MIN-SEM or SLIDE succession.

This progression over mm. 82–83 provides the only tonic arrival in the first scherzo theme. If an analyst ascribes any confluence between a satisfying tonic arrival and deeper structural closure, the MIN-SEM relation must play a role in deeper levels of voice leading. Example 11c shows one way of interpreting the first scherzo theme and transition (mm. 7–83). The motion to iv at m. 34 provides dominant preparation, and in m. 82, the use of MIN-SEM forces an inversion of the relative positions of descant and bass.[58]

[57] Harrison (1994, 53).

[58] For a traditional Schenkerian reading of the scherzo movement that acknowledges the importance of semitonal motion but treats all of it as neighboring, see Kaufman (1987, 154–179).

Example 12: Voice-leading sketch for Sonata, Op. 94, ii, mm. 340-348

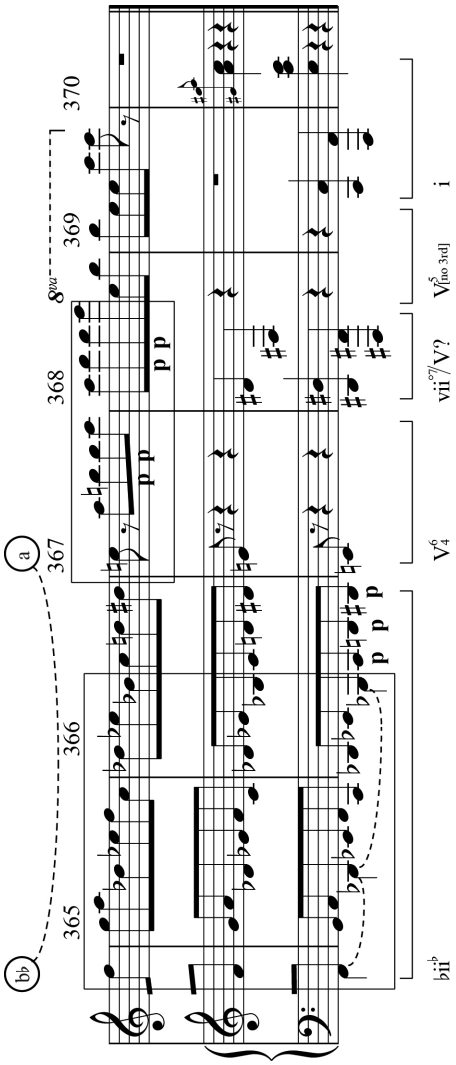


The movement's reprise section (mm. 228–348) alters the conclusion of the second scherzo theme to create an even more elaborate cadential gesture that, as before, uses a partial MIN-SEM to suggest dominant-to-tonic motion. This gesture recalls the previous tonic arrivals and leads to the movement's coda. Example 12 shows a reduction of this final cadential gesture. As in the first scherzo theme, the cadential gesture contains descending scales in the piano part, shown in small noteheads on the top staff in Example 12. These scales are punctuated by chords every two measures, and the bottom staff in Example 12 normalizes the register of these chords to reveal a progression that gradually introduces the pitches of the **b**♭ triad at m. 346, unfolding the same triad's root and third over mm. 340–344.

The above analysis not only shows that MIN-SEMs pervade the Op. 94 scherzo, but also demonstrates that it provides an essential form-defining element, since it occurs at marked formal locations and creates the movement's only arrivals on the tonic harmony. Only in the final measures of the coda, shown in Example 13, does a V–i progression appear at a cadential location.[59] This progression can be heard as a correction of the cadential gestures used earlier in the movement, reinterpreting the **b**♭ triad as a predominant-functioning Neapolitan and providing the normative tonal closure that has been lacking until this point. But as a correction, it is not decisive, since several musical aspects obscure and weaken it.

[59] Codas are most often identified in movements in sonata form, rather than in scherzo movements. But codas in large-ternary-form movements are relatively common in the classical style (Caplin 1998, 215–216), and since the Op. 94 scherzo can be conceived as a large ternary, the label is appropriate. It should be noted that the movement's coda is distinct from Caplin's definition of a *coda* in a minuet/trio form. A minuet's coda is restated verbatim when the minuet is reprised after the trio (Caplin 1998, 227–228); by contrast, the coda in Op. 94 is stated only once at the end of the entire movement.

Example 13: Sonata, Op. 94, ii, mm. 365-370,
with analytical annotations and Roman-numeral analysis



A harmonic analysis of the conclusion is shown underneath the score in Example 13. Immediately before the cadential progression, the flute/violin and piano play, in octaves, a rapid descending figure that arpeggiates a **b**♭ triad, recalling the same chord that appeared in the previous cadential gestures. This arpeggiation is shown by extra downward beams isolating the last note of each three-note figure, along with connecting dotted slurs. This **b**♭ triad, now provisionally suggesting a minor-mode Neapolitan, leads to V at m. 367. In m. 366/beats 2–3, both instruments play a series of passing notes, marked with "p" on Example 13, that connect ♭ii with V. The flute/violin arpeggiates through the root and third of the tonic triad in m. 367, implying a cadential ♮. With this progression, the **b**♭ and **a** triads again occur in direct succession, recalling the original exact statement of the MIN-SEM and "correcting" the partial iterations (**b**♭–**A**) characteristic of previous arrival points. In m. 368/beats 1–2, the piano plays two members of a neighboring vii^{o7}/V, but the flute/violin contradicts this harmonic implication by continuing its arpeggiation of the cadential ♮ and climaxing on E6, the note that clashes with the vii^{o7}/V. A V–i progression is implied over mm. 368–370, but the third of V is missing, and the chords conflict with the underlying meter, since they occur every two beats rather than every three.

Although the final cadential progression could be said to correct the previous tonic arrivals by re-substituting a common-practice V–i cadence for the previous MIN-SEM progressions, its presentation is so turbid that the listener may not perceive it. Thus, the compensatory function often associated with a coda is left partially unfulfilled,[60] and the many distortions of diatonic voice-leading reduction inflicted by MIN-SEM successions are not given a clear, unadulterated resolution. The lack of compensation is made all the more salient by contrast with the coda's other rhetorical features, which do suggest a fulfillment or completion: the entire section is centered in A minor, normalizing the constant modulations of the previous scherzo themes; the section revisits

[60] The compensatory nature of some coda sections is discussed in Caplin (1998, 186–187) and Hepokoski and Darcy (2006, 286).

brief motives from the second and first scherzo themes twice, suggesting a final double rotation of two main themes, albeit in reversed order;[61] and the final statement of MIN-SEM is complete rather than partial.

Conclusion

Analyses of Prokofiev frequently depict his music as creating a clash between incommensurable musical structures.[62] This depiction creates analytical narratives that are compelling in part because they jibe with Prokofiev's musical aesthetic, which twists expectations of common-practice tonality and implies a similar clash between what is stated at the outset and the sardonic or playful subversion of this message at deeper levels. Indeed, Prokofiev's comments about his own music in his first autobiography acknowledge an element of "joking" or "mockery" that inflects all of his styles of music.[63]

In the examples analyzed in this article, the SEM-class successions, in and of themselves, often suggest a playful ethos. Their ability to jar a passage far out of its diatonic environment, as well as their sometimes blatant (or thinly disguised) parallel fifths, suggest a mockery of common-practice harmonic and voice-leading norms. The element of mockery and playfulness is compounded when SEM-class successions are endowed with key-defining status: they create deeper-level clashes between normative and non-normative voice-leading backgrounds and suggest deeper divisions between what is stated at the outset and what is stated underneath.

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[61] On the rotational nature of codas, see Hepokoski and Darcy (2006, 285).

[62] Minturn (1997), for example, speaks of the conflict between tonal cues and added dissonant notes, the latter of which form a network of associations that can be uncovered through Fortean set-class analysis. Rifkin (2004) describes pitch-class motives that stand in conflict and cut across levels of voice-leading reduction uncovered through Schenkerian analysis. Bass (1988) describes a clash between a "shadow" diatonic structure and chromatically displaced notes that are a semitone from this "shadow" but also contain implications for continuation.

[63] Zimmerman (1998, 155). The Russian terms Prokofiev uses are *shutka, smekh,* and *nasmeshka*. More recently, Rifkin (2006) has suggested a parallelism between neoclassical composers' incommensurable structures and non-linear narrative structures in modernist literature.

In the case of the Op. 94 Scherzo, SEM-class successions are influential in a formal hearing of the movement, since a variety of cadential patterns are used to close sections and the chromatic voice-leading patterns recur at deeper levels of reduction. The hearing creates a wonderfully messy narrative in which multiple harmonic systems thwart each others' attempts to achieve closure, comporting with the movement's alternating frantic and sarcastic moods. The Op. 94 scherzo might be taken as a *locus classicus* for how the composer not only features semitone-related triads, but also makes them formal goals and signposts. Similar passages elsewhere in Prokofiev's music, and in music by others, will benefit from the same mode of analysis.

References

Bass, Richard. 1988. "Prokofiev's Technique of Chromatic Displacement." *Music Analysis* 7, No. 2: 197–214.

Biamonte, Nicole. 2008. "Augmented-Sixth Chords vs. Tritone Substitutes." *Music Theory Online* 14, No. 2. *http://www.mtosmt.org/issues/mto.08.14.2/mto.08.14.2.biamonte.html* .

Burns, Lori. 1993. "J.S. Bach's Mixolydian Chorale Harmonizations." *Music Theory Spectrum* 15, No. 2: 144–172.

———. 1994. "Modal Identity and Irregular Endings in Two Chorale Harmonizations by J.S. Bach." *Journal of Music Theory* 38, No. 1: 43–77.

———. 1995. *Bach's Modal Chorales*. Stuyvesant, NY: Pendragon Press.

———. 2000. "Analytic Methodologies for Rock Music: Harmonic and Voice-Leading Strategies in Tori Amos's 'Crucify.'" In *Expression in Pop-Rock Music: A Collection of Critical and Analytical Essays,* edited by Walter Everett, 213-246. New York: Garland.

Caplin, William. 1998. *Classical Form*. New York: Oxford University Press.

Christensen, Thomas. 1993. *Rameau and Musical Thought in the Enlightenment*. New York: Cambridge University Press.

Cohn, Richard. 1992. "Schenker's Theory, Schenkerian Theory: Pure Unity or Constructive Conflict?" *Indiana Theory Review* 13, No. 1: 1–19.

———. 2012. *Audacious Euphony: Chromaticism and the Triad's Second Nature*. New York: Oxford University Press.

Dahlhaus, Carl. 1990. *Study on the Origins of Harmonic Tonality*. Translated by Robert O. Gjerdingen. Princeton: Princeton University Press.

Everett, Walter. 2008. "Pitch Down the Middle." In *Expression in Pop–Rock Music: Critical and Analytical Essays*, 2nd edition, edited by Walter Everett, 111-174. New York: Routledge.

Ewell, Philip. 2012. "Rethinking Octatonicism: Views from Stravinsky's Homeland." *Music Theory Online* 18, No. 4 *http://www.mtosmt.org/issues/mto.12.18.4/mto.12.18.4.ewell.php*

Fankhauser, Gabe. 2008. "Flat Primary Triads, Harmonic Refraction, and the Harmonic Idiom of Shostakovich and Prokofiev." In *Musical Currents from the Left Coast,* edited by Jack Boss and Bruce Quaglia, 202-215. Middlesex: Cambridge Scholars Publishing.

Gollin, Edward. 2000. "Representations of Space and Conceptions of Distance in Transformational Music Theories." Ph.D. dissertation, Harvard University.

———. 2011. "On a Transformational Curiosity in Riemann's *Schematisirung der Dissonanzen*." In *The Oxford Handbook of Neo-Riemannian Music Theories,* edited by Edward Gollin and Alexander Rehding, 382-399. New York: Oxford University Press.

Harrison, Daniel. 1994. *Harmonic Function in Chromatic Music: A Renewed Dualist Theory and an Account of Its Precedents*. Chicago: University of Chicago Press.

———. 1995. "Supplement to the Theory of Augmented-Sixth Chords." *Music Theory Spectrum* 17, No. 2: 170–195.

Heetderks, David. 2011. "Transformed Triadic Networks: Hearing Harmonic Closure in Prokofiev, Copland, and Poulenc." Ph.D. dissertation, University of Michigan.

Hepokoski, James, and Warren Darcy. 2006. *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth Century Sonata*. New York: Oxford University Press.

Hook, Julian. 2002. "Uniform Triadic Transformations." *Journal of Music Theory* 46, no. 1/2: 57–126.

Hyer, Brian. 1995. "Reimag(in)ing Riemann." *Journal of Music Theory* 39, No. 1: 101–138.

Kaufman, Rebecca. 1987. "Expanded tonality in the late chamber works of Sergei Prokofiev." Ph.D. dissertation, University of Kansas.

Kholopov, Yuri. 1988. *Harmony: Theoretical Course*. Moscow: Muzika.

Klumpenhouwer, Henry. 1991. "A Generalized Model of Voice Leading for Atonal Music." Ph.D. dissertation, Harvard University.

Lewin, David. 1990. "Klumpenhouwer Networks and Some Isographies that Involve Them." *Music Theory Spectrum* 12, No. 1: 83–120.

McClelland, Ryan. 2006. "Extended Upbeats in the Classical Minuet: Interactions with Hypermeter and Phrase Structure." *Music Theory Spectrum* 28, No. 1: 23–56.

McQuere, Gordon. 1983. "The Theories of Boleslav Yavorsky." In *Russian Theoretical Thought in Music,* edited by Gordon McQuere, 109-164. Ann Arbor: UMI Research Press.

Miller, John Gabriel. 2008. "The Death and Resurrection of Function." Ph.D. dissertation, Ohio State University.

Minturn, Neil. 1997. *The Music of Sergei Prokofiev*. New Haven: Yale University Press.

Morris, Robert. 1987. *Composition with Pitch-Classes: A Theory of Compositional Design*. New Haven: Yale University Press.

Murphy, Scott. 2014. "Transformational Theory and Film Music." In *The Oxford Handbook of Film Music Studies,* edited by David Neumeyer, 471-499. New York: Oxford University Press.

Neumeyer, David. 2009. "Thematic Reading, Proto-Backgrounds, and Registral Transformations." *Music Theory Spectrum* 31, No. 2: 284–324.

Pau, Andrew. 2013. "'A Flight into the Exotic Distance': Harmony and Voice Leading in the Act IV Duet from Bizet's *Carmen*." Presentation at the Society for Music Theory Annual Meeting, Charlotte, NC, 2 November.

Poszowski, Antoni. 1973. "Wlasciwosci 'dominanty prokofiewowskiej' [The features of the 'Prokofiev dominant']." *Zeszyty Naukowe/ Państwowa Wyższa Szkoła Muzyczna w Gdańsku* 12: 37–46.

Prokofiev, Sergei. 2001. *Sonata for Violoncello and Piano*, Op. 119. Revised edition. Editing of the violoncello part by Mstislav Rostropovich. Hamburg: Sikorski.

Riemann, Hugo. 1895. *Harmony Simplified; Or, The Theory of the Tonal Functions of Chords [Vereinfachte Harmonielehre],* second ed. Translated by H. W. Bewerunge. Augener.

Rifkin, Deborah. 2000. "Tonal Coherence in Prokofiev's Music: A Study of the Interrelationships of Structure, Motives, and Design." Ph.D. dissertation, Eastman School of Music.

———. 2004. "A Theory of Motives for Prokofiev's Music." *Music Theory Spectrum* 26, No. 2: 265–290.

———. 2006. "Making It Modern: Chromaticism and Phrase Structure in Twentieth-Century Tonal Music." *Theory and Practice* 31: 133–158.

Schenker, Heinrich. [1935] 1977. *Free Composition [Der Freie Satz]*. Edited and translated by Ernst Oster. Hillsdale, NY: Pendragon Press.

Segall, Christopher. 2013. "Triadic Music in Twentieth-Century Russia." Ph.D. dissertation, City University of New York.

Smith, Peter H. 2009. "Brahms's Motivic Harmonies and Contemporary Tonal Theory: Three Case Studies from the Chamber Music." *Music Analysis* 28, no. 1: 63–110.

Sologub, Olga. 2013. "Yuri Kholopov's *Modern Traits*: A Russian Perspective on Prokofiev's Music." Presented at the RMA Research Students' Conference, Southampton, UK, 3–5 January.

Straus, Joseph. 2003. "Uniformity, Balance, and Smoothness in Atonal Voice Leading." *Music Theory Spectrum* 25, No. 2: 305–352.

Tymoczko, Dmitri. 2011a. "Dualism and the Beholder's Eye: Inversional Symmetry in Chromatic Tonal Music." In *The Oxford Handbook of Neo-Riemannian Music Theories,* edited by Edward Gollin and Alexander Rehding, 246-267. New York: Oxford University Press.

———. 2011b. *A Geometry of Music: Harmony and Counterpoint in the Extended Common Practice*. New York: Oxford University Press.

Zimmerman, Daniel. 1998. Review of Neil Minturn, *The Music of Sergei Prokofiev*. *Journal of Music Theory* 42, No. 1: 153–164.