

Harmony and Voice Leading in the Music of Stravinsky

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Much of Stravinsky's music elaborates two structural fifths separated by some interval. Typically, one of those fifths is deployed harmonically (with various possible harmonic fillings) and the other is deployed melodically as a perfect fourth (with various possible melodic fillings). The harmony and voice leading of Stravinsky's music thus often prolong a fundamentally bi-quintal structure. The analyses that appear in this article are drawn from a substantial Analytical Catalogue (available as an appendix to the online version of this issue of *Music Theory Spectrum*) that comprises ninety-five individual passages from forty-four different works—that is, from virtually every one of Stravinsky's compositions from *Petrushka* (1911) to *Agon* (1957).

Keywords: Stravinsky, harmony, voice leading, prolongation, bi-quintal structure

THREE PRELIMINARY EXAMPLES

Example 1 shows the opening of Stravinsky's ballet *Petrushka* (1911). The oscillating harmony consists of a perfect fifth (D–A) filled with additional tones (E and G) to create a type of tetrachord, sc[0257], that is deployed as a stable, consonant harmony throughout Stravinsky's compositional career. The melody in the highest sounding voice in the first few measures simply arpeggiates this harmony. The melody that enters in m. 6, however, rubs against the harmony rather than meshing with it. Like so many of Stravinsky's melodies, this one moves within the span of a perfect fourth. In this case, the melodic fourth is E–B (read in descending order) and the span is filled in with passing notes D and C♯. The resulting tetrachord-type, sc[0235], is as common a framework for Stravinsky's melodies as sc[0257] is for his harmonies. In this case, the melody traces this fourth-span repeatedly, animated with changing melodic patterns and metrical placement.

We can imagine the passage as based on two perfect fifths, one deployed and filled in harmonically, the other deployed as a perfect fourth and filled in melodically. (At the end of the passage, there is a hint in the flute of a third structural fifth, A–E, but I will put that to the side for the moment.) The melodic span E–B is offset from the harmonic frame D–A by two semitones, so I refer to the relationship here as Model 2. In classical tonality, melody and harmony are usually congruent. Indeed, if the melody in m. 6 had entered two semitones lower, so that the melody spanned D–C–B–A, the passage would have sounded much more tonally normal.¹ It is the discrepancy between melody and harmony in this passage that lends it some of its distinctively Stravinskian bite.

The opening of *The Rite of Spring* (1913) can be understood in a similar way, involving the juxtaposition of two structural fifths, illustrated in Example 2. As in the passage from *Petrushka* in Example 1, the opening melody of the *Rite* spans a Dorian tetrachord, sc[0235]: D–C–B–A. This melodic fourth is articulated differently, with C as the principal upper-voice tone, elaborated by an upper-neighbor D and a third-span C–B–A, but the complete tetrachordal span, framed by D–A, remains a structural unit. The harmony is organized around a contrasting fifth, C♯–G♯, expressed first as an open harmonic fourth and then filled in as C♯–D♯–F♯–G♯, creating a harmonic [0257], as in *Petrushka*. The sustained harmonic fourth colors the [0257] melody, assimilating it to the C♯–G♯ fifth. The harmonic frame, C♯–G♯, and the melodic frame, D–A, are displaced by one semitone (Model 1). Compared to the opening of *Petrushka*, the sense of clash between melody and harmony is intensified here by the greater dissonance of the interval of displacement.

In the passage from near the opening of *Les Noces* (1917) shown in Example 3, the two structural fifths are at the distance of six semitones (Model 6), with scarcely any elaborative filling for either of them. The harmony consists of the open fifth Bb–F. The melody moves within the same tetrachordal frame as the *Petrushka* passage in Example 1 (E–B), but fills it in only partially as [035], E–D–B, rather than as [0235], E–D–C♯–B. As in both previous examples, the melody from *Les Noces* moves within its framing perfect fourth in a highly repetitive and rhythmically/metrically varied manner. The melody does not conform to the underlying harmony but clashes with it. Because the melodic and harmonic structural fifths are displaced by six semitones (Model 6), the notes of the passage lie within a single octatonic collection. Similarly, Model 2 (as in *Petrushka*, Example 1) usually implicates a diatonic collection (in that case, the two-sharp collection). Model 1 is sometimes associated

¹ Straus (2012) attempts a speculative recomposition along these lines.

MODEL 2 (0235)
D-E-A-B (0257)

EXAMPLE 1. *Petrushka*, first scene (“*The Shrovetide Fair*”), mm. 1–11 [Cat. no. 1]. Model 2 (D/E). Harmonic fifth D–A filled in as D–E–G–A. Melodic fourth E–B filled in as E–D–C#–B.

with the modes of the harmonic-minor scale, but the passage from the *Rite* in Example 2 cannot be assigned to any of the standard scales.

THE BI-QUINTAL MODEL OF HARMONY AND VOICE LEADING

These three familiar passages, as well as a great deal of Stravinsky’s music from throughout his career, are based on two structural fifths separated by some interval. Typically, one of those fifths is deployed harmonically (with various possible harmonic fillings) and the other is deployed melodically as a perfect fourth (with various possible melodic fillings). The harmony and voice leading of Stravinsky’s music thus often elaborates a *fundamentally bi-quintal structure*.

Chart 1 summarizes six models of Stravinskian harmony and voice leading, with the model named in the first row according to the interval that separates the two structural fifths. The second row of the chart positions a hypothetical pitch-class C in opposition to another pitch class at the prescribed intervallic distance, and the third row identifies the structural fifths erected on the pitch classes. Typically there will be some sense of

musical tension between these pitch classes and these fifths. The fourth row of the chart combines the two structural fifths into a single tetrachord, identified as a “harmonic axis.”² The axis as a whole may be a literal presence in the music, and it may be prolonged by connecting its tones with passing tones or embellishing them with neighboring tones.

The fifth row of Chart 1 identifies some common ways in which the structural fifths can be filled in harmonically, often with scs[027], [0247], and [0257], although other harmonic fills are also possible. In actuality, and especially in his middle, neoclassical period, Stravinsky most commonly fills his structural fifths harmonically as major or minor triads. (Although this is not shown on the chart, a harmonic fifth is occasionally not only filled in as a triad but also further elaborated as a seventh chord—for example, C–G might be filled in with E and extended by B \flat into the seventh chord C–E–G–B \flat .) The

² The term and concept are taken from Straus (1982). The present study modifies and extends that earlier concept in two ways: (1) fifths rather than triads are taken as the structural components of a harmonic axis; and (2) all intervals rather than only 3 and 4 are taken as ways of relating the structural components Kielian-Gilbert (1982).

$$\begin{matrix} D & \text{---} & A \\ D & - C - B - A & \frown G \end{matrix}$$

$$\begin{matrix} C\# \\ | \\ G\# \end{matrix}$$

$$\begin{matrix} G\# & G\# \\ | & | \\ F\# & D\# \\ | & | \\ C\# & C\# \end{matrix}$$

MODEL 1 (0235)

$$\begin{matrix} C\# - D - G\# - A \\ (05) \end{matrix} \quad (0257)$$

EXAMPLE 2. The Rite of Spring, Part 1, Introduction, mm. 6–12 [Cat. no. 8]. Model 1 (C#/D). Harmonic fifth C#–G# expressed as perfect fourth and then filled in as C#–D#–F#–G#. Melodic fourth D–A filled in as D–C–B–A, with an emphasis on C as principal upper-voice tone.

$$\begin{matrix} E & \text{---} & B \\ E & - D - B \end{matrix}$$

$$\begin{matrix} F \\ | \\ B\flat \end{matrix}$$

MODEL 6 (035)

$$\begin{matrix} (07) \end{matrix}$$

EXAMPLE 3. Les Noces, first scene, mm. 11–20 [Cat. no. 24]. Model 6 (Bb/E). Harmonic fifth Bb–F without fill. Melodic fourth E–B partially filled in as E–D–B.

Model	1	2	3	4	5	6
PC	C, C#	C, D	C, Eb	C, E	C, F	C, F#
Fifths	G G# C C#	G A C D	G Bb C Eb	G B C E	G C C F	G C# C F#
Harmonic axis	C-C#-G-G# 0-1-7-8 (=0156)	C-D-G-A 0-2-7-9 (=0257)	C-Eb-G-Bb 0-3-7-t (=0358)	C-E-G-B 0-4-7-t (=0158)	C-F-G-C 0-5-7-0 (=027)	C-F#-G-C# 0-6-7-1 (=0167)
Harmonic fill (027/057, 0247, 0257)	C-(D-E-F)-G C#-(C#-C#-C#)-G#	C-(D-E-F)-G D-(E-F#-G)-A	C-(D-E-F)-G Eb-(F-G-Ab)-Bb	C-(D-E-F)-G D-(F#-G#-A)-B	C-(D-E-F)-G F-(G-A-Bb)-C	C-(D-E-F)-G F#-(G#-A#-B)-C#
Harmonic fill (triads)	C+ — P' — C#- P C- C#+	C+ - DIAPO - D- P C- D+	C+ Eb- P C- R — Eb+	C+ — L — E- P C- -HEXPO- E+	C+ — L' — F- P C- — R' — F+	C+ -OCTPO- F#+ P C- -OCTPO- F#-
Fourths	G-C, G#-C#	G-C, A-D	G-C, Bb-Eb	G-C, B-E	G-C, C-F	G-C, C#-F#
Melodic fill (primary spans) 0135/0235/0245	G-A(b)-B(b)-C G#-A(#)-B(#)-C#	G-A(b)-B(b)-C A-B(b)-C(#)-D	G-A(b)-B(b)-C Bb-C(b)-D(b)-Eb	G-A(b)-B(b)-C B-C(#)-D(#)-E	G-A(b)-B(b)-C C-D(b)-E(b)-F	G-A(b)-B(b)-C C#-D(#)-E(#)-F#
Melodic fill (secondary spans)		D-E(b)-F(#)-G A-B(b)-C	C-D(b)-Eb Eb-F-G G-A(b)-Bb	C-D-E E-F(#)-G G-A-B		
Scales	Harmonic minor	Diatonic	Octatonic Diatonic	Diatonic Hexatonic	Diatonic Acoustic	Octatonic

CHART 1. Six models of Stravinskian harmony and voice leading.

sixth row of the chart identifies the relevant triads and connects them with familiar neo-Riemannian operations, P, L, R, and their obverses, P', L', and R'.³

Stravinskian harmony often involves the juxtaposition of triads, and the possible combinations vary with the model. In Model 1, triads may be in the P'-relation (also referred to in the literature as SLIDE). Model 2 may juxtapose triads that are “diatonic poles” (triads that combine to create a diatonic hexachord) just as Model 4 may juxtapose triads that are “hexatonic poles” (triads that combine to create a hexatonic hexachord),

3 P relates a major and a minor triad that share a perfect fifth (like C major and C minor). L relates a major and a minor triad that share a minor third (like C major and E minor). R relates a major and a minor triad that share a major third (like C major and A minor). The nomenclature L', P', R' is from Morris (1998), which refers to them as the “obverse transforms” of L, P, and R: “In an obverse operation, one note is held invariant while the other two change. L' retains one note while the complementary ic 3 in the triad changes and is therefore related to L. P' and R' are similarly related to P and R” (185). What Morris calls P' is often referred to in the literature as SLIDE, a coinage of Lewin (1987): “We can also define more exotic operations on Klangs. For instance we can define an operation SLIDE that preserves the third of a triad while changing its mode” (178). P' thus relates a major and a minor triad that share the same third (like C major and C# minor). L' relates a major and a minor triad where the root of the major triad is retained as the fifth of the minor triad (like C major and F minor). R' relates a major and a minor triad where the fifth of the major triad is retained as the root of the minor triad (like C major and G minor).

and Model 6 may juxtapose triads that are “octatonic poles” (triads related at T₆ that combine to produce six of the eight notes of an octatonic collection).⁴ R-related triads are typical of Model 3; L-related triads are typical of Model 4; and the obverses of L and R (i.e., L' and R') are typical of Model 5. P-related triads are typical of all six models, and indeed, the clash of major and minor is a persistent feature of Stravinskian harmony.

Either of the structural fifths may be deployed as a melodic fourth, as summarized in the seventh row of Chart 1. These melodic fourths may be filled in with passing notes, typically creating set classes of types [025/035], [0135/0245], or [0235] (as in the eighth row of Chart 1). These are all *primary spans* because they connect the notes of one of the structural fifths.

The remaining fourths and thirds within the harmonic axis—formed not within but between the notes of the structural fifths—may also be filled in with passing notes (these *secondary spans* are shown in the ninth row of Chart 1). Both primary and secondary spans may be articulated in various ways. Most commonly, the highest and lowest notes of the melodic spans are the structural tones and the inner notes are understood as passing. Occasionally, however, as in the passage from *The Rite of Spring* in Example 2, the second-highest note of a fourth-span is the principal melodic tone, with a neighbor note above it and a third-span below it. All of the melodic fourths may

4 On hexatonic poles, see Cohn (2004).

be embellished with neighbor tones above the highest or below the lowest note—the latter is particularly common in Stravinsky's music.

When the structural fifths are filled in harmonically and elaborated melodically in the ways described here, certain familiar scales may emerge as by-products. As the last row of Chart 1 suggests, octatonic collections may emerge from Models 3 and 6; diatonic collections may emerge from Models 2, 3, 4, and 5; the hexatonic and acoustic collections may be associated with Model 4; and Model 1 may produce one of the modes of the harmonic-minor scale. The scalar environment varies according to the structural frame, and to the ways in which the frame is elaborated harmonically and melodically.

In thinking of scales as secondary by-products of harmony and voice leading, the approach taken here is complementary to that of the prevailing trend in Stravinsky studies. At present, the dominant approach to pitch organization in Stravinsky's music is scale based, taking the octatonic and diatonic collections as principal objects, and describing chords and melodies as ways of partitioning and articulating the scales.⁵ The approach taken here starts from an idea of stable, referential harmonies and the ways they might be extended, elaborated, and prolonged by voice leading. Scales emerge as by-products of harmonic and melodic activity.⁶ These are not contradictory but complementary approaches, and each has its strengths and weaknesses.

A central feature of the theoretical model proposed here is some degree of tension between the two structural fifths. In traditional tonal music, and in some of Stravinsky's more tonally conventional passages, the melodic spans fit squarely within the prevailing harmony. In Stravinsky's earliest music, for example, and in some of the more classical of his neoclassical music, the harmonic fifth and the melodic fourth are one and the same. We might refer to this as Model 0, where there is no discrepancy between the two structural fifths.

Models 1–6, however, are designed to account for something that starts happening in *Petrushka* and persists until the end of Stravinsky's compositional life, namely a tension of some kind between the melodic span and the harmonic frame. The degree of tension may vary both within and between models. Models 1 and 6, in which the fifths are related by a dissonant interval, generally convey more tension between their structural fifths than do Models 2, 3, 4, and 5. Even within a given model, however, local compositional choices will affect the degree to which the structural fifths are heard in opposition to each other.

The tension between the structural fifths is obviously related to the stratification of the musical texture into discrete layers, a widely discussed Stravinskian style characteristic. The opposition between the harmony and melody engenders and sustains the stratification of the musical texture. In some pieces, most conspicuously in *The Rite of Spring*, there may be more than two structural fifths and thus more than two harmonically supported textural layers. Far more common, however, are the bi-quintal structures that are the topic of this article.

In these bi-quintal structures, two perfects fifths are stabilized and elaborated. The theoretical model thus bears a relationship to the traditional and contested concept of "bitonality."⁷ Although there are actually very few passages in Stravinsky's music that are bitonal in any sort of pure sense—that is, in which the music is conceived and understood in two keys simultaneously—there are lots of passages, including those most characteristic of their composer, in which there is some degree of tension between two competing pitch centers, each reinforced by its own supporting, consonant perfect fifth. It might be most helpful to imagine bitonality as a spectrum of possibilities rather than a single absolute state. If so, we can see much of Stravinsky's music as lodged somewhere on the *bitonal spectrum*. Sometimes, the structural fifths are asserted with virtually equal strength; other times, one is felt as relatively subordinate to the other. The analytical apparatus may give the impression that the two fifths are always equal in structural weight, but in musical practice, the relative prominence of the fifths will vary. The theoretical model presented here is designed to capture and express a range of bitonal effects.

In addition to its stratification into discrete layers, each referring to a stable, structural fifth, Stravinsky's music is also often carved into discrete textural blocks that are juxtaposed without transition.⁸ Within each block, we find a bi-quintal structure that simultaneously expresses an inherent tension and binds the block together. As the music moves from block to block, the structural fifths also move. In some cases, the motion of the fifths is parallel and the interval between them (and thus

5 The principal proponents of the octatonic and octatonic-diatonic orientations are Pieter C. van den Toorn and Richard Taruskin, and both have written extensively on the topic. See especially van den Toorn (1983, 1986, and 1987) and Taruskin (1985 and 1996). This approach has its origins in Berger (1963). The approach has come under fire recently from a number of directions. See Tymoczko (2002 and 2003). Tymoczko advocates a scale-based approach, but one that acknowledges scales other than the octatonic and diatonic, especially the modes of the acoustic (melodic ascending minor) and the harmonic-minor scales. Taruskin's most recent pro-octatonic polemic (2011) provoked responses from several music theorists in the same issue of *Music Theory Spectrum*.

6 This point of view is consonant with that advocated in Brown (2005). Arguing on Schenker's behalf, Brown states: "Schenker rejected 'The Myth of Scales' not because scales and modes are irrelevant to music theory, but rather because they have only limited explanatory value. Although they provide us with useful categories for classifying melodic lines, scales and modes are much less effective at explaining how melodic lines behave in functional triadic contexts. Schenker's response to this shortcoming was simple; instead of deriving music from scales or modes, he believed that these scales arise from composing out essential harmonies. They are products, rather than primitives in the system" (169).

7 For generally sympathetic assessments of bitonality and polytonality as viable theoretical concepts, see Harrison (1997), Tymoczko (2002), and Kaminsky (2004).

8 This feature of Stravinsky's music has been widely acknowledged. See, for example, van den Toorn (1983), where the phenomenon, termed "block juxtaposition," is identified as a "peculiarly Stravinskian conception of form" (454). Similarly, Taruskin (1996) considers "Drobnost," defined as "splinteredness; the quality of being formally disunified, a sum-of-parts" (1677), one of Stravinsky's essential style characteristics.

Model	1	2	3	4	5	6
Fifths	C–G C#–G#	C–G D–A	C–G E♭–B♭	C–G E–B	C–G F–C	C–G F#–C#
Harmonic axis	0–1–7–8 (=0156)	0–2–7–9 (=0257)	0–3–7–1 (=0358)	0–4–7–e (=0158)	0–5–7–0 (=027)	0–6–7–1 (=0167)
Trichords	015/016	025/027	025/037	015/037	027	016

CHART 2. *Affinities among the harmonic axes and their trichordal subsets associate Models 1 and 6, 2 and 5, and 3 and 4.*

the model) remains the same. In some cases, the motion of the fifths is oblique, with one holding while the other moves. In still other cases, the motion of the fifths is contrary, creating a symmetrical wedge, either outward or inward. The long-range harmonic motions of Stravinsky's music are thus defined by the relative motions of its structural fifths.

The harmony and voice leading I am describing here is fully prolongational. The structural fifths, and the harmonic axis they jointly define, function as consonances, susceptible to elaboration. The gaps within and between the notes of the structural fifths are liable to be filled in with passing tones, and the structural tones themselves may be decorated with neighboring tones.⁹ The resulting linear spans are thus prolongational, but they are not goal-directed in the manner of the Schenkerian *Zug*. Rather, the melodies articulate the prolongational spans in repetitive and unpredictable ways.¹⁰ As a result, the prolongational analyses that follow must be understood as synchronic rather than diachronic; they are out-of-time snapshots of the harmony and voice leading of the textural blocks that comprise Stravinsky's music. The prolongational spans operate *within* the textural blocks, binding them into self-contained units. *Between* the blocks, we find patterns of transposition that guide the movement of the structural fifths.

Networks of affinities bind the six voice-leading models presented here (see Chart 2). The affinities are particularly apparent in the harmonic axis for each model (i.e., the combination of two perfect fifths) and in the trichordal subsets of the axes. From this point of view, the most obvious affinities partition the system symmetrically, linking Models 1 and 6, Models 2 and 5, and Models 3 and 4. Models 1 and 6 share a tritone and the dissonant, biting [016] trichord.¹¹ Model 1 (sometimes) and Model 6 (almost always) produce an octatonic environment, and the semitone their axes share is often presented as a prominent ip 11 found between the textural layers.¹² These two

models are particularly favored in Stravinsky's first-period, "Russian" style. Models 2 and 5 are oriented toward perfect fourths/fifths and share the five-cycle segment [027]. These models usually produce an open-sounding, consonant, diatonic environment. Models 3 and 4 share the consonant triad and are particularly favored in Stravinsky's second-period, neoclassical style. They are associated with a variety of collectional environments, including octatonic, diatonic, hexatonic, and others. There are other affinities within the system—Models 1 and 4 share [015]; Models 2 and 3 share [025]—but the symmetrical arrangement of Chart 2 groups the models in a structurally and stylistically significant way. Accordingly, in the analyses that follow, I will consider first Models 1 and 6, then Models 2 and 5, and finally Models 3 and 4.

The analyses that appear in this article are drawn from a substantial Analytical Catalogue that comprises ninety-five individual passages from forty-four different works—that is, from virtually every one of Stravinsky's compositions from *Petrushka* (1911) to *Agon* (1957), including as many as possible of the best-known passages (like those in Examples 1–3). My explicit goal is to demonstrate that the approach to harmony and voice leading described here is not only pervasive throughout Stravinsky's music, but is also crucial in defining the distinctive Stravinskian sound. The full catalogue is available as an appendix to the online version of this issue of *Music Theory Spectrum*, and the musical passages discussed in this article are identified by their catalogue number. In Chart 3, the catalogue is indexed by work, by harmony/voice-leading model, and by the specific fifths in use; Stravinsky has certain favored locations for his harmonic fifths and melodic fourths.

ANALYTICAL ILLUSTRATIONS OF MODEL I

Model 1 is especially typical of Stravinsky's Russian period, with the opening of the *Rite of Spring* (Example 2) a prototypical example. Example 4 shows a structurally similar passage from the first scene of *Petrushka*. The pedal B♭ attracts the chordal D to itself as part of an implied B♭-major triad. In general, strong centric tones may be taken to imply the support of a structural upper fifth. Above it, the melody moves within

9 The approach taken here thus largely meets the conditions for post-tonal prolongation established in Straus (1987). See subsequent discussion in Lerdahl (1989), Larson (1997), and Väisälä (1999).

10 In practice, the degree of goal-orientation may vary considerably in Stravinsky's music—this is a central topic of Horlacher (2011).

11 [016] is identified in Taruskin (1996) as the "Rite-chord."

12 This phenomenon is traced in van den Toorn (1983).

Model 1	$C/C\sharp$ <i>63</i>	$C\sharp/D$ <i>8,15,19</i>	$D/E\flat$ <i>16</i>	$E\flat/E$ <i>9,11,24</i>	E/F <i>62</i>	$F/F\sharp$	$F\sharp/G$ <i>20,26,49,50</i>	$G/A\flat$	$G\sharp/A$	$A/B\flat$ <i>2,38</i>	$B\flat/B$	B/C
Model 2	C/D <i>1,7,37</i>	$C\sharp/D\sharp$	D/E <i>1,12</i>	$E\flat/F$	$E/F\sharp$	F/G	$F\sharp/G\sharp$ <i>50</i>	G/A <i>71</i>	$A\flat/B\flat$ <i>32</i>	A/B <i>30,65</i>	$B\flat/C$ <i>74</i>	$B/C\sharp$
Model 3	$C/E\flat$ <i>13,45,47,57,72</i>	$C\sharp/E$	D/F <i>18,73</i>	$E\flat/G\flat$	E/G <i>3,12,27,31,44,48,55,73</i>	$F/A\flat$ <i>43</i>	$F\sharp/A$ <i>25,46</i>	$G/B\flat$ <i>32,40,74</i>	$G\sharp/B$	A/C	$B\flat/D\flat$	B/D <i>12,29,39,41,61</i>
Model 4	C/E <i>32,51,42,62,68,70</i>	$D\flat/F$	$D/F\sharp$ <i>4,12,16,23,36</i>	$E\flat/G$ <i>34</i>	$E/G\sharp$	F/A <i>22,35,38,54</i>	$G\flat/B\flat$ <i>52</i>	G/B <i>50</i>	$A\flat/C$ <i>42</i>	$A/C\sharp$	$B\flat/D$ <i>5</i>	$B/D\sharp$ <i>6</i>
Model 5	C/F	$C\sharp/F\sharp$	D/G <i>21,28,56</i>	$E\flat/A\flat$	E/A <i>33</i>	$F/B\flat$	$F\sharp/B$	G/C <i>53,69</i>	$A\flat/D\flat$	A/D <i>3,64,66,67</i>	$B\flat/E\flat$	B/E
Model 6	$C/F\sharp$ <i>4,14</i>	$C\sharp/G$ <i>12,58,60</i>	$D/A\flat$ <i>17</i>	$E\flat/A$ <i>6,59</i>	$E/B\flat$ <i>10,24</i>	F/B						

CHART 3. *Index of Analytical Catalogue. Catalogue items (numbers in italics) sorted by model number and by generating fifths (the lower notes of the generating fifths are separated by a slash).*

EXAMPLE 4. *Petrushka, first scene, five measures at Rehearsal no. 7 [Cat. no. 2]. Model 1 (A/B \flat). Harmony is B \flat –D–F (the F is implied); melodic span is A–G–F \sharp –E.*

the fourth-span A–G–F \sharp –E. That melodic fourth-span is actually a sort of composite melody, with A–G–F \sharp in the winds heard bumping up against a boundary E in the strings. The biting, dissonant quality of Model 1 is audible especially in the tritone and major seventh formed between the lower note of the harmonic fifth (B \flat) and the boundary tones of the melodic fourth (E and A). This passage thus presents a sharp contrast with the Model 2–based opening of the ballet (Example 1). The change in interval between the structural fifths is manifested in the changing harmonic and melodic relations of the musical surface.

The opening of the second of the *Pribaoutki* (1914), shown in Example 5, operates in similar fashion. In the melody, we find the familiar Dorian tetrachord, presented repeatedly and mostly descending: E \flat –D \flat –C–B \flat within an E \flat –B \flat melodic frame. The melody is sometimes directly supported by E \flat -major

triads, but there is a contrasting harmonic layer that establishes D as a countervailing pitch center. In the first phrase, the D is associated with F \flat (=E) within what I conceive as a D–E–(A) harmony. Centric pitch classes, like the D here, usually have actual fifth support, and when the centric D returns at the end of the song, the A is a strongly supportive presence. Its implied presence in the opening is thus confirmed at the end.

At the end of this short song (from m. 15 in Example 5), D-centered harmony returns in the form of a D-minor triad. The structural fifth, D–A, is emphasized on every downbeat, while the full chord is arpeggiated in the melody. Here, however, the D-centered harmony is juxtaposed with a contrasting harmony on F \sharp : F \sharp –A \sharp –C \sharp . In this instance of Model 4, we have a combination of a D-minor triad with an F \sharp -major triad. As is often the case in these bi-quintal structures, one of the fifths (D–A) strongly predominates over the other (F \sharp –C \sharp). Indeed,

Eb — Bb
 Eb - Db - C - Bb

Allegro $\text{♩} = 100$

f

Lou - i - se, viens vi - te, viens vi - te, ma fil - le; la pâte... est le -

(A) (A)
| E
D D

f

sempre simile

Bb Bb
| G
Eb Eb

6

vé - e... Cours à le cui -

A — D
A - G - F - D

15

Voi - là - l'coq qui leur ré - pond et les pouls qui tournent en rond.

A A
| F
D D

stacc.

C# C#
| A#
F# F#

MODEL 1

T_3

MODEL 4

D-Eb-(A)-Bb

(027)

(047)

D-F#-A-C#

(037)

(047)

HEXPOLE

EXAMPLE 5. Pribaoutki, *Song 2* (“Nataska” or “Le Four”) [Cat. no. 16]. Model 1 (D/Eb) leading to Model 4 (D/F#). The first phrase juxtaposes D-E-(A) harmonically with Eb-Db-C-Bb melodically. In the final phrase, D-centered harmony is retained as D-F-A, both harmonically and melodically, but now juxtaposed with a contrasting harmony on F#, F#-A#(=Bb)-C#.

one might imagine $F\sharp-C\sharp$ as creating a sort of low-level interference with a stronger $D-A$. Both fifths are filled as triads, and these triads are related to each other as hexatonic poles: together they create the hexatonic collection $\{C\sharp, D, F, F\sharp, A, Bb\}$ that underlies this passage. While it is possible to think of this song as modulating from one large collection (without any traditional name) to a hexatonic collection, it is probably simpler to focus on the shift from Model 1 to Model 4, with the $D-A$ fifth holding and the other structural fifth moving obliquely with respect to it via T_3 , from $Eb-Bb$ to $F\sharp-C\sharp$.

Middleground motion is often controlled, as it is here, by the shifting positions and relations of the structural fifths. In the opening of the song, the $D-A$ fifth grinds against $Eb-Bb$, in the characteristically sharp, biting manner of Model 1. At the end of the song, the $D-A$ fifth is retained, creating a strong sense of continuity, but now it is juxtaposed against $F\sharp-C\sharp$ within Model 4. Whether the resulting hexatonic polar harmony has some of its usual “uncanny” quality¹³ is debatable, but certainly there is a musical sense of opening out that nicely reflects the motion in the nonsense rhymes of the text from the confined space of a kitchen to images of ducks playing musical instruments and cranes dancing.

A similar sort of movement, in Example 6, from model to model binds the first three blocks of *Les Noces*. In the first block, the melody $E-D-B$, filling in the melodic fourth, $E-B$, is heard in relationship to the repeated $D\sharp$, which I imagine as representing a structural fifth, $D\sharp-A\sharp$. I imagine the $A\sharp$ to be implied here because centric tones generally do have the support of an upper fifth—that is Stravinsky’s standard practice. If the absent fifth is not contradicted by pitches that would be sharply dissonant with it, I generally imagine it as implied. In this case, the implication is confirmed in the third block, where a centric $D\sharp$ returns with the support of an actual $A\sharp$.

With the entry of the second block at Rehearsal no. 1 (previously discussed with respect to Example 3), the melody stays the same, but the harmony shifts to $Bb-F$. When the third block arrives at Rehearsal no. 2, the melody intones E . Although the E is not elaborated melodically as it was in the previous blocks, the sense of continuity is unmistakable and I imagine the melody as still suggesting the melodic fourth $E-B$. In this case, the B is strongly implied because the centric E was heard with its support a moment earlier.

The harmony for the third block returns to the bass $D\sharp$, as in the first block, but now with the support of an actual, rather than an implied, $A\sharp$. The three blocks thus involve the reharmonization of an E -centered melodic line, first by $D\sharp-(A\sharp)$ within Model 1, then by $Bb-F$ within Model 6, and finally returning to Model 1. Further continuity is created by the $A\sharp/Bb$ that is shared within the harmonic fifth in all three blocks.

One structural fifth thus remains fixed ($E-B$) while the other shifts in relation to it: first $D\sharp-A\sharp$ (Model 1), then $Bb-F$ (Model 6), then back to $D\sharp-A\sharp$. That the mobile fifth moves down and up by T_5 has obvious motivic significance. Just as the

principal melody oscillates between two tones a perfect fourth apart (E and B), the larger middleground structure oscillates between two structural fifths that lie a perfect fourth apart ($D\sharp-A\sharp$ and $Bb-F$).

A similar sort of oblique motion characterizes the relationship between the first and fourth variations of the third movement of the *Concerto for Two Solo Pianos* (1934), only now, in Example 7, it is the harmony that holds fast while the melody shifts in relation to it. The melody for both passages, functioning as the theme for these variations, is the subject of the fugue found in the fourth movement of the work (an unusual example of a theme arriving after its variations). That melody falls within the familiar Dorian melodic span, $E-D-C\sharp-B$ (compare Examples 1, 3, and 6, from *Petrushka* and *Les Noces*), emphasizing D as the principal structural tone. In the fourth variation, the tune is transposed up a whole tone to fall within the span $F\sharp-E-D\sharp-C\sharp$. In both passages, however, the harmony remains the same, elaborating a $G-D$ structural fifth as a minor triad plus a seventh above G . As a result, we find oblique motion among the structural fifths: the $G-D$ harmonic fifth first supports the melodic fourth $E-B$ (Model 3) and then $F\sharp-C\sharp$ (Model 1). The sense of clash between the competing fifths is almost always stronger in Model 1 than in Model 3, and that is the case here as well. Even within a single model, the sense of tension between the structural fifths may be relatively emphasized or deemphasized. The models always involve some sort of duality, but its intensity may vary.

Stravinsky is well known for composing at the piano, and there is a strongly tactile and pianistic quality to these structural fifths and their behavior in relation to each other. One can easily imagine Stravinsky finding these fifths at the keyboard, often in certain favored locations, like $D-A$ for the harmony or $E-B$ for the melody, then improvising different ways of filling these spans harmonically or melodically. After some time, perhaps one hand stays in its first location while the other moves, or perhaps they both move, creating different structural combinations. Shifts in texture and in structure are thus associated with real, physical movements of the hands at the keyboard.

This tactile, pianistic sense is felt acutely in the many “polychords” Stravinsky wrote in which the two principal components are triads whose roots are a semitone apart (i.e., Model 1).¹⁴ The most famous of these, and probably the most famous sonority in all of Stravinsky’s music, is the eight-note chord that is heard throughout the “Dance of the Young Girls” in *The Rite of Spring*, shown in Example 8. Its two structural fifths

¹³ See Cohn (2004).

¹⁴ The term “polychord” is used in Salzer (1962) to refer to the opening sonority in the Symphony in Three Movements, which juxtaposes triads on G and Db , an arrangement I refer to as Model 6 (see Cat. no. 58). Another Model 6 polychord—the *Petrushka* chord—is discussed below. Tymoczko (2002) uses the term “triadic superimposition” to describe situations like this. For a related instance of a Model 1 polychord, see the harmony that begins the third of the Three Pieces for String Quartet (Cat. no. 15).

E — B
E — D — B

BLOCK A

M.M. ♩ = 80

ff

Tres - se, tres - se, ma — ma

ff

(A#)
D#

sf *sempre*

tresse à moi, — ma tresse à moi

BLOCK B

① ♩ = 160

Ma - mère — t'a - vait le - soir tres -

E — B
E — D — B

F
Bb

EXAMPLE 6. *Les Noces*, first scene, first three textural blocks [Cat. no. 24]. Model 1 (D# \sharp /E), Model 6 (Bb/E), and a return to Model 1 (D# \sharp /E). Melody centered on E within E–B melodic fourth harmonized first by D# \sharp –(A# \sharp) within Model 1, then by Bb–F within Model 6, and finally by D# \sharp –A# \sharp , marking a return to Model 1.

are Eb–Bb (elaborated as Eb–G–Bb–Db) and E–B (elaborated as E–G#–B). The Eb–Bb fifth is further elaborated as a melodic fourth, filled in as Eb–Db–Bb.

This passage has been widely discussed and is one subject of a recent debate between Pieter van den Toorn and Dmitri Tymoczko.¹⁵ Van den Toorn argues that the passage is

fundamentally octatonic, with five of the seven pitch classes of the chord referable to a single octatonic collection (G# and B do not belong).¹⁶ Tymoczko argues that the passage is

¹⁵ See Tymoczko (2002), van den Toorn (2003, his extended response), and Tymoczko (2003, his reply to van den Toorn's response). The debate centers on the status of the octatonic scale in Stravinsky's music. Tymoczko

¹⁶ Scale-based explanations frequently have problems of this kind, with notes appearing in the music that are not in the purportedly referential scales, and notes that belong to the scales not represented in the music.

BLOCK C

② *Les amies de noces.*
mezza voce
f *p* *dim.*

(B) | E

On tresse, on tres-se-ra, la tresse à Nas-ta-sie, on tres-se-ra la tresse à

f *p* *dim.*

p sub *sim.*

A# | D#

sf *p sub*

MODEL 1 (035) (07)

MODEL 6 (035) (07)

MODEL 1 (07)

T_0 T_5 T_0 T_5

EXAMPLE 6. (Continued).

accountable to one of the modes of the harmonic-minor scale, with all seven of its pitch classes referable to the harmonic-minor scale on G#: G#-A#-B-C#-D#-E-F*-G#. Quantitatively at least, Tymoczko would seem to have the better of the argument. For my own part, I would prefer to avoid the scalar dispute entirely and observe that Model 1 harmony and voice leading give rise here to a larger collection that has a familiar name (harmonic minor), but may give rise to other large collections without familiar names. Stylistic consistency and musical coherence reside in the harmony and voice leading, derived from combinations of structural perfect fifths, often but not always filled in as harmonic triads, rather than in the identity of any scale that may be produced as a byproduct. In the *Rite*,

Model 1 is the common source for the Introduction to Part 1 (Example 2) and the eight-note chord of the “Dance of the Young Girls” (Example 8), which do not share a scalar reference.

Similar Model 1 superimpositions of triads, particularly where the triads are SLIDE-related (i.e., share a common third), are characteristic of *Orpheus* (1947). As the ballet begins, Orpheus laments the loss of Eurydice, and the descending notes in the harp, provided in Example 9, suggest his lyre. The Model 4 affinities of the opening music, with its Phrygian-inflected opposition of perfects fifths on C and E, will be discussed in due course. At Rehearsal no. 2, we find a complex chord that Maureen Carr designates an “emblematic

EXAMPLE 7. *Concerto for Two Pianos, third movement, Variations 1 and 4* [Cat. no. 48]. Model 3 (E/G) and Model 1 (F \sharp /G), with harmony based on G–D supporting a melody that spans first E–B, then F \sharp –C \sharp .

sonority,” because of its generative role in the music of the ballet.¹⁷ She parses it into “a major and a minor triad separated by a half step,” i.e., E major and F minor. It can thus be understood as an elaboration of the semitone-related structural fifths E–B and F–C, although the E-major component is much more clearly audible than the F-minor component. The E–B fifth is elaborated harmonically as E–G \sharp –B and melodically by the Phrygian tetrachord E–D–C–B that predominates in the ballet from its opening notes. The F–C fifth, somewhat buried within the chord, is elaborated, by F–A \flat –C, a triad SLIDE-related to E–G \sharp –B. Taking the passage as a whole, we hear the E–B fifth initially in a relatively consonant, diatonic relationship with C–G (Model 4), then in a much tenser, dissonant relationship

with F–C (Model 1). As is so often the case in Stravinsky’s music, the middleground motion involves an oblique relationship between the structural fifths, with one remaining constant and the other moving in relation to it.¹⁸

18 In a passage from much later in the ballet, we find a similar Model 1 juxtaposition of SLIDE-related harmonies (Rehearsal no. 63; see Cat. no. 63). Amid music oriented toward C \sharp minor, including a C \sharp -minor triad elaborated by the melodic fourth C \sharp –B \sharp –A \sharp –G \sharp , the violas, with their own key signature of no sharps or flats, arpeggiate a C-major triad. As is often the case with Model 1, all of the notes of the passage can be ascribed to a mode of the harmonic-minor scale on F (or E \sharp), as it might be written without regard to diatonic spelling: E \sharp –G–G \sharp –A \sharp –C–C \sharp –E. But focusing instead on the harmony and voice leading of Model 1 makes it easier to relate this passage to the many other Model 1 passages in Stravinsky’s music that, by

17 See Carr (2002).

VAR. IV

4/4 12/8 (♩. = 96) *lo stesso tempo*

p

mf

F
D
B \flat
G

F# — C#
F#-E-D#-C#

MODEL 1 (0235)
F#-G-C#-D (037t)

EXAMPLE 7. (Continued).

ANALYTICAL ILLUSTRATIONS OF MODEL 6

The prototypical illustrations of Model 6 involve Stravinsky's characterization of the puppet Petrushka, specifically what he referred to as the "music in two keys in the second tableau [conceived] as Petrushka's insult to the public."¹⁹ As Example 10 shows, the music juxtaposes C-major and F \sharp -major triads, with each triad filled in with 035-spans: C \sharp -E-F \sharp and G-B \flat -C. The Adagietto that immediately follows represents a shift of mood and model. The structural F \sharp -C \sharp fifth is retained from the preceding Model 6 but is now juxtaposed with D-major harmony to create Model 4.

virtue of different harmonic and melodic filling and elaboration, do not conform to this particular scale type.

¹⁹ Stravinsky and Craft (1981, 136).

The motion from Model 6 to Model 4 is oblique: F \sharp -C \sharp holds while C-G moves up two semitones to D-A. Within both of the two passages in Example 10 there is a strong sense of clash between stable, structural perfect fifths, an arrangement that resonates with Stravinsky's own sense of the music as "in two keys." The first passage is entirely octatonic; the second is diatonic (Lydian on D). In both cases, the collectional environment reflects the shifting relationship between the structural fifths and the different ways in which each is expressed and prolonged.

In the subsequent scene of the ballet, Petrushka's arrival in the Moor's room is signaled by the music shown in Example 11, which involves a similar juxtaposition of Models 4 and 6. Initially, the music juxtaposes E \flat -major and B-minor triads. These triads are hexatonic poles, and together they create a complete hexatonic collection. Whereas Model 4 in the

Tempo giusto $\text{♩} = 56$

$\begin{matrix} \text{Db} \\ \text{Bb} \text{ Bb} \\ | \\ \text{G} \\ \text{Eb} \text{ Eb} \end{matrix}$

$\begin{matrix} \text{B} \text{ B} \\ | \\ \text{G}\# \\ \text{E} \text{ E} \end{matrix}$

$\begin{matrix} \text{Eb} - \text{Bb} \\ \text{Eb} - \text{Db} - \text{Bb} \end{matrix}$

MODEL 1 (047) (047t) (035)

$\text{Eb} - \text{E} - \text{Bb} - \text{B}$

EXAMPLE 8. The Rite of Spring, “Dance of the Young Girls,” at Rehearsal no. 13–14 [Cat. no. 11]. Model 1 (Eb/E). The harmony superimposes E–B, represented as an Fb-major triad, and Eb–Bb represented as an Eb-major-minor seventh chord. The structural fifth Eb–Bb is also realized and partially filled melodically as Eb–Db–Bb (035).

second scene of the ballet (Example 10) produced a diatonic, Lydian scale, the same model here produces a hexatonic scale.

As the music continues, the Eb-major triad is retained and now heard against an A-major triad. These are the familiar octatonic poles of Model 6 and represent a transposition of the first passage from Example 10 at T₃, thus remaining within the same octatonic collection. The motion from Model 4 to Model 6 is oblique, with Eb–Bb retained and B–F# moving down a whole tone to A–E. This motion thus mirrors and reverses the motion from Model 6 to Model 4 described in Example 10. In both the second and third scenes of the ballet, then, Petrushka is characterized musically not by any single scale—his music involves octatonic, diatonic, and hexatonic scales—but rather by the oblique motion of structural fifths leading from Model 6 to Model 4 and back again. Petrushka’s music is often taken as evidence of octatonicism in Stravinsky’s music, but the passages in Examples 10 and 11 suggest that his musical identity has more to do with triadic combination (either at T₄ or T₆) than it does with any scale that may result. Certainly the Moor and the Ballerina know whose music they are hearing, even in its Model 4 (hexatonic) guise, and, according to the stage directions, they “prick up their ears.”

Although Model 6 is most characteristically associated with the octatonically inflected music of Stravinsky’s first,

“Russian”-style period, and there are many instances in the catalogue, especially in *The Rite of Spring*, it does occur in later music as well. The *Symphony in Three Movements* (1945) begins as in Example 12, with a harmonic combination of G major and Db major, described by Felix Salzer as a “polychord.”²⁰ The music offers a Petrushka-like conflation of major triads related at T₆. Neither triad is elaborated by a primary span (filling in the chordal fourth), but the Db-major triad is elaborated by the secondary span, Ab–G–F, with E acting as a lower neighbor to F.²¹

ANALYTICAL ILLUSTRATIONS OF MODEL 2

From the dissonant, tritone-rich, and often octatonically inflected Model 6, we move to a very different sonic world, namely the open, spacious, relatively consonant, and usually diatonic Model 2. Example 13 shows two passages from the opening of *Petrushka*. As noted earlier with reference to Example 1, the first passage expresses Model 2, with a D–A harmony (filled in as D–E–G–A) and an E–B melodic span

²⁰ See Salzer (1962, 194).

²¹ Related Model 6 harmony and voice leading shape other, contrasting passages in this movement; see Cat. no. 59 and no. 60.

The musical score is divided into two systems. The first system includes parts for Piano, Vln. I, Vln. II, Vc., and Cb. It features a tempo marking of 'Lento sostenuto' with a quarter note equal to 69. Harmonic diagrams above the staff show chord progressions: E-B, E-D-C-B, B-B, A-G, E-E, and G-G, E-D, C-C. The second system includes parts for Fl., Hn., Trp., and Trb. It features a tempo marking of '(p)'. Harmonic diagrams show chord progressions: E-B, E-D-C-B, C-C, A♭/A, F-F, B-B, G♯, E-E. Below the score, two models are shown: MODEL 4 (C-E-G-B) and MODEL 1 (E-F-B-C). MODEL 4 is associated with triads (0135), (0357), and (0247). MODEL 1 is associated with triads (037) and (047), with a 'SLIDE' arrow between them. Transpositions T₀ and T₅ are indicated between the models.

EXAMPLE 9. *Orpheus*, first scene, mm. 1–10 [Cat. no. 62]. Model 4 (C/E) in Phrygian environment, with C–G and E–B both expressed as harmonies, and E–B also invoked as E–D–C–B Phrygian tetrachord. Subsequently, E–B holds while the contrasting fifth shifts to F–C, creating Model 1 (E/F), with SLIDE-related triads, F–A♭–C and E–G♯–B, the latter elaborated melodically as E–D–C–B.

(filled in as E–D–C♯–B). In the second passage, the D–A harmonic frame is retained, but the melody has shifted to C–G—both the upper voice and bass voice melodies move within that frame. That melodic frame is filled in as C–B♭–A–G (another Dorian tetrachord), with a lower neighbor, F, adjoined to the lowest tone. The motion between the structural fifths is thus oblique (the harmonic fifth is retained while the melodic fifth moves at T₈). The result, however, is

that both passages involve Model 2: in the first passage, the melody is two semitones “too high” for the harmony, and in the second passage it is two semitones “too low,” symmetrically balancing the first.

The *Gloria* movement of the *Mass* (1948) begins in a kind of A major, and the vocal line traces the prolonging fourth-span, A–G♯–F♯–E, while the oboe, in Example 14, traces the prolonging fifth-span, E–D–C♯–B–A. But the English horn

Furioso ♩ = 108

ff

$\begin{matrix} G & G \\ | & E \\ C & C \end{matrix}$

$\begin{matrix} C\# & C\# \\ | & A\# \\ F\# & F\# \end{matrix}$

$\begin{matrix} G & - & C & & C\# & - & F\# \\ G-A\#-C & & C\#-E-F\# \end{matrix}$

$\begin{matrix} C\# & - & F\# \\ C\#-B-G\#-F\# \end{matrix}$

Adagietto ♩ = 54

quasi gliss.

p

non cresc.

p

f

(ten.)

$\begin{matrix} A & A \\ | & F\# \\ D & D \end{matrix}$

MODEL 6

T_0

MODEL 4

(035) (035)

(047) (047)

$C-F\#-G-C\#$

T_2

$D-F\#-A-C\#$

(0257)

(047)

EXAMPLE 10. *Petrushka*, Scene 2, "Petrushka's Curses" and *Adagietto* [Cat. no. 4]. Model 6, as $F\#-A\#-C\#$ and $C-E-G$, gives way to Model 4, with the $F\#-C\#$ retained, but now juxtaposed with $D-F\#-A$.

melody ($F\#-G\#-A-B$) and the cadential harmony at the end of m. 4 ($F\#-B$) both relate to the structural fifth $B-F\#$. Collectively, we experience a kind of diatonic wash within the

three-sharp collection, with centricity shifting between A (A major) and B (B Dorian). Each of those weakly established centers is elaborated both harmonically and melodically within

R76 Vivace $\text{♩} = 80$
 8-measure phrase, p , $cresc.$
 Chord diagrams:
 Treble: $B\flat$ $B\flat$ | G
 Bass: $E\flat$ $E\flat$
 Treble: $F\sharp$ $F\sharp$ | D
 Bass: B B
 Harmonic analysis: $E\flat^+$, B^- , $(\flat)8$, $(\flat)8$, $(\flat)8$
 Label: HEXPOLE

Chord diagrams:
 Treble: $E\flat$ — $B\flat$
 Bass: $E\flat$ — $C\sharp$ — $B\flat$
 Treble: $B\flat$ $B\flat$ | G
 Bass: $E\flat$ $E\flat$
 Treble: E E | $C\sharp$
 Bass: A A
 Harmonic analysis: $(\flat)8$, $(\flat)8$, A^+ , $E\flat^+$, $(\flat)8$
 Label: OCTPOLE

MODEL 4 T_0 MODEL 6 (035)
 Treble: (037) (047) (035)
 Bass: (047) (047)
 Labels: $B-E\flat-F\sharp-B\flat$, T_2 , $A-E\flat-E-B\flat$

EXAMPLE 11.1. *Petrushka*, Scene 3 (*Petrushka's appearance in the Moor's room*) [Cat. no. 6]. Model 4 juxtaposes hexatonic poles, $E\flat$ major and B minor; Model 6 juxtaposes octatonic poles, A major and $E\flat$ major.

Model 2 (A/B).²² A–E predominates over B– $F\sharp$, which is felt more as a slight counterbalance than a vigorous threat. The melodic spans operate to some extent independently of each other, coinciding only at cadential points, somewhat in the manner of the Renaissance polyphony that so obviously influences the sound of this music.

In Example 15, a passage from *Jeu de Cartes* (1936), Model 2 functions as a bridge between Models 1 and 4 in a series of

²² Agawu (1989) similarly observes that sc[0257] “provides the prolongational frame for the semicanonic opening four measures of the Gloria (the pitch classes involved are E, $F\sharp$, A, and B)” (156).

oblique structural motions. The passage begins with a melody that alternates the notes of one structural fifth ($F\sharp$ – $C\sharp$) while the harmony arpeggiates, reiterates, and fills in another (G – D). At Rehearsal no. 180, the melody remains fixed on $F\sharp$ (now without its supporting $C\sharp$), but the harmony SLIDES from G – B – D to $G\sharp$ – B – $D\sharp$ (these two triads share their third). As a result of this oblique motion of the structural fifths, the music has shifted from Model 1 to Model 2. At Rehearsal no. 183, the harmony SLIDES back to G – B – D . The melody, however, has changed. Starting back at Rehearsal no. 182, although still treating $F\sharp$ as a structural tone, the melody elaborates B-minor harmony, especially the fourth-span B – $A\sharp$ – $G\sharp$ – $F\sharp$. In relation

EXAMPLE 12. *Symphony in Three Movements, I*, mm. 1–7 [Cat. no. 58]. Model 6 realized as a juxtaposition of G-major and D \flat -major triads, the latter elaborated by an A \flat –G–F secondary span.

to the beginning of the passage in Example 15, the motion is once again oblique—the harmony is G–B–D while the melody shifts from F \sharp –C \sharp to B–F \sharp —and takes us from Model 1, through Model 2, to Model 4. Within each distinct textural block, a single model holds sway, with its characteristically offset harmony and prolongational voice-leading spans. The middle-ground motion from block to block is defined by the shifting of the structural fifths in relation to each other.

ANALYTICAL ILLUSTRATIONS OF MODEL 5

Model 5 usually produces the same sonic world as Model 2, replete with open fourths and fifths and largely diatonic in orientation. *The Rake's Progress* (1951) opens with a harmonious, A-majorish invocation of a pastoral Eden, shown in Example 16. Model 5 engenders a consonant and largely diatonic environment, projecting the structural fifths A–E and D–A. Harmonically, A–E is filled in as A–B–E, A–D–E, A–B–D–E, and occasionally A–C \sharp –E. It is further elaborated melodically within the A–E melodic fourth as A–G \sharp –F \sharp –E. The opposing fifth, D–A, is heard harmonically as D–E–A (on the downbeats of mm. 2 and 3, for example) and melodically as the fourth-span D–C \sharp –B–A. Typically, these harmonies and these spans intertwine in unpredictable ways. Clearly the A–E fifth is primary here, and the D–A fifth represents a gentle, nonassertive countervailing presence.

The second scene of *The Rake's Progress* shifts from a garden in the country to a brothel in sinful London. Musically, Stravinsky uses Model 5 at the same pitch level to establish the second scene as a sort of demonic parody of the first, represented in Example 17. The principal harmony throughout the passage is A–B–D–E, usually voiced to emphasize D in the bass, but with A securely in the bass in the final measures. The D–A melodic fourth is filled in initially as D–C \sharp –B–A, but later as D–C–B \flat –A, with a Phrygian inflection suggesting the sinister forces at work beneath the apparent peacefulness of Shadow's soothing words.

In Example 18, from *A Soldier's Tale* (1918), we find a harmony fixed on G–D by an ostinato that fills in this structural fifth as G–A–D. The same structural fifth is filled in as a melodic fourth either as G–F–E–D or G–F \sharp –E–D. At the same time, countervailing spans fill in a contrasting melodic fourth either as D–C–B–A or D–C \sharp –B–A (the latter is found in the music just beyond that excerpted in Example 18). The D–A spans are in inner voices and thus less prominent than the G–D spans. The collectional environment is thus a bit muddled, but the basic contrast of two perfect fifths within Model 5 remains clear throughout. Like the other Model 5 examples discussed here and presented in the Analytical Catalogue, the level of tension between the structural fifths, separated by a relatively consonant interval of five semitones, is relatively low compared to Models 1 and

The image displays a musical score for Petrushka, Scene 1, featuring piano and violin parts. The score is divided into two main sections. The first section (measures 1-25) includes a piano part with a complex rhythmic pattern and a violin part with triplets. The second section (measures 25-32) features a change in tempo and dynamics, marked 'poco a' and 'f'. Harmonic diagrams are placed throughout the score to illustrate specific chord structures. At the bottom, a diagram shows two instances of 'MODEL 2' connected by a transposition arrow labeled T_8 . The first instance has a harmony of D-E-A-B and a melody of (0235) over (0257). The second instance has a harmony of C-D-G-A and a melody of (0235) over (0257).

EXAMPLE 13. *Petrushka, Scene 1 [Cat. no. 1]. Two representations of Model 2, the first with harmony D-E-G-A and melody E-D-C#-B, the second with the same harmony and a melody transposed to C-Bb-A-G.*

6. Nonetheless, one feels even here a slight tug in two opposing directions, charging the relatively consonant and largely diatonic surface with a characteristically Stravinskian harmonic energy.

ANALYTICAL ILLUSTRATIONS OF MODEL 3

Model 3 and Model 4 structures are extremely prevalent in Stravinsky's music, especially in his middle period, neoclassical

$$\begin{array}{|c} \hline E & \text{---} & A \\ \hline E-D-C\# & - & B-A \\ \hline \end{array}$$

$$\begin{array}{|c} \hline E & E \\ | & C\# \\ \hline A & A \\ \hline \end{array}$$

$$\begin{array}{|c} \hline F\# & F\# \\ | & E \\ \hline B & B \\ \hline \end{array}$$

$$\begin{array}{|c} \hline F\# & \text{---} & B \\ \hline F\#-G\# & - & A-B \\ \hline \end{array}$$

$$\begin{array}{|c} \hline F\# & \text{---} & B \\ \hline F\#-G\# & - & A-B \\ \hline \end{array}$$

MODEL 2
 A-B-E-F#
 (047) (0245) (057)

EXAMPLE 14. Mass, *Gloria*, mm. 1–10 [Cat. no. 65]. Model 2 as A–E, filled in as A–C#–E and spanned by E–F#–G#–A and E–D–C#–B–A, in relation to B–F#, stated as a harmonic fourth and fifth and spanned by B–A–G#–F#.

music.²³ The “Russian Dance” from *Petrushka*, however, appears to be chronologically the first clear instance of Model 3 in Stravinsky’s music. In Example 19 the harmonic fifth, G–D, is fleshed out as a dominant-seventh chord, G–B–D–F. Above it, the melody repeatedly traces a Phrygian tetrachord E–D–C–B, within the structural fourth E–B. The melodic B is often

embellished with a lower-neighbor A; such lower-neighbor embellishments of a melodic tetrachord are extremely common in Stravinsky’s melodies.

In the passage that follows (at Rehearsal no. 11), the harmony moves up by T_7 to D–A (now elaborated as a major triad, rather than a dominant-seventh chord). The melody moves down by T_7 to E–A (now filled as a Dorian instead of a Phrygian tetrachord, but still with an embellishing lower

23 These are the structures referred to as “tonal axes” in Straus (1982).

178 $F\# - C\#$

secco

mf sempre poco marcato

179

$D\ D$
|
 $B\ G$

$F\# - (C\#)$

180

$D\#\ D\#$
|
 $G\#\ G\#$

181

$F\# - B$
 $F\# - G\# - A\# - B$

stacc.

182

f

mf come sopra

183

$B - D$
 $B - C\# - D$

$D\ D$
|
 $G\ G$

178 MODEL 1 (07) $F\# - G - C\# - D$ (047)

180 MODEL 2 (07) $F\# - G\# - C\# - D\#$ (037)

182 MODEL 4 (0245) $G - B - D - F\#$ (047)

SLIDE SLIDE

EXAMPLE 15. *Jeu de Cartes*, “Third Deal,” Rehearsal no. 178–84 [Cat. no. 50]. Model 1 as $F\# - C\#$ in the melody in relation to $G - B - D$ in the harmony. Model 2 retains the melody but SLIDES the harmony to $G\# - B - D\#$. Model 4 alters the melodic focus toward $B - F\#$, while SLIDING the harmony back to $G - B - D$.

EXAMPLE 16. *The Rake's Progress, Act I, Scene 1 [Cat. no. 66]. Model 5 as A–E, expressed harmonically as A–B–D–E and A–C#–E and melodically as A–G#–F#–E, heard in relation to D–A, expressed harmonically as D–E–A and melodically as D–C#–B–A.*

neighbor). Despite their obvious contrasts, these two passages are thus internally similar and connected by the symmetrical contrary motion that takes us from Model 3 to Model 5. From a scalar point of view, the first passage is Mixolydian on G and the second is Dorian on A, but the prolongational voice leading within the textural blocks and the contrary motion of the structural fifths between the blocks more efficiently capture both the differences and the continuity between these passages.

I previously noted that Stravinsky often finds his way back to certain preferred locations for his structural fifths. The same combination of fifths that shapes the “Russian Dance” (Example 19), with G–D in the harmony and E–B in the melody, also underpins the passage from the *Symphony of Psalms*

(1930), shown in Example 20.²⁴ The relationship between E and G as competing tonal centers in this music has been widely remarked, originally by Milton Babbitt.²⁵ At the beginning of the passage, a stable harmonic E–B fifth supports the Phrygian filling of the same melodic tetrachord, E–D–C–B. While the melody remains within the same tetrachord in the second half of the passage, however, the harmony shifts to G–D, filled in as

²⁴ See also the opening “Soldier’s March” from *The Soldier’s Tale* (Cat. no. 27) for a related passage with harmony centered on G/D and melody that spans E–B.

²⁵ See Babbitt (2003, 150).

D — A
D-C#-B-A

174 Nick (raising his glass)

Sweet — dreams, my ma - ster. Dreams — may

Lan - ter - loo, lan - ter - loo.

175

lie, — But dream. — For — when —

you wake, — you die. —

CURTAIN

176

sempre legato

B
A
A
I
E
D
D

D — A
D-C-B \flat -A

EXAMPLE 17. The Rake's Progress, Act I, Scene 2 [Cat. no. 67]. Model 5 as in Example 16, but with the melodic span D-C#-B-A darkened into D-C-B \flat -A.

EXAMPLE 17. (Continued).

MODEL 5

A-D-E-A

MODEL 5

D-G-A-D

EXAMPLE 18. The Soldier's Tale, "Little Airs" [Cat. no. 28]. Model 5 as G-D harmony, elaborated by G-F-E-D and G-F#-E-D spans, contrasted with spans that elaborate a structural D-A.

EXAMPLE 19. *Petrushka*, Scene 1, “Russian Dance” [Cat. no. 3]. Symmetrical contrary motion from Model 3 (E/G) to Model 5 (A/D).

both/either G-B \flat -D and G-B-D. That some of this music seems referable to diatonic scales (G major or E Phrygian) and/or to an octatonic scale on E suggests the protean nature of Model 3, which is at home in either collectional environment.

The opening of *Agon* (1957) strikingly recalls the opening of *The Rite of Spring*. Compare Example 2 and Example 21. In both cases, the melody projects the Dorian tetrachord, D-C-B-A, articulated to establish C as the principal upper-voice

The musical score consists of several systems:

- System 1:** Piano accompaniment. Treble clef has a melodic line with a *mf* dynamic. Bass clef has a harmonic accompaniment. Chord diagrams: $\begin{matrix} E & - & B \\ E & - & D & - & C & - & B \end{matrix}$ and $\begin{matrix} B & B \\ | & G \\ E & E \end{matrix}$.
- System 2:** Vocal line (cant. *espressivo m.g.*) and piano accompaniment. Treble clef has a vocal line with *m.d.* and *m.g.* markings. Bass clef has piano accompaniment. Chord diagrams: $\begin{matrix} B & - & E \\ B & - & C & - & D & - & E \end{matrix}$ and $\begin{matrix} D & D \\ | & B \\ G & B \end{matrix}$.
- System 3:** Vocal line with lyrics "Texto" and piano accompaniment. Treble clef has a vocal line with *m.d.* and *m.g.* markings. Bass clef has piano accompaniment.
- System 4:** Vocal line with lyrics "E - xau - di o - ra - ti -" and piano accompaniment. Treble clef has a vocal line with *mf cantabile* marking. Bass clef has piano accompaniment with *mf legato* marking. Chord diagram: $\begin{matrix} B & B \\ | & G \\ E & E \end{matrix}$.
- System 5:** A diagram labeled "MODEL 3 (0135)" showing a sequence of notes: E-G-B-D. Sub-models are indicated as (037) and (047).

EXAMPLE 20. Symphony of Psalms, first movement, at Rehearsal no. 2 [Cat. no. 44]. Model 3 (E/G) realized as E-D-C-B in melody harmonized by either E-B or G-D, with variable fill.

D — A
 D - C - B - A

E — B
 E - D - C# - B

D D — A A
 G G

D D — A A
 G G

MODEL 3 (0235)

D-F-A-C (027)

MODEL 3 (0235)

E-G-B-D (027)

T_2

EXAMPLE 21. *Agon*, opening [Cat. no. 73]. Two realizations of Model 3 (D/F, then E/G).

The image displays a musical score for Example 22, consisting of piano and vocal parts. The piano part is in 2/4 time with a tempo of 104. The vocal part is in 3/4 time. The score is annotated with harmonic analysis boxes and structural markers.

Harmonic analysis boxes include:

- Top right: $G - D$ and $G - F - E\flat - D$
- Top right: $E\flat - B\flat$ and $E\flat - D - C - B\flat$
- Left side: $(D) - G$
- Right side: $B\flat - B\flat$ and $E\flat - E\flat$

Structural markers include an 8-measure bracket and an 8-measure dotted line. The piano part features a recurring octave G in the bass line, marked with p and mf . The vocal part features a recurring octave G in the treble line, marked with mf .

Model 4 is shown at the bottom, with four instances labeled (0245), (0135), (047), and (037). The model is based on the Eb-G-Bb-D chord structure.

EXAMPLE 22. *Mavra*, Overture [Cat. no. 34]. Model 4 ($E\flat/G$). Ambiguity between $E\flat-G-B\flat$ and $G-B\flat-D$ as harmonic support for the recurring octave Gs. Both structural fifths are realized as fourth-spans: $G-F-E\flat-D$ and $E\flat-D-C-B\flat$.

tone, with D as its upper neighbor. The harmonic environment, however, is quite different. In *Agon*, the D-A melody is heard in relation to an F-C harmonic fifth, filled in initially as F-B-C and then as F-G-C. In a contrasting passage beginning in m. 10, the same structural situation is simply transposed up two semitones. The harmonic fifth, now G-D, is

filled in as G-A-D, while the Dorian melodic tetrachord E-D-C#-B is again articulated to feature the second-highest note as the principal melodic tone. Here, the two contrasting blocks represent the same underlying model of harmony and voice leading, and the motion between the structural fifths is simply parallel.

Maestoso $\text{♩} = 58$

$\begin{matrix} A & \text{---} & E \\ B\flat & \text{---} & A-G-F-E \end{matrix}$

$\begin{matrix} C & C \\ | & A \\ F & F \end{matrix}$

$\begin{matrix} F & F \\ | & D \\ B\flat & B\flat \end{matrix}$

$\begin{matrix} A & \text{---} & E \\ B\flat & \text{---} & A-G-F-E \end{matrix}$

10

$\begin{matrix} T_0 \\ \text{MODEL 4} & (0135) & \text{MODEL 1} & (0135) \\ \text{F-A-C-E} & & \text{A-B}\flat\text{-E-F} & \\ & & & (047) \end{matrix}$

T_{+5}

EXAMPLE 23. Serenade in A, first movement, mm. 1–14 [Cat. no. 38]. Model 4 (F/A) followed by Model 1 (A/B \flat), with oblique motion between the structural fifths. The principal melodic span A–G–F–E is found in both blocks, decorated with an upper-neighbor B \flat .

The second of the passages from *Agon*, with G–D in the harmony and E–B spanned in the melody, recalls both the “Russian Dance” from *Petrushka* (Example 19) and the first movement of the *Symphony of Psalms* (Example 20). While the structural affinities among these passages are clear, the affective impact would seem to vary pretty widely, from the celebratory but somewhat mechanical first movements of *Petrushka* and the other puppets, to the solemn ritual of the *Symphony of Psalms*, to the sprightly, abstract dance of *Agon*. Although Stravinsky obviously has certain favored structural combinations, he is able to employ them to various expressive ends.

ANALYTICAL ILLUSTRATIONS OF MODEL 4

Mavra (1922) is the gateway to Stravinsky’s second-period, neo-classical style,²⁶ and its overture begins with a largely diatonic presentation of Model 4, E \flat /G, provided in Example 22. The music begins with octave Gs, and the musical crux is whether that G represents the root of a G-minor triad or the third of an E \flat -major triad. Both possibilities are strongly suggested harmonically, although the music never presents a complete,

²⁶ (Taruskin 1996).

C—G
C-B-A-G

B B
| G G
E | E
C C

MODEL 4
C-E-G-B
(0245)
(047) (037)

EXAMPLE 24. *Symphony in C, I, first theme, six measures at Rehearsal no. 5 [Cat. no. 51]. Model 4 (C/E) in predominantly C-major environment, with E-B and C-G both suggested harmonically, but C-G reinforced as C-B-A-G melodic span.*

root-position statement of either triad. Furthermore, both possible harmonies are elaborated with prolonging melodic spans, E \flat -D-C-B \flat for E \flat major and G-F-E \flat -D for G minor.

A similar ambiguity between tonal centers characterizes the realization of Model 4 (F/A) shown in Example 23. In the first six measures of the *Serenade in A* (1925), F major and A minor compete for priority within an F-A-C-E harmonic axis.²⁷ Pitch-class A is strongly emphasized, but usually within an F-major harmony. The principal melodic span, however, A-G-F-E (with the A embellished with its upper neighbor, B \flat), tends to reinforce A. In the contrasting textural block that begins at m. 7, the melody with its A-G-F-E span remains largely intact, transposed down an octave. The accompaniment, however, has been transposed from mostly F-A-C to mostly B \flat -D-F. As a result of this oblique motion among the structural fifths, we have moved from Model 4 (F/A) to Model 1 (A/B \flat). The motion of the harmonic fifth has strong motivic significance in this context, not only as a move by five semitones (an interval so frequently deployed melodically) but also as a composing-out of the interval between F and B \flat , so frequently traversed in the melody.²⁸

When using Model 4, Stravinsky often invokes tension between C and E as pitch-class centers and between C-G and E-B as structural fifths. Usually the C-G fifth is harmonic and the E-B fifth is realized as a melodic fourth. The prevailing collectional environment may be diatonic (inflected as either major or Phrygian) or not, depending on how the structural fifths are filled. We have already noted one such passage, namely the opening of *Orpheus* (see Example 9). There, the Phrygian inflection conveys its traditional association with mourning.²⁹

The first theme of the first movement of the *Symphony in C* (1940) also makes use of Model 4 (C/E), but arranges the elements to project something more like C major than E Phrygian, shown in Example 24. The harmony of the passage is ambiguous as to which structural fifth is primary: it consists of only E-G, common to both C-E-G and E-G-B. The melodic span C-B-A-C tends to tip the balance toward C-G, but E-B remains potent as a countervailing presence (note that the melodic B is always on a strong beat, suggesting the possibility of hearing the C as a decorated escape tone with respect to it). The dichotomies of C and E as pitch classes, C-G and E-B as structural fifths, and C-E-G and E-G-B as triads are central to the organization of this sonata exposition and to the

²⁷ See Straus (1987b) for a discussion of this passage along similar lines.

²⁸ The passage from *Renard* (1916), analyzed in Cat. no. 22, has a similar realization of Model 4 (F/A), although in a more ambiguous, ill-defined scalar environment.

²⁹ The opening of the *Cantata* (1962; Cat. no. 68) is strikingly similar, and Stravinsky himself identified this music as “in the Phrygian mode.” See Stravinsky (1966, 429).

The image displays a musical score for Example 25, consisting of piano and voice parts. The score is divided into measures 11 and 12. Above the piano part, there are several Schenkerian spans and chord diagrams. The first span covers measures 11-12 and is labeled with the chord diagram A—F# and A—G#—F#. The second span covers measures 11-12 and is labeled with the chord diagram C#—A and C#—B—A. The third span covers measures 11-12 and is labeled with the chord diagram F#—D and F#—E—D. The fourth span covers measures 11-12 and is labeled with the chord diagram D—A and D—C—B—A. Below the piano part, there is a section labeled MODEL 4, which shows a chord diagram D—F#—A—C# and a musical line with a Schenkerian span labeled (047c).

EXAMPLE 25. *Piano Concerto, first movement, at Rehearsal no. 11 [Cat. no. 36]. Spans identified in Schenker (1996) are primary or secondary within Model 4 (D/F#).*

movement as a whole.³⁰ As with Model 3 (E/G), Model 4 (C/E) thus defines a family of works with strikingly shared structural attributes, but with affective impact that varies according to the Phrygian or major inflection of the structural fifths.

CONCLUSION

In 1926 Heinrich Schenker described Stravinsky's music in terms of prolongational spans, with linear motions traversing intervals within a stable, referential harmony. In a sharply negative assessment of a passage from Stravinsky's *Piano Concerto* (1924), Schenker credited Stravinsky with the use of linear

³⁰ See Straus (1987c) for an extended discussion along similar lines.

progressions, but condemned him for thwarting their natural behavior at every opportunity.³¹ Schenker's graphic analysis "shows linear progressions; they are indeed of a simple type, but they are linear progressions nonetheless. Is it not the case, however, that Stravinsky contradicts this plan where he is able to?"³²

Schenker is mistaken in imagining that the linear progressions he identifies are in the service of prolonging a simple tonic triad, or that Stravinsky may have wished them to be, but he is profoundly right to imagine that Stravinsky's music can be understood in terms of prolongational melodic spans. With regard to the bi-quintal approach taken in this article, the passage from the Piano Concerto that so agitated Schenker realizes a Model 4 juxtaposition of two perfect fifths, D–A and F♯–C♯, represented in Example 25. Within the tonal axis produced by their combination, D–F♯–A–C♯, all of Schenker's linear progressions emerge as either primary spans (D–A) or secondary spans (C♯–A, A–F♯, F♯–D). The harmony and voice leading of the passage is thus fully prolongational, but with respect to a bi-quintal combination rather than a simple tonic triad.

The theoretical model presented here thus falls within the Schenker-inspired tradition of analyzing post-tonal music generally and Stravinsky's music in particular.³³ While some of the analyses produced within this tradition have suffered from inconsistency and lack of clarity,³⁴ the possibility of prolongation in Stravinsky's music has long been and remains appealing. What the prolongational approach essentially requires is an ability to identify relatively consonant, structural, stable tones and harmonies and to relate the relatively dissonant, non-structural, unstable tones and harmonies to them, usually as passing, neighboring, or arpeggiating. The bi-quintal model presented here can do those things and can thus reap the benefits of the prolongational approach, including a sense that musical units can be bound together by embellishing spans and that larger groupings and collections emerge from smaller, simpler ones via consistent processes.

With remarkable prescience, Milton Babbitt argued back in 1964 that "Schenker's analysis of only sixteen measures of the Piano Concerto, for all that it bristles with normative irrelevancies, provided the most revealing insight into the procedures of Stravinsky's compositions."³⁵ Indeed, Stravinsky's procedures

of harmony and voice leading are strikingly consistent across the different phases of his career (from *Petrushka* to *Agon*) and across different scalar or collectional environments. Now, almost ninety years after Schenker's analysis and fifty years after Babbitt's endorsement of it, this approach strikes me as full of life and promise, and if we seek the sources of "consistency, identity, and distinction"³⁶ in Stravinsky's music, we should look closely at its harmony and voice leading along the lines suggested here.

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- 31 Schenker's analysis appears in an essay from 1926, edited and translated as Schenker (1996). Schenker's analysis has sparked a considerable response from music theorists, including Morgan (1976), Benjamin (1976/1977), Morgan (1978), Agawu (1989), Straus (1997), and Traut (2007). The last of these offers a persuasive account of the passage based on an analytical normalization of linear spans that are displaced musically from their customary relationships; this analysis resonates in interesting ways with the approach taken here.
- 32 See Schenker (1996, 17).
- 33 The history of Schenker-inspired, prolongational approaches to post-tonal music is traced and critiqued in Straus (1987 and 1997). The most significant recent work in this tradition is that of Olli Väisälä (1999 and 2002). See also Brown (2005, esp. 202–09).
- 34 See the critique offered in Straus (1987).
- 35 See Babbitt (2003, 148).
- 36 This triad of nouns is from van den Toorn (1983).

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