

# Communication and Interaction in Stravinsky's *Scherzo fantastique* (1907-1908)

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Recent years have witnessed numerous contributions toward the “new branch of theory” which Arthur Berger prophesied for Stravinsky’s music, one prepared “to deal with the nature of twentieth-century music that is centric (i.e., organized in terms of tone center) but not tonally functional.”<sup>1</sup> Perhaps most well known among the new approaches is that inaugurated by Berger himself and further developed by Pieter van den Toorn, in which Stravinsky’s tone structures are classified according to octatonic, diatonic, and interacting octatonic-diatonic pitch organization.<sup>2</sup> Berger’s and van den Toorn’s procedure

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<sup>1</sup>Arthur Berger, “Problems of Pitch Organization in Stravinsky,” *Perspectives of New Music* 2 (1963): 11.

<sup>2</sup>This method is set forth most comprehensively in Berger, “Problems of Pitch Organization” and in Pieter C. van den Toorn, *The Music of Igor Stravinsky* (New Haven: Yale University Press, 1983). See also by van den Toorn, “Some

has recently been supplemented by Richard Taruskin, who, in response to certain of its critics, has sought to “shore up” particular aspects of the approach through an increased historical perspective and with an analysis of the second tableau of *Petrushka*.<sup>3</sup>

Despite its apparent shortcomings, the Berger-van den Toorn method has yielded discoveries of octatonic, diatonic, and octatonic-diatonic pitch organization in Stravinsky that have proven so widespread that a stage appears to have been reached at which, as Taruskin has put it, “no further objection to those findings can, I think, be entertained.”<sup>4</sup> It is for this reason that a next logical step toward the “new branch of theory” which Berger predicted would comprise the development of principles centering not upon the isolation and classification of relevant pitch collections—this procedure would now be considered a required preliminary step—but rather upon a study of dynamic relations existing among the collections themselves. With this purpose in mind I wish to introduce principles of a *well-defined*

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Characteristics of Stravinsky’s Diatonic Music,” in *Perspectives of New Music* 14 (1975): 104-138; “Octatonic Pitch Structure in Stravinsky,” in *Confronting Stravinsky*, ed. Jann Pasler (Berkeley: University of California Press, 1986), 130-156; *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language* (Berkeley: University of California Press, 1988).

<sup>3</sup>Richard Taruskin, “Chernormor to Katschei: Harmonic Sorcery; or, Stravinsky’s Angle,” *Journal of the American Musicological Society* 38 (1985): 72-142; “*Chez Petrouchka*: Harmony and Tonality chez Stravinsky,” *Nineteenth-Century Music* 10 (1987): 265-86. A principal critic of Berger and van den Toorn (to whom Taruskin specifically responds) has been Joseph Straus; see his Review of Pieter C. van den Toorn, *The Music of Igor Stravinsky* in *Journal of Music Theory* 28 (1984): 129-134. Taruskin’s “shoring up” of the Berger-van den Toorn approach, which can be considered a partial concession to the criticism of Straus and others, is particularly evident in his *Petrushka* analysis. Taruskin employs the analysis as a corrective in order to demonstrate the possibility of (1) large-scale referability of an octatonic collection, (2) consistent distinction between referable and “chromatic” pitches with respect to given referential collections and (3) delineation of voice leading at diverse structural levels.

<sup>4</sup>Taruskin, “Chernormor to Katschei”: 78.

*collection, communication, and interaction.*<sup>5</sup>

The notion of *well-defined collection* provides a formal basis for the isolation and classification of pitch collections that must precede a study of the relationships among such collections. Specifically it seeks to characterize the degree of consistent distinction available between pitch classes attributable to a given referential collection and those that are not. A “collection” (i.e., a specific unordered grouping of pitch classes) is thus “well-defined” to the extent that it can be clearly differentiated from foreign pitch classes by means of musical context (e.g., predominance of pitch classes belonging to the collection, rhythmic or articulative stress upon such pitch classes, distinction of such pitch classes through register or texture). This might seem insignificant in light of Taruskin’s work (or similarly, that of Jay Reise for the music of Scriabin), where distinction between members and non-members of a given collection is made during the process of analysis. Yet formalizing the concept of *well-defined collection* ensures recognition of a fundamental consideration in any collectional approach: the degree and nature of purity (or “definition”) in collections asserted to be operative.<sup>6</sup>

Well-defined collections can relate to one another in either of two ways: in succession (“horizontally”) or in combination (“vertically”). Coherent transition between *successive* collectional domains is often achieved through techniques of voice leading or by means of a mutual pivot (as with successive keys in tonal modulation), and we say that sets bearing this relation *communicate* with one another. An interesting method of whole tone-diatonic communication, for example, is the treatment of part or all of a whole-tone collection as a dominant

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<sup>5</sup>An earlier version of this paper was presented at the inaugural meeting of Music Theory Midwest at Northwestern University, May 1990.

<sup>6</sup>Taruskin, “*Chez Petrouchka*,” and Jay Reise, “Late Scriabin: Some Principles Behind the Style,” *Nineteenth-Century Music* 6 (1983): 220-31. Systematic differentiation of pitches accountable from those not accountable to a given referential collection is something that, as Taruskin states (with reference to the octatonic collection and its four remaining “chromatic” tones), “neither Berger nor van den Toorn has tried very rigorously to do” (“*Chez Petrouchka*”: 267).

complex (Figure 1).<sup>7</sup>

The actual *combination* of well-defined collections is called *collectional interaction*. Interacting pitch complexes exhibit varying degrees of mutual integration; that is, they range from combinations of distinct collections that simultaneously inhabit disparate regions of the overall musical texture to formations that are more thoroughly fused and can be discerned only through careful attention to musical detail.

Figure 1. Whole tone-diatonic communication.

As used here, the term *interaction* expands a specific analytical method (that of Berger and van den Toorn) into a generalized principle. Thus the principle of *interaction*—as well as that of *well-defined collection* and *communication*—has the capacity to embrace not only octatonic and diatonic configurations, but whole-tone and chromatic ones as well, and indeed any means of pitch organization that is deemed germane to the music at hand. And since by definition these collections are being well-defined, it is possible to be very precise in describing the manner in which such collections communicate and interact. Well-defined collections thus provide the basis for a similarly precise definition of communication and interaction among such collections within overall musical contexts.

The following essay presents examples of communication and

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<sup>7</sup>For a discussion of the relationship of the whole tone collection and dominant complexes, see Arnold Schoenberg, *Theory of Harmony*, ed. Roy E. Carter (Berkeley: University of California Press, 1988), 391-92.

interaction derived from Stravinsky's early composition for orchestra, *Scherzo fantastique* (1907-1908). Van den Toorn has noted that "few of Stravinsky's works exhibit a more persistent referential commitment to the octatonic collection than the early *Scherzo fantastique*."<sup>8</sup> To this I add that the *Scherzo* exhibits communication and interaction among well-defined octatonic, diatonic, whole-tone, and chromatic collections. In order to demonstrate the applicability of these principles to later works of Stravinsky and to the works of other composers, the paper concludes with an example of diatonic-octatonic whole tone interaction in Stravinsky's *Les noces* (1914-1917) and an example of pentatonic-whole tone-diatonic communication in Claude Debussy's *Prélude à l'après-midi d'un faune* (1894).

Before beginning, some terminological notes are in order, and these will be clarified by looking at Example 1. First, measures are indicated by reference to rehearsal numbers in the score, plus or minus a number of measures. Example 1 thus ranges from 7-1 to 7+1. Second, integer notation denotes pitches and pitch classes (pc's), with C = 0, C-sharp or D-flat = 1, ..., B = 11. Whole-tone collections containing either even or odd integers will be referred to as "even" or "odd" whole-tone collections, respectively. Third, sets given in prime form are in parentheses, while actual pitches and pitch classes are not. Thus in Example 1, the integers in the score and in the summary at the bottom of the page represent actual pitches, while those in the six Roman numeral partitions surrounding the score are in prime form. Finally, transpositional combination, a procedure identified by Richard Cohn,<sup>9</sup> in which intervals and sets are combined with their transpositional products, is denoted by an asterisk. Thus in partition II of Example 1, (0 4 8) \* (read "by") (0 1 2 3 4) indicates that an (0 4 8) "augmented fifth" triad is transposed over an (0 1 2 3 4) chromatic pentachord. Similarly, partition III indicates that both a "major" triad and a chromatic tetrachord are transposed over an (0 3 6 9), interval

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<sup>8</sup>van den Toorn, *The Music of Igor Stravinsky*, 461, note 21.

<sup>9</sup>Richard Cohn, "Inversional Symmetry and Transpositional Combination in Bartok," *Music Theory Spectrum* 10 (1988): 19-42.

class (ic) 3 cycle; and partition V depicts a tritone (i.e., pitches related by ic 6) transposed over (0 3 6 9).

Example 1. Diatonic-whole tone interaction; diatonic-octatonic communication; octatonic-chromatic interaction.

The musical score consists of five staves. The first staff is annotated with Partition I: (0 4 8) +5 triad. The second staff is annotated with Partition II: (0 4 8) \*(0 1 2 3 4). The third staff is annotated with Partition III: ((0 4 7) (0 1 2 3)) \*(0 3 6 9) at ♯ and Partition IV: (0 3 6 9) at ♭. The fourth staff is annotated with Partition VI: (0 2 5 8) \*(0 3 6 9) at ♭. The fifth staff is annotated with Partition V: 6 \*(0 3 6 9) at ♭. Chord symbols at the bottom indicate E: V<sup>7</sup>/<sub>+5</sub> and I<sup>4</sup>/<sub>3</sub>.

Summary (partitions III, IV and V only):

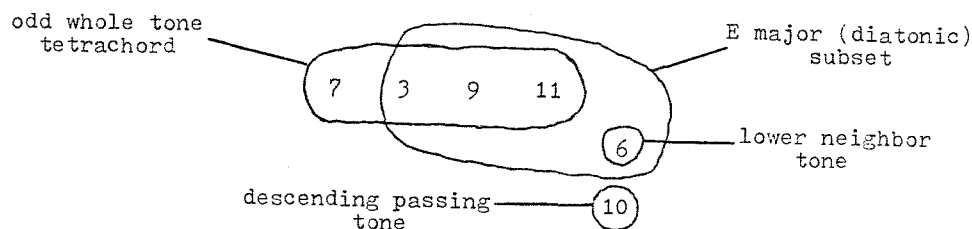
Rhythm:

III:	4	11	8	9	10	11	1	8	5	6	7	8	10	5	2	3	4	5	7	2	11	0	1	2
IV:	4	8	11	4	3	2	1	5	8	1	0	11	10	2	5	10	9	8	7	11	2	7	6	5
V:	4						1						10						7					
	8						11						2						5					
	2						5						8						11					

At 7-1 (the first measure of Example 1) occurs dominant harmony in E major, the outcome of a V/ii to V/V progression in that key. This harmony is realized as a whole-tone tetrachord 11 3 7 9, resulting in V7/+5 harmony with respect to tonal functionality. Diatonic-whole tone interaction in the example is summarized in Figure 2. Here pitch class 7 comprises the definitive whole-tone element, since it is the only

one among the four pitch classes of the chord that is not contained in both E major and odd whole-tone interacting collections. The interaction of constituent collections, moreover, has been further clarified in that, of the remaining pitch classes, pc 6 in partition I is regarded as a lower neighbor adhering to the diatonic E major collection but not to the odd whole-tone collection. Similarly, pc 10 in the measure is interpreted as a descending chromatic passing tone belonging to neither collection. A kinship in this reading can thus be noted with the traditional distinction of non-harmonic from harmonic pitches in tonal music. By virtue of their “non-harmonic” status with respect to one or both of the two interacting collections, pc’s 6 and 10 further serve to define the profile of interaction in the example.

Figure 2. Diatonic-whole tone interaction.



The whole-tone aspect of the measure, however, as with the chromaticism generated in partition II, serves but a transient function at the surface; primary is the overriding functional dominant to tonic connection that governs the musical progress to octatonicism at rehearsal 7.

Tonic resolution at 7 forms the communicative link between successive diatonic and octatonic collections. Diatonic resolution is here elided to partition III, in which a complete octatonic collection is generated through transposition of (0 4 7) “major” triads (beginning with the tonic E major triad) over a descending (0 3 6 9) ic 3 cycle. Partition III is in fact achieved by means of two routes, as depicted by level III, the summary at the bottom of the example. In both routes, however, each major triad is conjoined with an (0 1 2 3) chromatic tetrachord. The resultant octatonic-chromatic interaction actuates

complete collections in both cases, since  $(0\ 4\ 7) * (0\ 3\ 6\ 9)$ , as noted, results in a complete octatonic collection, and since each of the  $(0\ 1\ 2\ 3) * (0\ 3\ 6\ 9)$  paths yields a full chromatic aggregate.

The two routes of partition III intersect exclusively at  $\downarrow$  beats; these points form the basis of partition IV, which summarizes the 4 1 10 7 descending T9 transposition levels of partition III. Partition V, by contrast, arpeggiates as  $6 * (0\ 3\ 6\ 9)$  ascending at  $\downarrow$ , the complementary 2 5 8 11 ic 3 cycle with respect to the complete octatonic collection of partition III. The full collection can thus be viewed as generated by two distinct processes, each corresponding to a specific rhythmic level of the texture (as illustrated by the example's summary): (1) partitions IV and V: the two ic 3 cycles 4 1 10 7 and 2 5 8 11 in contrary motion at the  $\downarrow$  beat, and (2) partition 111: the 4 1 1 8 E major triad (with chromatic interaction) transposed over 4 1 10 7 (descending) at the "surface" rate  $\downarrow$ . Furthermore, since these two levels share the 4 1 10 7 operand, it is possible to describe partition III as an octatonic-chromatic elaboration at  $\downarrow$  of the 4 1 10 7 aspect of partitions IV and V at  $\downarrow$ . To this structuring can be added partition VI, in which vertical octatonic partitioning at  $\downarrow$  is supplemented with pitch class transposition of  $(0\ 2\ 5\ 8)$  "dominant seventh" harmony over  $(0\ 3\ 6\ 9)$ .

Having carefully defined integral collections and their relationships to one another in Example 1, we can summarize the example: A functional progression culminates in dominant harmony at 7-1, which is realized as a whole-tone subset (diatonic-whole tone interaction). Tonic resolution of this harmony precipitates an octatonic collection (diatonic-octatonic communication), and the octatonic collection is realized as complementary ic 3 cycles in contrary motion at  $\downarrow$ , with octatonic-chromatic interaction issuing from the descending cycle at  $\downarrow$ .

By producing an octatonic collection through various generative paths in Example 1, the composer seems to be preoccupied with the complex as an end in itself. Yet the passage as a whole comes clearly into focus only when dynamic relations of the collection to non-octatonic elements (including contrasting collectional orientations) are precisely described. If whole-tone partitioning in the example seems



Example 2. Diatonic-whole tone interaction; diatonic-whole tone communication; whole tone-chromatic interaction; whole tone-diatonic communication.

I. D-scale on F

II. (0 4 8) at (d, d<sup>b</sup>) chain

The musical score consists of four staves. The first staff is labeled 'I. D-scale on F' and contains a sequence of notes with various accidentals and fingerings. The second staff is labeled 'II. (0 4 8) at (d, d<sup>b</sup>) chain' and shows a sequence of notes with a circled '2' and 'dpt' annotation. The third and fourth staves show more complex rhythmic and melodic patterns, with the fourth staff labeled 'IV. (+2, -2) chains at d.' and containing a circled '5' and 'dpt' annotation. The score includes various musical notations such as notes, rests, accidentals, and fingerings, along with some diagrams and annotations in boxes.

Summary (sampling of partitions III and IV at 11):

Rhythm:	
IV:	9 9 9 8 9 10 11 11 11 0 11 10 9
III:	(9) 3 3 11 7 7 3

## Example 2, continued.

V. (0 4 8)\*4 at (d, d) chain

9 5 1 9  
9 9 5 1

12

IV. →

F#: V<sup>+</sup><sub>5</sub> I<sup>6</sup>

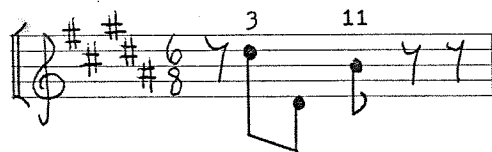
less systematic than octatonic partitioning, Example 2 offers more extensive whole-tone partitioning as well as new methods of communication and interaction among collectional regions.

The example begins with the concluding portion of a series of tonic to submediant progressions spanning rehearsal numbers 9 to 10+2. Two such progressions in A minor (the end of the second launches Example 2) are followed by a third in F minor. In each case, minor tonic harmony is elaborated with non-transpositional partitionings of a Dorian scale centered upon the tonic degree (with a few chromatic passing and neighbor tones, as shown in partition I), and in each case submediant harmony is realized in odd whole-tone form. (A full collection is followed by two tetrachordal subsets. Note that, in each case, the fundamental bass is determined by the low register and thematic character of the bassoon at rehearsal numbers 9 to 10 and the bass clarinet at 10 to 10+2. These melodies are isolated on the bottom staff of Example 2.) Submediant harmony in the example, like the dominant harmony of Example 1, comprises functional diatonic harmony imbued with whole-tone content. At 10+2, however, the

whole-tone aspect of the interaction is exploited: 1 5 7 11 or VI7/-5 harmony acts as communicative pivot between preceding diatonic and subsequent whole-tone collectional domains.

Whole-tone partitioning in Example 2 follows two main paths. The first, partitions II and III, employs the *Scherzo*'s principal motive (Figure 3). The motive's overall, descending "major third" is transposed by ic 4 within partition II, resulting in (0 4 8) patterning at the rhythmic interval chain ( ♩ ♩ ). Partition III, meanwhile, transposes this patterning upward by ic 2; the overall result is (0 4 8) \* 2 or a complete odd whole-tone collection.

Figure 3. Principal motive of *Scherzo*, rehearsal 1+2.



Elided to partition II are string figures based upon the *Scherzo*'s opening accompanimental pattern. In each case, an odd whole-tone degree is elaborated by lower and upper chromatic neighbors in motion to another odd degree. Here, as in Example 1, attention to partitioning of the meter clarifies not only the whole tone-chromatic interaction at hand, but also its relationship to whole-tone partitioning at levels II and III. Each "accompanimental" figure accesses new, odd whole-tone degrees at the strict rhythmic rate ♩ (i.e., twice per measure). After the initial two-measure outburst of whole-tone partitioning in III, the figures stabilize to the inversionally symmetric voice exchange patterns of partition IV. In addition, each odd whole-tone degree of partition IV (as well as the similar "accompanimental" material which precedes it) can be subdivided to repeated (or sustained) occurrence at the rhythmic rate ♩; this material therefore shares its basic rate of odd whole-tone incidence with that of partitions II and III.

The situation is depicted in the example's summary. Each eighth-note beat of the 6/8 measure receives as many as three odd whole-tone pitch classes from partitions IV and III (or II, which supplies pc 9 at the initial downbeat of the summary), while even, chromatic degrees of

the partition are relegated to offbeat, 4/16 and 6/16 positions.

In a manner similar to that of Example 1, Example 2 demonstrates the consistency with which collections in the *Scherzo* can often be delineated. Such consistency is regulated by a corresponding degree of functional differentiation among contrasting formations, often analogous to the “harmonic/non-harmonic” dichotomy in tonal music. A secure context for whole-tone partitioning in the example can thus be established, where pitch classes 0, 8, and 10 are described as “non-harmonic” to the collection—as chromatic upper neighbors, lower neighbors, and ascending/descending passing tones, respectively—by virtue of pitch class membership, voice leading, and metric disposition (as in functional tonality). Example 2, moreover, isolates additional even chromatic degrees, such as pc 6 at 11+1 and pc 2 at 11+3, which receive similar treatment. While pc content at 11 to 12 thus approaches the full chromatic aggregate, partitioning of this content is clarified only through a well-defined interaction among its whole-tone and chromatic components.

At 12-1 a 1 5 9 11 whole-tone tetrachord is merely sustained, receives a functional interpretation (i.e., V7/+5 in F-sharp major), and resolves to a tonic in the following bar. The conclusion of Example 2 is thus forged with whole tone-diatonic communication.

The entire example can be summarized as follows: At rehearsal numbers 9 to 10+2 occur three tonic to submediant progressions, two progressions in A minor followed by a third progression in F minor, with each submediant harmony realized in terms of a whole-tone collection (diatonic-whole tone interaction). At 10+2, the harmony provides a link to extensive whole-tone partitioning (diatonic-whole tone communication) that blends with well-defined chromatic interaction. At the conclusion of the example, whole-tone harmony, reinterpreted as dominant harmony, resolves to a tonic in the following bar (whole tone-diatonic communication).

Examples of interaction among contrasting formations have thus far taken the form of (1) momentary blendings (as in dominant-whole tone complexes) and (2) surface chromaticism grafted onto octatonic (as in Example 1) and whole-tone (as in Example 2) contexts. Let us now concentrate on passages in which contrasting set types are more fully

joined, each contributing to a unique aspect of the overall texture. In such instances, Stravinsky often seizes upon one such aspect in order to guide the music to an impending goal via the technique of communication.

Examples 3 and 4 reproduce music leading to a reprise, at rehearsal number 29, of opening material in B major. In Example 3 the prevailing 0 2 3 5 6 8 9 11 octatonic collection obtains in two principal ways. First, partition III, which transposes  $4 * (0 3 6 9)$  at  $\flat$ , alone produces the complete collection. Partition I, which forms a  $(-3,0)$  interval chain at  $\flat$ , can also be understood in terms of  $(0 4 7) * (0 3 6 9)$  when additional pitches on the first and last eighth-notes of each measure are considered. In either case the partition spans a descending 11 8 5 2 ic 3 cycle at  $\flat$ , which can be combined with the ascending  $6 * (0 3 6 9)$  at  $\flat$  of partition II to again form the full collection.

The second octatonic construct in Example 3 resembles the octatonic network of Example 1; in both cases  $(0 4 7)$  and chromatic surface material is transposed over a descending ic 3 cycle and combined at the rhythmic interval of transposition with a “complementary” ic 3 cycle realized as an ascending  $6 * (0 3 6 9)$  transposition. In both examples, moreover, the descending ic 3 cycle divides the vertical tritone of each ascending  $6 * (0 3 6 9)$  so as to produce descending  $(0 2 6) * (0 3 6 9)$  pitch class sets.

To reiterate,  $(0 2 6)$  harmony transposed over a descending  $(0 3 6 9)$  cycle (at  $\flat$  in Example 1 and at  $\flat$  in Example 3) results from the combination of two “structural” ic 3 cycles, one of which produces octatonic-chromatic interaction at an accelerated rhythmic rate (6:1 in both cases). Moreover,  $(0 2 6)$  comprises the second largest intersection of complete octatonic and whole tone collections, after  $(0 2 6 8)$ . Thus  $(0 2 6)$  subsets of structural verticalities in Examples 1 and 3 can be viewed both as subsets of the prevailing octatonic collection and, due to the odd-number T9 interval of transposition, as alternating odd and even whole-tone subsets. Both examples therefore evince fully integrated octatonic-whole tone interaction, with interference in the vertical whole-tone aspect deriving solely from additional pitches (placed in brackets in the summary of Example 3)

Example 3. Octatonic-whole tone-chromatic interaction; octatonic-whole tone communication.

I. (-3,0) chain  
at  $\dot{d}$  and  
((0 4 7) + (0 1  
2 3 4 5))  
\* (0 3 6 9) at  $\dot{d}$ .

II. 6 \* (0 3 6 9)  
at  $\dot{d}$ .  
( $\dot{d}$ . at  $\boxed{26}+1$ )

III. 4 \* (0 3 6 9)  
at  $\dot{d}$ .  
( $\dot{d}$ . at  $\boxed{26}+1$ )

Summary:

		$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	
Rhythm:		$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	$\dot{d}$ .	
I:	11	8	8	5	5	2	2	11	11	8	4	1	6	3
II:	(9)	0	3	6	9	0	3	6	9	0	3	6		
III:	3	6	9	0	3	6	9	0	3	6	9	0	(plus 10)	
	11	8	5	2	11	8	5	2						

which complete (0 2 5 8) “dominant seventh” harmonies at these points.<sup>10</sup> Example 1, however, never exploits the potential of this structuring; its vertical whole tone aspect remains obscured by the (0 2 5 8) completion of partition VI, which helps tip the balance decisively to octatonicism.

Such is not the case in Example 3. At 26+1, where  $\flat$  is replaced with  $\sharp$  as a new rate of vertical (0 2 6) \* (0 3 6 9) descending unfolding, the process of T9 at  $\sharp$  has been anticipated by partition I. Yet partition I itself is now varied; its normative pitch classes 8 and 5, as well as the additional “interference” pitches of the partition, are replaced by 4 and 1 at  $\sharp$ . This not only keeps to within the even/odd vertical whole-tone alternation at T9, but actually expands it to (0 2 4 8) \* 3 descending at 26+1. While partitions II and III thus contribute to the example’s octatonicism at 26+1, partition I, already a forerunner due to its T9 at  $\flat$  pattern, expands the vertical whole-tone aspect of the example beyond its (0 2 6) point of origin and beyond the octatonicism of the passage. This process continues in the following measure, where an additional, even whole-tone degree, pitch class 10, is freely supplied, resulting in a whole-tone tetrachord 0 2 6 10. The employment of additional pitch classes in Example 3, in contrast to the first example, has thus tipped (0 2 6)-based octatonic-whole tone interaction in favor of vertically oriented whole tone partitioning.

Examples 3 and 4 are linked through the “6-3” variant of partition I in Example 3, which, transposed by ic 4, becomes partition I in Example 4. Juxtaposed with the new partition is a second partition, in which ic 4 is transposed by a half step at  $\flat$ . Together the two partitions establish the primary ingredients of Example 4, and the potentiality of this material occurs at about 28-2. At partition IV the chromatically descending figure of partition I is finally allowed to continue downward. Partition III, as with the (0 2 6) \* 3 motion at

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<sup>10</sup>Elliott Antokoletz has demonstrated similar interaction among octatonic and whole tone components (realized as (0 2 6 8) \* (0 3 6 9); see his article “Interval Cycles in Stravinsky’s Early Ballets,” *Journal of the American Musicological Society* 39 (1986): 580-87.





26+1 in Example 3, here increases the rate of even/odd whole-tone alternation in partition II, to coincide with the ♩ rate of partition IV. As a result, 28-2 contains an alternation of even and odd whole tone trichords at its two ♩ beats. From this point, even and odd whole-tone degrees are added at the rate of one (of each) per measure, culminating in the two full collections as verticalities at each ♩ beat of 28+1. This stacking of whole-tone degrees is accomplished through gradual introduction of ic 4 transpositions to two principal generative paths at this part of the example, partitions IV/V/VI and partitions III/VII (as summarized at the bottom of Example 4). The two paths result in complementary (0 4 8) triads (with respect to complete whole-tone collections) on successive even and odd degrees of each path.

Yet if verticalities in the passage embody pure even and odd whole-tone formations, it must also be noted that from a linear standpoint the generative paths that result in this vertical framework do not. Partitions III and VII, for example, produce a complete chromatic collection at ♩. Moreover, transpositional combination of partition IV by i.c. 4 brings partition V at ♩ to the level of octatonic generation; this collection is contained in the top two lines at the right side of the example's summary. Upon completion of vertical (0 4 8) triads at partition VI (line 3 of the summary), subsets of cardinality 6, deriving from all three octatonic collections, become available by combining any two of the three voices of the partition at ♩. Finally, at the "lower" rhythmic level ♪, partitions I, IV, V, and VI access complete chromaticism.

At 28+2 through 29 the significance of even whole-tone predominance at the downbeat of each measure (i.e., at ♩) becomes explicit. The complete, even whole-tone collection is sustained for two full measures, interpreted as a dominant in B major and resolved to the tonic of that key at the reprise of opening music. The preceding octatonic-whole tone-chromatic interaction thus moves via whole tone-diatonic communication to the diatonically oriented music of the reprise.

Let us now review the musical processes illustrated in Examples 3 and 4. At rehearsal numbers 25 through 26, (0 2 6) harmony is transposed over a descending ic 3 cycle at ♩ and blended with

descending chromatic segments unfolding at ♩ (octatonic-whole tone-chromatic interaction). At 26+1, where the rate of (0 2 6) unfolding is increased to ♪, additional even and odd degrees at ♪ produce pure vertical whole-tone (but non-octatonic) tetrachords to the downbeat of the following measure (octatonic-whole tone communication). In Example 4, partition I, a variant of partition I in Example 3, set in transposition by ic 4 at ♪, is combined with 1 \* 4 motion at ♪ in partition II. At 28-2, the rate of harmonic unfolding again increases from ♪ to ♩, and the vertical whole-tone element is again expanded, here through gradual introduction of ic 4 transpositions into the descending T9 and ascending T1 paths of the example. Example 4 thus culminates in alternating, even and odd whole-tone harmonies at ♩ (with full collections attained from 28+1) in interaction with linear octatonic collections at ♪ (combination of any two of the top three lines at the right side of the example's summary) and with linear chromatic generation at both ♪ (in the bottom three lines of the summary) and ♩ (within the top three lines). At the conclusion of Example 4, a full, even whole-tone collection is sustained and treated as dominant harmony, resolving to a B major tonic at the reprise of opening music (whole tone-diatonic communication).

Octatonic-whole tone-chromatic interaction in Example 4, as with similar interaction in Example 3, presents a well-integrated texture by virtue of the fact that, with the exception of chromatic surface material, collections are fused through multiple functions of pitch classes. Pitch classes serve "multiple duty" with respect to interacting collections. By this distinction, for instance, the large-scale chromatic and octatonic collections of Example 4 are less well-integrated with one another than they are with the vertical whole-tone collections which crosscut them.

The top three lines in the summary of Example 4, moreover, demonstrate how variant octatonic collections might interact via their common ic 3 cycle. Example 5, among other things, displays the interaction of two complete and discernible octatonic collections. Once again, careful attention to the generative unfolding of variant partitionings will shed light upon the interactional process.



Example 5, continued.

VI. (0 2 4 8)  
even whole  
tone tetra-  
chord

V. (0 2 6 8)  
odd whole  
tone tetra-  
chord

IV. (0 2 5 8)  
\*3 at ♮

87 88

B:V-5 I

Summary (entire example):

Rhythm: e.d. o.d. a.d. o. o. o. . . . .

I:	1 3 4	4 6 7	7 9 10	10 0 1	1 3 4					
	6 7	9 10	0 1	3 4	6 7					
II:	1	4	7	10	1	1	2	1	2	2
	4	7	10	1	4	4	4	4	5	4
	7	10	1	4	7	7	7	7	7	6
III:	7	10	1	4	11	11	10	11	10	11, 10
	11	2	5	8	7					
	11	2	5	8	11					

IV V VI

octatonic II

octatonic I

The full texture of Example 5 from rehearsal numbers 85 to 87+2 is generated by repeated ic 3 transposition of three integral sets. Transposition takes place at successively smaller rhythmic intervals, from  $\overset{\cdot}{\circ}\overset{\cdot}{\circ}$  (three measures) to  $\overset{\cdot}{\circ}\overset{\cdot}{\circ}$  (two and one half measures) and  $\overset{\cdot}{\circ}$  (two measures). The first of the sets (partition I), based on a common motive in the *Scherzo*, produces an octatonic pentachord 1 3 4 6 7 (0 1 3 4 6). When transposed over the example's (0 3 6 9) linear operand, the set generates a full octatonic collection 0 1 3 4 6 7 9 10 (see the example's summary), which is divisible into complementary 0 3 6 9 and 1 4 7 10 ic 3 cycles (with respect to the complete octatonic collection). A second principal element of the texture has been isolated in partition II. The basic set here is (0 2 5 8), now in its more familiar guise of "half-diminished seventh" chord. This component, too, is transposed over (0 3 6 9). Now the (0 2 5 8) "half diminished seventh" chord differs from the (0 3 6 9) "fully diminished seventh" in its disruption of the ic 3 cycle that generates the latter chord; a single degree is displaced by a half step, resulting in ic 2 + ic 4 division of the adjacent tritone in place of ic 3 + ic 3. While the 1 4 7 \* (0 3 6 9) portion of partition II thus concurs with the octatonic collection of partition I (a 1 4 7 10 ic 3 cycle is generated), the deviant ic 2/ic 4 degree of partition II, pc 11, generates an 11 2 5 8 ic 3 cycle when transposed over (0 3 6 9). This cycle fails to correspond with the 0 3 6 9 component of partition I, and partition II thus accesses a second octatonic collection, 1 2 4 5 7 8 10 11, with the two collections sharing only constituent 1 4 7 10 ic 3 cycles.

The third partition makes use of the *Scherzo*'s principal motive. Its characteristic descending major third handily summarizes the ic 4 deviance of partition II, and its overall 4 \* (0 3 6 9) pattern again produces the second octatonic collection.

At 87+3 partitions I and III drop out, and the first and second (0 2 5 8) harmonies of partition II, 1 4 7 11 and 2 4 7 10, are rapidly alternated at  $\overset{\cdot}{\circ}$ . Here, as with (0 2 5 8) harmony in Example 3, Stravinsky exploits the 3/4 odd and 3/4 even whole-tone content of each chord, respectively, in octatonic-whole tone communication. At partitions V and VI, a simple sleight-of-hand (i.e., replacement of pitch class 4 with 5 and pitch class 7 with 6, respectively) results in pure

odd/even whole-tone alternation at 88-1. The even whole-tone chord is then reinterpreted as  $V7/+5$  in B major and resolved to a tonic pedal at 88 (whole tone-diatonic communication).

Example 5 can be summarized as follows. The example begins with three basic events: (0 2 5 8) harmony followed by combination of two of the *Scherzo's* principal motives. Transposition of these elements upward over (0 3 6 9) creates two intersecting yet complete and distinctive octatonic collections (octatonic-octatonic interaction). Finally, (0 2 5 8) harmony is isolated and converted to whole-tone harmony (octatonic-whole tone communication), which resolves to a tonic pedal in B major (whole tone-diatonic communication).

The remarkable octatonic-octatonic interaction of Example 5 evinces a much lesser degree of integration than does interaction in the previous two examples. The potential for integration exists (specifically in the ic 3 cycle shared by the two octatonic collections); but instead, two of the *Scherzo's* principal motives are combined, each endowed with diverging referential implications. The coordinated fusion of texture and pitch class which has been observed in more fully integrated interactions does not occur.

The delineation of well-defined collections and the description of their relations in communication and interaction has proven useful in interpreting Stravinsky's early *Scherzo fantastique* (1907-8). Where constituent elements and their relations are readily defined, analysis serves as a logical prelude not only to the study of passages exhibiting lesser degrees of well-definition, but also to a linkage of these systems with structural properties of higher order. Further, the preliminary results offered in this essay confirm a potential for growth in the study of collectional relations, both from the standpoint of the collection itself (i.e., by refining and systematizing techniques for distinction between members and non-members) and with respect to participating collections (i.e., by expanding the notion of collectional relations to include various types of collections and associations).

Yet the reader may well wonder to what extent principles employed in this paper will be of use in analysis of subsequent Stravinsky compositions and in works of other composers, particularly in compositions invoking few or none of the properties of tonal

functionality.<sup>11</sup> Stravinsky himself confessed embarrassment (later proven unfounded) at the prospect of the *Scherzo*'s revival fifty years after its completion.<sup>12</sup> Do these methods thus reflect the isolated tinkering of a student composer, or do they admit potential for wider application?

As a tentative response to this question I offer two brief examples. Example 6 presents an analysis of measures 101-163 of Stravinsky's *Les noces* (1914-1917). The example depicts numerous types of interaction among collections which can be well-defined by means of functional and textural differentiation. For instance, even whole-tone degrees (distinguished from odd degrees by their appearance in open note heads) are, with a single exception, exclusively drawn upon for use within the two-note, whole-step ostinatos that appear in each section of the example (as shown by encircled pitches). Measures 112-116, moreover, contain the interaction of an even whole-tone collection which functions "harmonically" (i.e., realized in chords and in a relatively low register) with odd whole-tone and A-overtone (or raised fourth-lowered seventh degree scale) collections which function "melodically" (i.e., realized linearly and in a relatively high register). While direct communication in the passage is restricted due to its cellular construction, all but the first section of music (and a brief interruption at mm. 117-119) are bound together by a descending linear whole-tone collection (connected by arrows in the example) which is fully realized by ostinato figures. (The final D-E of the descent is

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<sup>11</sup>It should be stated that the traditional role of tonal functionality in no way vitiates its potential for inclusion in a "new branch of theory." Oddly enough, the conclusions reached in Berger's final paragraph have been little noted in subsequent research: "Consequently, even though an attempt was made here to avoid tonal theory as a norm from which to depart, we found ourselves eventually obliged to confront it as a result of certain potentially tonal interpretations which arose out of what I believe to be the essential nature and significance of the music. The validity of these interpretations, their relation to tonal functionality or, conceivably, their relevance to a functionality of a new order—these are problems that ought to be seriously explored, preferably in a concerted effort" ("Problems of Pitch Organization": 42).

<sup>12</sup>Igor Stravinsky and Robert Craft, *Conversations with Igor Stravinsky* (London, 1958), note 1.

Example 6. Stravinsky, *Les noces* (1914-1917), mm. 101-163. Diatonic-whole tone interaction; whole tone-whole tone-overtone interaction; octatonic-whole tone interaction; diatonic-diatonic-whole tone interaction; whole tone-based communication.

mm. 101-111                      mm. 112-116                      mm. 119-127

6/7 C-scale on A                      overtone scale on A                      octatonic collection

"harmonic" even whole tone collection                      "melodic" odd whole tone collection                      "harmonic" even whole tone collection

mm. 128-149                      mm. 150-162                      m. 163

C-scale on G                      C-scale on A

F-scale on G                      D-scale on E

contained within a repetitive (0 2 5)/(0 3 5) motive, and could be described as “quasi-ostinato.”) The stepwise, even whole-tone descent of the passage culminates on a low C3 which supports the huge “Va, va” climax of m. 163.

Example 7 contains the beginning of a familiar passage from Debussy’s *Prélude à l’après-midi d’un faune* (1894). Pentatonic-whole tone communication in the example is accomplished through the 5 3 1 melodic segment common to both collections. At m. 58 the balance tips in favor of the odd whole-tone collection; pc 11 completes the collection and extends the melodic aspect of the passage beyond its pentatonic origin. The odd whole-tone melodic descent continues to pc 9 at m. 59; this, as well as functional dominant to tonic motion (indicated at the bottom of the example), facilitates communication



Example 7. Debussy, *Prélude à l'après-midi d'un faune* (1894), mm. 55-62. Pentatonic-whole tone communication; whole tone-diatonic communication.

1 3 5 7 9:  
5/6 odd whole tone collection

1 3 5 8 10:  
pentatonic collection on D<sup>b</sup>

1 3 5 7 9 11:  
odd whole tone collection

D<sup>b</sup>: I      (I+5)<sup>9/5</sup>      I      F#: V<sup>9/7</sup> +5 -5      i

between a complete odd whole-tone collection and subsequent diatonic material centered around F-sharp.

The samplings of *Les noces* and of Debussy's *Prélude* invite comparison with the examples drawn from the *Scherzo*. In the last two examples, collectional unfolding is by far less strictly bound to meter, and accordingly, reliance upon transposition as a generative agent is less extreme. Collections are thus generated with greater freedom and over relatively longer spans than in Stravinsky's *Scherzo*. In the

selection from *Les noces*, moreover, greater insularity among interactional domains results in a lesser degree of easily discernible communication; and since variant collections interact with greater frequency within these domains, “pure” non-interacting collectional partitionings are less common.

All of these differences point to a more sophisticated, well-formed compositional technique in the final two examples. Yet the tools and methods that enabled analysis of the works are essentially the same. In each case musical progress results from the ongoing “argument” produced by the succession and combination of well-defined groupings of pitch classes. This inherent similarity reveals an underlying consistency in compositional approach—at least in the portions of works discussed here—and holds promise for further investigation of works by Stravinsky and his contemporaries.