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Counterpoint and Polyphony in Recent Instrumental Works of John Adams

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FLORIDA STATE UNIVERSITY

COLLEGE OF MUSIC

COUNTERPOINT AND POLYPHONY IN RECENT
INSTRUMENTAL WORKS OF JOHN ADAMS

By

ALEXANDER SANCHEZ-BEHAR

A Dissertation submitted to the
College of Music
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

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Dedicated to my parents

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ABSTRACT

This dissertation examines counterpoint and polyphony in John Adams's recent instrumental works, ranging from *El Dorado* (1990) to *My Father Knew Charles Ives* (2003). Since the early 1990s, Adams's music has been largely contrapuntal, as opposed to his earlier works, culminating with *Nixon in China* (1985–87), which are characterized by gradually unfolding harmonies in a minimalist and post-minimalist style. In the first chapter of the dissertation, I will define the terms counterpoint and polyphony, and discuss recent research on Adams, minimalism, and counterpoint. The second chapter sheds light on the characteristics of individual melodic lines, including a discussion of melodic intervals, common modifications of single lines, and Adams's incorporation of Nicolas Slonimsky's *Thesaurus of Scales and Melodic Patterns*. The third chapter examines different types of two-voice melodic lines common to Adams's recent instrumental works, consisting of ostinati, reiterating fragments, and canonic procedures. The interaction between concurrent musical lines is approached through the linear similarity measure CDSIM (**C**onsonance/**D**issonance **S**imilarity Index), which yields a numerical value of consonance or dissonance. The fourth chapter extends the discussion of canonic procedures to three or more voices. The fifth chapter investigates polyphonic textures that appear throughout the recent instrumental works. Last, I explore the notion of dovetailing, defined as the minimalist process of overlapping formal sections, which is enabled through a merging of polyphony and gradual additive and subtractive processes.

CHAPTER 1

INTRODUCTION

The purpose of this dissertation is to examine two prevalent and related linear aspects of John Adams's recent instrumental music—counterpoint and polyphony—and their connection to vertical or harmonic events. Such a study contributes to our understanding of Adams's stylistic progression and places his recent works composed after 1992 into a broader context by considering their place in his different compositional stages. His career as a composer may be divided into four periods: (1) 1970–77, confined to Adams's initial experimentation with minimalism, emulating Reichian tape techniques; (2) 1977–87, marked by gradually changing harmonies in a minimalist and post-minimalist style, concluding with the opera *Nixon in China*; (3) 1987–92, a transitional period characterized by Adams's discontent with and reassessment of his compositional style, during which he begins to show a discernable preoccupation for contrapuntal writing in *The Death of Klinghoffer* (1989–91); and (4) 1992–the present, a conscious break from harmonic structures in favor of a contrapuntal style, which comes into fruition with the *Chamber Symphony* (1992), a work modeled after Schoenberg's *Kammersymphonie*, Op. 9.

In this chapter, I review the handful of writings that deal with Adams's music from a theoretical perspective; they focus primarily on the composer's second stylistic period (1977–87).¹ Although several articles concern Adams's works from the 1990s, such as the Violin Concerto (1993) and *Lollapalooza* (1995), his most recent stylistic period remains largely unexplored.² The recent works are important and deserve a place among Adams's well-known canon. The significance of the recent works has also been

¹ The scores prior to 1977 are not readily available.

² John Adams, Rebecca Jemian, and Anne Marie de Zeeuw, "An Interview with John Adams," *Perspectives of New Music* 34/2 (Summer 1996): 88–104; Jonathan W. Bernard, "Minimalism, Postminimalism, and the Resurgence of Tonality in Recent American Music," *American Music* 21/1 (Spring 2003): 112–33; Michael Buchler, "Minimalism, Structure, Salience (and their absence) in John Adams's *Lollapalooza*," presented at the Music Theory Southeast Annual Meeting. Miami: March 5, 2005.

noted by Jonathan Bernard, who states that they are “more settled in their style, and . . . much more artistically successful.”³

Compared to his earlier works, such as *China Gates* (1977), Adams’s recent music is more analytically challenging because it does not follow strict minimalist processes established by early minimal music. For instance, Michael Buchler asserts that in *Lollapalooza* (1995), Adams continues to apply minimalist processes, though with a greater freedom than previously understood.⁴ Part of the challenge of dealing with Adams’s recent works comes from developing necessary tools and methodologies. Music critics may claim that Adams’s recent music and today’s post-minimalism in general defy analysis; this view merely exposes the inadequacy of many of the current analytical tools when applied to recent music. The tools I devise here are meant to be used for Adams’s recent music in particular, but of course they may be adapted to the music of other recent composers.

The process of developing analytical tools for recent contrapuntal music by John Adams began with close analysis of selected works, but rather than organizing the discussion of the tools based on the compositions in which they appear, the presentation in this dissertation resembles a standard instructional counterpoint book, moving from the simplest textures to more complex ones. I begin by describing the characteristics of single melodic lines in Adams’s music. Subsequent chapters extend my discussion to the interaction of two voices, followed by three or more voices, and last, entire musical strata. The content of each chapter, however, differs greatly from traditional counterpoint books since Adams’s music does not adhere to prescribed cadential formulas or common intervallic patterns (e.g., fauxbourdon) that we encounter in modal and tonal music.

Following my review of relevant literature in this chapter, Chapter 2 begins with a discussion of pitch successions in melodic patterns. Adams utilizes all types of simple and compound melodic intervals, frequently favoring stepwise motion in faster works that exhibit what is known as perpetual motion. I also show that Adams commonly

³ Bernard, 117.

⁴ Buchler, “Minimalism, Structure, Salience (and their absence) in John Adams’s *Lollapalooza*,” presented at the Music Theory Southeast Annual Meeting. Miami: March 5, 2005.

resorts to chromatic aggregate completion in melodic lines and walking basses. Next, I discuss the arrangement and the properties of Slonimsky's *Thesaurus of Scales and Melodic Patterns*, an influential source for musical composition that Adams has used since the early 1990s. Slonimsky's title "thesaurus" suggests that a composer can look for musical "synonyms" of a pattern that share the same interval cycle and number of pitches. Most of the patterns in this book are transpositionally symmetrical. Adams borrows these patterns from the *Thesaurus*, sometimes in their entirety (just as Slonimsky presents them in prime and retrograde form), and other times altering them through different types of modifications that are discussed in this chapter. These modifications—such as *add a note/group of notes*—are not limited to patterns from the *Thesaurus*; indeed, they appear extensively throughout Adams's music because they describe the gradual process of music that is common to Adams and other minimalist composers.

In Chapter 3, I discuss various two-voice techniques common to Adams's recent instrumental works. Some of these compositional methods, such as *unison displacements* through polyrhythms, are restricted to the orchestral works, while others, like canonic techniques, are found in Adams's chamber works as well (e.g., *Chamber Symphony* and *Hallelujah Junction*). Next, I discuss three different canonic techniques found in Adams's works: (1) strict canons, (2) free-imitative passages, and (3) what I call *developing imitation*. The third type of imitation is also canonic, though it is radically different from the first two in that it consists of imitative units that are initially presented intact, and eventually altered through various means (e.g., transposition, key-signature transformations) to create a sense of development. Last, I devised a method of classifying degrees of consonance/dissonance between ostinatos, reiterating fragments and other linear patterns, and comparing their level of similarity through CDSIM (Consonance/Dissonance Similarity Index). Through this similarity tool, we can better interpret the arrangement and interaction of recurring patterns.

Chapter 4 extends the discussion of two-voice patterns to three or more voices. First, I elaborate on Slonimsky's harmonization of the melodic patterns from the *Thesaurus*, and examine how they influence Adams's own musical layers that consist of at least three voices. I also examine how Adams maintains a balance between

harmonic structures and their linear presentation. Next, I discuss unison displacement of three voices through the use of polyrhythms. Since the displacement of unisons in three voices is more complex than that of two voices, Adams applies a freer approach, at times including intervals other than the unison. Canonic techniques involving three voices are also encountered in Adams's recent works, though with less frequency than two-voice canons. The last section deals with juxtaposed contrapuntal techniques, including the use of two simultaneous canons, and the juxtaposition of a canon with a pattern featuring unison displacements.

Chapter 5 considers other polyphonic textures and their relation to simultaneous musical lines, such as reiterating fragments, imitative patterns, and the like. I propose a way of looking at the vertical structures of polyphonic textures in order to assist the analyst identify and compare discrete units for comparison. Michael Buchler's similarity index CSATSIM is used to compare these units. This comparison shows that Adams normally favors pitch-collections that are similar in content. These textures are also related in pitch content to simultaneous textures. By studying these two elements at the same time, I show how all textures work together in the musical unfolding process.

In Chapter 6, I consider how Adams employs additive and subtractive processes to connect overlapping formal sections. I will show that formal divisions are brought about through the interaction of various components (textural, orchestral, and polyphonic). As a model, I discuss "Chain to the Rhythm," from *Naive and Sentimental Music*, though this process that I call *dovetailing* is prominent in Adams's recent instrumental works.

Research on Minimalism, Counterpoint, and John Adams

Most of the research on John Adams written prior to 1991 is reviewed in Timothy Johnson's dissertation, "Harmony in the Music of John Adams: From *Phrygian Gates* to *Nixon in China*."⁵ Johnson's bibliography is particularly thorough in documenting studies concerning Adams's earlier works. His reference list includes historical, biographical, and theoretical sources, as well as general writings on minimalism and minimalists. Of

⁵ Timothy Alan Johnson, "Harmony in the Music of John Adams: From *Phrygian Gates* to *Nixon in China*" (Ph.D. diss., State University of New York, Buffalo, 1991), 2–18.

the scholarly works mentioned in Johnson's dissertation, writings by K. Robert Schwarz, Steve Reich, Daniel Warburton, and several others have been especially helpful in establishing a methodology for examining minimalism. In my own review of literature, I will refrain from duplicating Johnson's bibliographical work; nevertheless, these sources form an important foundation for the study of Adams's works.

Writings on Minimalism

There are a number of recent books that provide a good overview of minimalism. Keith Potter's *Four Musical Minimalists: La Monte Young, Terry Riley, Steve Reich, Philip Glass* focuses on the origins and early development of minimal music.⁶ Potter's insightful book highlights the stylistic differences among these composers and shows how their diversity fits within a minimalist aesthetic. This book does not aim to be comprehensive and detailed analyses are included only for works that were written before the 1980s.

In *Minimalists*, K. Robert Schwarz discusses the lives and works of American and European minimal composers La Monte Young, Terry Riley, Steve Reich, Philip Glass, John Adams, Meredith Monk, Michael Nyman, Louis Andriessen, and Arvo Pärt.⁷ Throughout the book, Schwarz highlights the origins of minimalism as a reaction to serialism and indeterminacy. The book gives less emphasis to the European composers, who joined the movement more than a decade after the first traces of minimalism appeared in Young's pieces. Although *Minimalists* is significantly wider in scope than Keith Potter's book, Schwarz offers no analytical readings of composer's works—the focus of this book is, instead, biographical.

In *Repeating Ourselves: American Minimal Music as Cultural Practice*, Robert Fink offers a different historical narrative on the genesis of minimalism.⁸ Rather than

⁶ Keith Potter, *Four Musical Minimalists: La Monte Young, Terry Riley, Steve Reich, Philip Glass* (Cambridge: Cambridge University Press, 2000).

⁷ K. Robert Schwarz, *Minimalists* (London: Phaidon Press, 1996).

⁸ Robert Fink, *Repeating Ourselves: American Minimal Music as Cultural Practice* (Berkeley: University of California Press, 2005). In his book, Fink draws some interesting connections between minimalist and disco music.

portraying minimalism as a reactionary movement against total serialism and chance music, or focusing on the styles and musical forerunners that influenced early minimalist composers, Fink argues persuasively that minimalism reflects a post-World War II American society of consumers, mass-media and production. According to Fink, these postindustrial changes have generated a culture of repetition; in this sense, minimal music is examined not for its economy of means, but for its high degree of repetition. His book provides extensive commentary on and analysis of Steve Reich's music to this aim, but very little space is devoted to John Adams since his works come from the second generation of minimal composers..

Several other authors have examined the transformation that minimalism has undergone throughout the years. According to Brent Heisinger, there are various characteristics that separate minimalism of the 1980s from its earlier manifestations. First, later composers sought to integrate minimalist gestures into vocal and dramatic works (e.g., Adams's *Harmonium*, *Harmonielehre*, and *Nixon in China*). Second, musical teleology or progression replaced mere musical succession.⁹ Finally, Heisinger notes that by the late eighties, minimalism had become "a genuine segment of mainstream contemporary music."¹⁰ Furthermore, the impact and sustaining power of the movement was by then entrenched in American society. John Adams himself has stated that "minimalism is the only really interesting important [stylistic] development in the past thirty years."¹¹ Adams's claim, however self-serving, attests to the minimalist influence in contemporary art music.

Jonathan W. Bernard examines the development of minimalism from its initial establishment to its recent practice in "Minimalism, Postminimalism, and the Resurgence of Tonality in Recent American Music."¹² He describes four basic stages since the birth of minimalism: (1) minimal pieces became more complex, (2) there was a

⁹ Brent Heisinger, "American Minimalism in the 1980s," *American Music* 7/4 (Winter 1989): 444.

¹⁰ *Ibid.*, 431.

¹¹ Mark Swed, "John Adams," *The Musical Times* 130/1761 (Nov. 1989): 664.

¹² Jonathan W. Bernard, "Minimalism, Postminimalism, and the Resurgence of Tonality in Recent American Music," *American Music* 21/1 (Spring 2003): 112–33.

greater concern with sonorities, (3) textures became explicitly harmonic, and (4) harmonies of a quasi-tonal essence came to the fore. This article also helps classify composers' works into three categories: minimal, post-minimal, or neither. Minimal works, depicted by the earlier stages described above, are represented by composers such as Riley, Glass, and Reich. Adams and others of the younger generation of minimal composers joined the movement at different stages from Reich and Glass. Adams's first mature works fall somewhere between stages 3 and 4, while Michael Torke's music largely belongs to stage 4. Today, the term post-minimalist applies to composers who were minimalist at the onset of their career (e.g., Reich, Glass) or developed their compositional styles afterwards, but in direct response to minimalism (e.g., Adams, Torke).¹³ Concerning non-minimal works, they may share certain elements common to minimal pieces such as ostinato and drone elements, but in general, these features provide weak evidence that a composer's style is part of the minimalist aesthetic.¹⁴

Robert Fink offers another account of the different stages since the birth of minimalism. While minimal music composed before 1974 consisted of marginal experimentation with repetitive patterns, the period between 1974 and 1982 showed a peak of pulse-patterned music.¹⁵ After that, minimalist style became more complex and personal, and as noted by K. Robert Schwarz and Fink, more intuitive.¹⁶ According to Fink, whereas minimalists lay "all the cards on the table," post-minimalists "keep at least a few [cards] up their sleeves."¹⁷ Fink's description of minimalism seems broader than

¹³ Ibid., 127.

¹⁴ Ibid., 128. According to Bernard, the music of Mary Jane Leach and Beth Anderson is repetitive but not minimal because their drone elements take after other musical models that make use of ostinato or drone elements, such as non-Western and/or ancient musics, and Henry Cowell's hymn-and-fuguing pieces.

¹⁵ Robert Fink, "(Post-)minimalisms 1970–2000: the Search for a New Mainstream," in *The Cambridge History of Twentieth-Century Music*, ed. Nicholas Cook and Anthony Pople (Cambridge, United Kingdom: Cambridge University Press, 2004), 541.

¹⁶ Ibid., 542; K. Robert Schwarz "Process vs. Intuition in the Recent Works of Steve Reich and John Adams," *American Music* 8/3 (Autumn 1990): 245–73.

¹⁷ Fink, 542.

that of other authors. For him, minimalism even encompasses the neo-romantic movement apparent in the music of composers like John Corigliano.

These writings on minimalism are essential to the study of Adams's works. Having a knowledge on the origins and development of the minimalist movement as a whole helps contextualize Adams's music within a larger framework. From this vantage point, Adams's early works are understood as forming part of a musical aesthetic that reacted against chance music and total serialism, and are also indicative of an contemporary American culture of mass production. In his post-minimal works, musical processes exhibit greater freedom and the musical style is more personal.

Writings on Twentieth-Century Counterpoint

With only a small body of literature on John Adams and his music, this dissertation will draw more generally upon sources relating to counterpoint in other recent composers. Jane Clendinning's work provides one of the most extensive approaches to counterpoint in music since the 1960s.¹⁸ In her dissertation, "Contrapuntal Techniques in the Music of György Ligeti," Clendinning describes the different hierarchies that counterpoint produces in the music of Ligeti. Although most of Ligeti's works are not generally associated with the minimalist movement, Clendinning suggests that counterpoint can create extended structures in recent music. In Ligeti's music in particular, intervals can often signal cadential moments or points of repose. The same could be said of Reich's *Piano Phase* and Adams's *Hallelujah Junction*, to name just two examples from minimalist literature. In both cases, intervallic structure plays a significant role in articulating the form of a piece.

Other writers whose analytical and theoretical work can be applied to counterpoint in Adams's music include Gretchen Horlacher, Henry Martin, John Roeder, and Joseph Straus. Horlacher describes the ways in which pitches and their placement affect meter

¹⁸ Jane Piper Clendinning, "Contrapuntal Techniques in the Music of György Ligeti" (Ph.D. diss., Yale University, 1989); idem, "Structural Factors in the Microcanonic Compositions of György Ligeti," in *Concert Music Rock, and Jazz since 1945*, ed. Elizabeth West Marvin and Richard Hermann (Rochester, New York: University of Rochester Press, 1995), 229–58.

in *Piano Phase* and other works by Reich.¹⁹ Her work suggests that bass notes and metrical placement play an important role in determining meter. In another article, Horlacher relates Straus's notion of pattern completion in Stravinsky's music to the composer's use of ostinati.²⁰ Similar notions of pattern completion are often encountered in Adams's music.

Henry Martin's approach to counterpoint in early twentieth-century compositions seems applicable to later works as well.²¹ Martin examines the music of Bartók, Shostakovich, Copland, and Hindemith from a note-to-note (first species) perspective. Martin shows what a twentieth-century first-species exercise might look like and expands this notion of modern species counterpoint to three parts. His approach demonstrates how twentieth-century composers may have reconciled the horizontal dimensions of consonance and dissonance.

John Roeder's article on beat-class modulation in Reich's music is similarly useful in finding suitable "beat-class tonics" in the music of John Adams—though only in passages where meter is clear.²² Roeder's notion of beat classes relies upon regularly established contrapuntal patterns and, therefore, demonstrates that counterpoint affects how we perceive beginning and end points of a given pattern.

Joseph Straus's 1982 article on voice leading in Stravinsky is also applicable to the music of John Adams.²³ Straus writes on the importance of pattern completion throughout Stravinsky's compositional career. Straus claims that "whether the piece is 'impressionistic' (*Symphonies of Wind Instruments*), 'neo-classical' (*Symphony in C*), 'Russian' (*Les Noces*), or 'proto-serial' (*Agon*), the same principles apply: pervasive use

¹⁹ Gretchen Horlacher, "Multiple Meters and Metrical Processes in the Music of Steve Reich," *Intégral* 14–15 (2000–2001): 265–97.

²⁰ Gretchen Horlacher, "The Rhythms of Reiteration: Formal Development in Stravinsky's Ostinati," *Music Theory Spectrum* 14/2 (Autumn 1992): 171–87.

²¹ Henry Martin, "Seven Steps to Heaven: A Species Approach to Twentieth-Century Analysis and Compositions," *Perspectives of New Music* 38/1 (Winter 2000): 129–68.

²² John Roeder, "Beat-Class Modulation in Steve Reich's Music," *Music Theory Spectrum* 25/2 (Fall 2003): 275–304. A "beat-class tonic" coincides with the perceptual beginning of a measure.

²³ Joseph Straus, "A Principle of Voice Leading in the Music of Stravinsky," *Music Theory Spectrum* 4 (Spring 1982): 106–24.

of a normative pattern and exploitation of the desire for complete statements of that pattern.”²⁴ Horlacher also writes on the notion of pattern completion between two or more ostinati by calculating their lowest common multiple to find their point of convergence.²⁵ Although Adams’s textures are markedly different from Stravinsky’s, he also employs pattern repetition—and even pattern completion—and his repetitive techniques relate to those of other contemporary composers.

Writings by John Adams

Adams’s writings about his music are generally limited to liner notes, interviews, and his official website. Most of Adams’s earlier compositions have been compiled in a set of recordings called the *John Adams Earbox*.²⁶ His liner notes to this collection of compact discs are especially insightful. They include the composer’s thoughts about his own compositions as well as other useful information, such as the person to whom each work was dedicated, by whom it was commissioned, and when and by whom each work was premiered.²⁷ The notes also include pertinent anecdotal information about each work.²⁸ The *Earbox* set only includes works composed prior to 1997; thus, the liner notes to other compact discs are more important when dealing with the newer works. Since the release of the *Earbox* set, Adams has written several monumental works, including his biggest instrumental work to date, *Naïve and Sentimental Music* (1997-98), his only oratorio, *El Niño* (1999-2000), and his recent opera, *Dr. Atomic* (2005).

Interviews with John Adams appear in various formats. National Public Radio has broadcast interviews with Adams throughout his compositional career, with increasing

²⁴ Ibid., 124.

²⁵ Gretchen Horlacher, “The Rhythms of Reiteration: Formal Development in Stravinsky’s Ostinati,” *Music Theory Spectrum* 14/2 (Autumn 1992): 171–87.

²⁶ John Adams, liner notes to *John Adams Earbox*, Nonesuch Compact Disc 79453-2, 1999.

²⁷ Lyrics to selected arias from his operas—*Nixon in China*, *The Death of Klinghoffer*, and the “songplay” *I Was Looking at the Ceiling and Then I Saw the Sky*—also appear in the liner notes. Complete recordings of the operas, however, do not appear in this set.

²⁸ For example, we learn that *Eros Piano* is influenced by Toru Takemitsu’s piece *Riverrun*. Without this testament, we might not be able to draw a connection between these two works.

frequency over the past few years.²⁹ On NPR, Adams has discussed the works *Harmonium*, *Harmonielehre*, *Short Ride in a Fast Machine*, *On the Transmigration of Souls*, *Dr. Atomic*, and his winning of the Pulitzer Prize. Although these interviews are not terribly revealing for the study of counterpoint in Adams's works, they do explain something about compositional process. Several interviews of a similar nature can be found in commercially released videocassettes and DVDs, including *John Adams: Minimalism and Beyond*, and *John Adams: A Portrait and a Concert of American Music*.³⁰

While the oral interviews that feature Adams aid in a general understanding of Adams's works and his compositional process, the remaining printed interviews take on a more formal approach. Rebecca Jemian and Anne Marie de Zeeuw's interview in *Perspectives of New Music*, for example, is more theoretical in nature, dealing with analytical and formal aspects of Adams's Violin Concerto (1993).³¹ In this article, various compositional techniques are explored in depth, including issues such as pulsation, metric modulation, pitch content, and polyphony. Adams's official website is another useful source for his own writings.³² It provides a nearly complete list of works with introductions to each, some of which discuss his changing compositional style. According to Adams, his earlier works emphasize harmony over counterpoint, featuring pulsing chords (e.g., "Negative Love" from *Harmonium*), fixed harmonies ("Shaking and Trembling" from *Shaker Loops*), and other harmonic techniques. Part of the background information for many of the works is duplicated from Adams's *Earbox* liner notes, with the exception of the newer works that were composed after the *Earbox*.

²⁹ These interviews can be found at www.npr.org.

³⁰ See John Adams, *John Adams: Minimalism and Beyond*, produced by Jim Berrow and directed by Barrie Gavin, 52 min, Films for the Humanities & Sciences, 1992, videocassette; John Adams, Bob Coles, Amita Dhiri, et al, *John Adams: A Portrait and a Concert of American Music*, produced by Colin Wilson and directed by Bob Coles, 134 min, Composers of Our Time, 2002, digital videodisc.

³¹ John Adams, Rebecca Jemian, and Anne Marie de Zeeuw, "An Interview with John Adams," *Perspectives of New Music* 34/2 (Summer 1996): 88–104.

³² Adams's official website can be accessed at www.earbox.com.

Literature on John Adams

There are a few authors who deal indirectly with counterpoint in the music of John Adams. In her 1993 dissertation entitled “The Development of Style in the Music of John Adams from 1978 to 1989,” Rebecca Louise Burkhardt analyzes Adams’s earlier works using linear graphs to represent the entrances of each pitch-class and to show prolongations.³³ According to Burkhardt, prolongation, in the context of Adams’s earlier works, consists of pitch-classes that combine to form a triadic harmony, which establishes a key center at the onset of a work. Burkhardt’s harmonic analyses provide a valuable long-reaching view of entire movements. Her graphs, while useful in considering overall form or other broad aspects of the pieces, are only intended to illustrate pitch-class prolongation, but they also reveal contrapuntal relationships that are not always readily apparent to the listener.

Timothy Johnson’s dissertation suggests a model for harmony in the music of John Adams from *Phrygian Gates* (1977) to *Nixon in China* (1987).³⁴ Rather than charting pitch-class entrances like Burkhardt, Johnson maps common pitch-classes held between chords. His model, called the common-tone index (CTI), describes pitch-class relationships that are retained between chords, sonorities, and fields. In Johnson’s work, the term “sonority” includes all sounding pitches, whereas “field” consists of the diatonic collections implied by musical the context. This perspective is beneficial when considering chord successions and longer prolongational spans, which are established in Adams’s earlier works by means of common tones. The CTI, however, is strictly designed for analyzing harmony in Adams’s works.

Other authors whose writings incorporate an analytical approach to the music of John Adams and minimalism include Jonathan W. Bernard and Catherine Ann Pellegrino. Bernard has published several articles pertaining to minimal music, including “Theory, Analysis, and the ‘Problem’ of Minimal Music,” in which he disposes of common misconceptions about minimalism, explains why minimal music has been

³³ Rebecca Louise Burkhardt, “The Development of Style in the Music of John Adams from 1978 to 1989” (Ph.D. diss., The University of Texas at Austin, 1993).

³⁴ Timothy Alan Johnson, “Harmony in the Music of John Adams: From *Phrygian Gates* to *Nixon in China*” (Ph.D. diss., State University of New York, Buffalo, 1991).

deemed as being “beyond analysis,” and offers new modes for analysis.³⁵ According to Bernard, many early descriptions of minimal music are misleading: minimal music is static, non-Western, and meant to hypnotize a listener. The question of what minimal music *is* proves more difficult to answer: “no list of ‘typical characteristics’ can serve as a foolproof test of what is minimal and what is not.”³⁶ Bernard’s analytical approach to minimal music requires less focus on quantitative analysis and demands a metaphorical comparison between music and minimalist art. This approach proves interesting for composers who have been heavily influenced by the plastic arts (e.g., Philip Glass).

In her dissertation entitled “Formalist Analysis in the Context of Postmodern Aesthetics: The Music of John Adams as a Case Study,” Catherine Ann Pellegrino debates how formalist or quantitative analysis can yield fruitful results when applied to minimal music.³⁷ Several features of Adams’s tonal structure are revealed through stratification. By considering the formation of each layer, Pellegrino illustrates Adams’s subtle organizational paradigms, which can be obscured if stratified analysis is not taken into account. Long-range connections of triads and seventh chords and their significance as individual entities may not be evident if only larger pitch collections are considered. Pellegrino also examines ways in which syntax, form, and rhetoric enable the process of closure. According to Pellegrino, closure is distinct from an arbitrary ending through two prerequisites: an anticipated arrival and a comparative state of repose.³⁸ She demonstrates that during these formal boundaries or points of closure, the contrapuntal structures of Adams’s music are essentially different from other sections; this will be a topic for further discussion in Chapter 6.

³⁵ Jonathan W. Bernard, “Theory, Analysis, and the ‘Problem’ of Minimal Music,” in *Concert Music Rock, and Jazz since 1945*, ed. Elizabeth West Marvin and Richard Hermann (Rochester, New York: University of Rochester Press, 1995), 259–84; idem, “Minimalism, Postminimalism, and the Resurgence of Tonality in Recent American Music,” *American Music* 21/1 (Spring 2003): 112–33; idem, “The Minimalist Aesthetic in the Plastic Arts and in Music,” *Perspectives of New Music* 31/1 (Winter 1993): 86–132.

³⁶ Bernard, “Theory, Analysis, and the ‘Problem’ of Minimal Music,” 261.

³⁷ Catherine Ann Pellegrino, “Formalist Analysis in the Context of Postmodern Aesthetics: The Music of John Adams as a Case Study” (Ph.D. diss., Yale University, 1999).

³⁸ Ibid., 146. For more information on this topic, see Catherine Ann Pellegrino, “Aspects of Closure in the Music of John Adams,” *Perspectives of New Music* 40 (Winter 2002): 147–75.

Other writings that pertain to John Adams's works are historical in nature. A unique and recently published book entitled *The John Adams Reader: Essential Writings on an American Composer* offers a wide range of musicological topics ranging from the *Klinghoffer* controversy to the critical reception of Adams's works, including writings about the composer's recent opera, *Doctor Atomic* (2005).³⁹ Additional studies by David B. Beverly, Matthew Nicholas Daines, and David Schwarz have focused on *Nixon in China* and *The Death of Klinghoffer*.⁴⁰

What Constitutes "Counterpoint" and "Polyphony"

The relationship between counterpoint and polyphony has appeared in theoretical discourse ever since the term *contrapunctus* was coined in the early fourteenth century. Throughout history, musicians have written varied and oftentimes conflicting views on their differences. Wolf Frobenius notes that some early scholars have regarded counterpoint and polyphony as synonymous terms a composition with multiple parts.⁴¹ A more pervasive definition today distinguishes between the two, and often describes counterpoint as the craft of writing various simultaneous parts, while polyphony entails the final product.⁴² This view, though commendable in its differentiation between counterpoint as a technique and polyphony as a style or aesthetic, seems unsatisfactory because it classifies all polyphonic and contrapuntal works into one broad category. Another common distinction is dependent on stylistic differences that predate and

³⁹ Thomas May, ed., *The John Adams Reader: Essential Writings on an American Composer* (Pompton Plains: Amadeus Press, 2006). Some critics have argued that Adams's *The Death of Klinghoffer* is anti-Semitic. Due to much heated controversy, the opera is seldom performed in the United States.

⁴⁰ In particular, musicological studies have focuses on *Nixon in China* and *The Death of Klinghoffer*. See David B. Beverly, "John Adams's Opera *The Death of Klinghoffer*" (Ph.D. diss., University of Kentucky/University of Louisville, 2002); Matthew Nicholas Daines, "Telling the Truth about Nixon: Parody, Cultural Representation and Gender Politics in John Adams's Opera *Nixon in China*" (Ph.D. diss., University of California at Davis, 1995); David Schwarz, "Listening Subjects: Semiotics, Psychoanalysis, and the Music of John Adams and Steve Reich," *Perspectives of New Music* 31/2 (Summer 1993): 24–56.

⁴¹ Wolf Frobenius, "Polyphony," in *The New Grove Dictionary of Music and Musicians*, rev. ed., vol. 20, ed. Stanley Sadie (London: Macmillan, 2001): 78.

⁴² Ibid. See also Carl Dahlhaus, "Counterpoint," in *The New Grove Dictionary of Music and Musicians*, rev. ed., vol. 6, ed. Stanley Sadie (London: Macmillan, 2001): 561.

postdate the *seconda prattica*: the music of the Middle Ages is described as polyphonic, while the music of the Baroque Era is more commonly referred to as contrapuntal.⁴³ This description will not suffice for the analysis of recent music, which is neither modal nor tonal in the sense of the older styles but unique to our time.

In the encyclopedia *Die Musik in Geschichte und Gegenwart*, Claude Palisca defines counterpoint as follows:

Counterpoint is the technique of combining simultaneous musical lines. The modern concept of counterpoint implies that parts so combined possess independence of rhythm and melodic direction but are at the same time brought into agreement through some deliberated principles, such as those of harmony. These principles and the proportion of independence and agreement exhibited in examples of counterpoint have varied considerably during the course of the history of polyphonic music. Counterpoint is therefore best explained in terms of the teachings and practices of the various periods of musical history.⁴⁴

This definition applies particularly well to tonal music, where counterpoint and tertian sonorities work together. According to Palisca, polyphony is a more general term, “descriptive of a musical texture in which several parts are sounded together but which may not be the result of any rational method.”⁴⁵ Although the idea of composing without a rational method seems peculiar (for there is some thought process in all composition), Palisca's description clearly distinguishes polyphony as a multi-voiced texture and counterpoint as a compositional process.

The musicologist and music theorist Carl Dahlhaus cites various definitions used by scholars to characterize counterpoint and polyphony. One of these definitions, which has arisen in the twentieth century, is particularly useful. As Dahlhaus states, “theorists have proposed a distinction between polyphony, the combining of equal voices, and counterpoint, a type of writing in which the voices are brought into relief against each other functionally and by virtue of their relative importance.”⁴⁶ A well-known figure who

⁴³ Frobenius, 76. Helmholtz's *Die Lehre von den Tonempfindungen als Grundlage für die Theorie der Musik* provides one of the earliest accounts of this definition.

⁴⁴ Claude Palisca, "Kontrapunkt," in *Die Musik in Geschichte und Gegenwart*, 2d ed., ed. Ludwig Finscher (Kassel: Bärenreiter, 1994). Palisca wrote the unpublished translation to this entry in 1985.

⁴⁵ Ibid.

⁴⁶ Dahlhaus.

concurr with this distinction is Adorno, who states that counterpoint consists of musical parts that are graduated according to rank, while polyphony encompasses numerous parts of equal importance.⁴⁷ Considering Adorno's issue of parity between polyphonic voices, it would seem more accurate to state that each part need only claim a *nearly* equal status to make up the conglomerate. Adorno's definition seems useful for our analytical purposes, though we can venture further to purport that these differences between counterpoint and polyphony are established by their parts, and their categorization is individualized to particular works or passages. Additionally, the individual lines in counterpoint frequently have a more discernable rhythmic character and melodic contour (more rises and falls), while in polyphony, the rhythms and melodic lines remain independent, yet exhibit a greater sense of uniformity.

Robert Gauldin demonstrates that Adorno and Palisca's descriptions need not be conflicting:

The term *polyphonic texture* is often used synonymously with *contrapuntal texture*, but *polyphonic* is a more general term, describing any music that features many voices. In [a] contrapuntal texture, each voice retains its own melodic contour and rhythmic identity, producing a web of interweaving parts. Rather than concentrating on a single line, the listener tends to switch back and forth between those parts of greater melodic or rhythmic interest.⁴⁸

Gauldin's notion of counterpoint as a subset of polyphony concurs with Palisca's definition. And the idea that listeners redirect their attention towards the more notable melodic strands parallels Adorno's view.

The definitions provided thus far are intended primarily to describe music of the common-practice era. For the purpose of this dissertation, which examines recent music, I will consider counterpoint as the formal process of composing with multiple strands within a musical texture, while polyphony entails either textures whose multitude of parts produces a homogenous whole (akin to Adorno and Gauldin's view).⁴⁹ In a way, my adaptations of the terms counterpoint and polyphony do not diverge from those

⁴⁷ Frobenius, 78.

⁴⁸ Robert Gauldin, *Harmonic Practice in Tonal Music*, 2d ed. (New York: W.W. Norton & Company, Inc., 2004) 70.

⁴⁹ Harold Owen provides this as one possible definition of counterpoint. See Harold Owen, *Modal and Tonal Counterpoint: From Josquin to Stravinsky* (New York: Schirmer Books, 1992), 4.

offered by the theorists previously mentioned. Just as in instructional counterpoint books, I examine the interaction of two, three, or more voices that appear by themselves or within a larger texture. To this aim, I include the study of imitation, canons, as well as other methods for linear interaction, such as reiterating fragments and ostinati. However, I do not formalize rules by which we can determine more notable musical strands. In the chapters on polyphony, I examine textures that have little rhythmic activity, and whose individual lines consist of notes with long duration (creating a very slow moving polyphony), usually lasting at least one measure. Furthermore, I examine these textures in context of entire passages, consisting of multiple textures.

CHAPTER 2

SCALES AND MELODIC PATTERNS

Introduction

This chapter will explore the simplest element of contrapuntal and polyphonic textures—single melodic lines. I will first consider various types of melodic lines found in Adams's works, including arpeggiating patterns, walking-basses, as well as lines featuring a quick and steady rhythmic drive (perpetual motion), and I will describe the types of pitch successions and pitch materials common to each type. Aside from these melodic types, Adams frequently employs melodic materials derived from Nicolas Slonimsky's *Thesaurus of Scales and Melodic Patterns*, a book that had an influence on his compositions beginning with the *Chamber Symphony* (1992).⁵⁰ Since Adams has not specified the nature or desire of this influence, little is understood about the way in which he uses these scales to form melodic patterns. Given the recency of his compositions, scholars have not yet traced Adams's patterns back to the *Thesaurus*, which raises a number of basic questions: how extensively does Adams use Slonimsky's *Thesaurus* in his works, and how do the chosen patterns relate to one another and interact within a musical piece? In order to understand the properties of these musical scales and melodic patterns better, and as a precursor to the discussion of Adams's use of them, Slonimsky's *Thesaurus* will be explored in depth.

This chapter will next explore some general observations regarding the pitch elements in Adams's melodic lines. The additive and subtractive processes Adams uses to modify these melodic units helps create a sense of continuity and development. I will expand on additive and subtractive processes and include other general modifications

⁵⁰ John Adams, liner notes to *John Adams Earbox* (Nonesuch Compact Disc 79453-2, 1999), 65. The contents of the *Thesaurus* written by the Russian composer Nicolas Slonimsky will be described shortly.

such as transposition, beat-class transposition, and inversion.⁵¹ Moreover, I will show how Adams uses and combines these modifications within single-line melodic patterns.

Pitch Succession of Melodic Patterns

Adams's own melodic patterns (that is, those not derived from Slonimsky's *Thesaurus*) typically exhibit stepwise motion, common in the beginning, middle, and end of a melodic segment.⁵² Adams often tinkers with these stepwise intervals by inserting accidentals and canceling them soon afterwards, allowing much chromatic interplay. As a result, the entire chromatic aggregate is often used in short spans, particularly in faster works that exhibit a type of *perpetuum mobile* (perpetual motion) that is characteristic of much minimal music.⁵³ The manner in which Adams arranges and alternates these stepwise intervals can create the impression of instability and tonal ambiguity that can only be clarified by other concurrent textures that focus on a particular tone or sonority. The excerpt in Figure 2.1, drawn from the first movement of *My Father Knew Charles Ives* (2003), demonstrates the level of chromatic interplay that is common to Adams's recent instrumental works.⁵⁴ The first sixteen notes in the excerpt constitute the chromatic aggregate. The pattern ascends upwards in an improvisatory style that is not bound by strict transposition or inversion. When Adams draws freely from the chromatic aggregate while creating a strong rhythmic drive with

⁵¹ Dan Warburton provides a good description of various modifications used by minimal composers, including Philip Glass and Steve Reich. See Dan Warburton, "A Working Terminology for Minimal Music," *Intégral 2* (1988): 135–59.

⁵² A segment refers to notes that are grouped together according to various musical criteria. For information on determining the length and content of a musical segment. Christopher Hasty, "Segmentation and Process in Post-Tonal Music," *Music Theory Spectrum 3* (Spring 1981): 54–73.

⁵³ This Latin term is characterized by a steady stream of quick notes that normally occur in a fast movement or work. Adams's well-known fanfare for orchestra entitled *Short Ride in a Fast Machine* (1986) has been cited for its use of *perpetuum mobile* to depict a speeding sports car on a highway. Incidentally, Arvo Pärt composed an orchestral work in 1963 entitled *Perpetuum Mobile*.

⁵⁴ In his official website (www.earbox.com), Adams informs us that his father, Carl Adams, did not know Charles Ives. The piece is inspired by the numerous connections—geographic, personal, professional, and aesthetic—between Ives, Adams, and their fathers. Adams's first movement, entitled "Concord," pays homage to Ives and his *Concord Sonata*, although Adams's Concord depicts the capital of New Hampshire while Ives's title refers to Concord, Massachusetts.

quick and steady sixteenth-notes, intervals tend to be rather small: this excerpt consists of mainly seconds and thirds.



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Figure 2.1: Chromatic Interplay in “Concord” from *My Father Knew Charles Ives*

Even in walking basses, which constitute a melodic-type figuration of a more typical bass motion, Adams also makes use of the chromatic aggregate through a profusion of smaller intervals. In Figure 2.2(a), from the third movement (“Hail Bop”) of the piano concerto entitled *Century Rolls* (1996), the aggregate is completed in eight measures. Here, ascending major seconds and ascending minor thirds predominate with seven major seconds and eight minor thirds. As the title suggests, the walking bass evokes the Bebop era of the 1940s, where bass players often maintained the beat by playing a walking bass.⁵⁵ Figure 2.2(b), from the *Chamber Symphony* (1992), also features chromatic completion, though there is a near-equal distribution of ascending and descending major and minor seconds. In this work, Adams draws on Schoenberg’s *Kammersymphonie*, Op. 9, which was a landmark work for the celebrated emancipation of dissonance.

(a) “Hail Bop” from *Century Rolls*



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Figure 2.2: Melodic Intervals in Walking Bases

⁵⁵ In his official website (www.earbox.com), Adams states he unintentionally misspelled the title of this movement, which stems from the well-known comet Hale-Bopp.

(b) “Aria with Walking Bass” from the *Chamber Symphony*



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Figure 2.2 – continued

Simple intervals typically have different associations from compound ones in Adams’s works. Dissonant simple intervals such as the tritone and major seventh are not avoided; at times, they are more prominent than other intervals. Arpeggiated figures with simple intervals appear extensively throughout the instrumental works. Arpeggios are often heard with increasing dynamics as they ascend in register, creating an effect similar to the Mannheim rocket of the eighteenth century, which is characterized by rising triadic figures with equal-note values and increasing dynamics—see Figure 2.3(a).⁵⁶

Adams uses compound intervals for differing effects: (1) to create dramatic tension, and (2) as chordal arpeggiations.⁵⁷ In lyrical movements such as “The Perilous Shore” from *Gnarly Buttons* and the first movement of *Naive and Sentimental Music*, compound intervals that are generally smaller than a twelfth are used for expressive means, further emphasized by their associated long-note durations. Figure 2.3(b), drawn from the second movement of *El Dorado* (1990), illustrates one example of a chordal arpeggiation that produces compound-intervallic spans against the recurring pitch C#5.⁵⁸

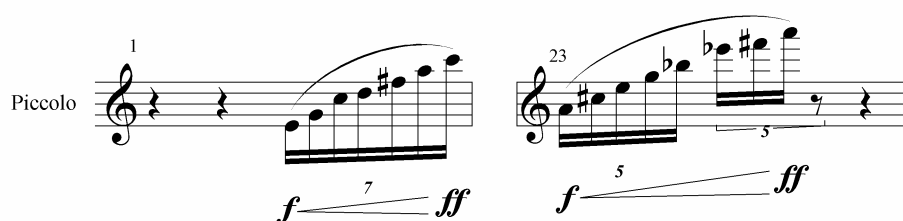
⁵⁶ This effect can be observed in *Slonimsky’s Earbox*, the first movement from *Naive and Sentimental Music*, and other works by the composer.

⁵⁷ These chordal arpeggiations are unlike the ascending arpeggios featuring only simple intervals.

⁵⁸ There are numerous discrepancies between *Grove Music Online* and Adams’s official website (www.earbox.com) concerning the date of completion of many of his works, including *Berceuse élégiaque*, *El Dorado*, *Le livre de Baudelaire*, *The Black Gondola*, *The Death of Klinghoffer*, *Choruses from The Death of Klinghoffer*, and *The Nixon Tapes*. Even more perplexing, several of his music scores show a different year of completion from these two sources. These are likely due to different completion, copyright, and publication dates. Sarah Cahill, accomplished concert pianist, friend of John Adams and

The absence of upward compound intervals is specific to this example only and unimportant when viewed in light of other passages that feature compound intervals within chordal arpeggiation. Unlike in standard tonal practice, Adams's simple and compound dissonant leaps do not always resolve by step; they often leap to another tone by a consonant or dissonant interval in the same or opposing direction.

(a) Ascending Arpeggio in *Slonimsky's Earbox*



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(b) Arpeggiation in *El Dorado*, "Soledades," mm. 114–115



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Figure 2.3: Arpeggiated Patterns

Slonimsky's *Thesaurus of Scales and Melodic Patterns*

Nicolas Slonimsky (1894–1995) seems to have been an important contemporary musical figure in Adams's life. Adams described Slonimsky as a "character of mind-

author of his *Music Grove* entry, confirmed that Adams checked and approved the entry before publication. Given this statement from an e-mail communication with Sarah Cahill, I will use the completion dates that are found on Grove.

boggling abilities” and a “coiner who never tired of minting his own.”⁵⁹ Following Slonimsky’s death in 1995, Adams composed an orchestral work entitled *Slonimsky’s Earbox* (1996), which “memorializes [Slonimsky’s] wit and hyper-energetic activity, but it also acknowledges [Adams’s] great debt to his *Thesaurus*.”⁶⁰

Slonimsky believed that music should be organized by forming scales “in such a way as to cover every kind of combination.”⁶¹ His attempt at such a feat was first published in 1947 as the *Thesaurus of Scales and Melodic Patterns*.⁶² It seems difficult to comprehend that for a time musicians were not interested in Slonimsky’s *Thesaurus*.⁶³ During its short history, this book has been influential to various prominent musicians, including Frank Zappa, John Coltrane, Henry Cowell, and John Adams, among others.⁶⁴ Over the years, the *Thesaurus* gained enormous respect in the jazz community, and many musicians have hailed Slonimsky’s book as *the* jazz bible.

Only a handful of scholars have written technical descriptions about the content of the *Thesaurus*, and those are brief.⁶⁵ Joseph Smith presents a pianist’s perspective to the *Thesaurus*, suggesting possible ways of using patterns from the book as technical exercises.⁶⁶ A pianist can, for instance, play a pattern against its inversion, creating contrary motion in the two hands while maintaining identical fingering. His article seems

⁵⁹ John Adams, liner notes to *John Adams Earbox* (Nonesuch Compact Disc 79453-2, 1999), 65.

⁶⁰ *Ibid.*

⁶¹ Nicolas Slonimsky, “Why I Wrote the *Thesaurus of Scales and Melodic Patterns*,” *Piano Stylist and Jazz Workshop* (January-February 1995): 37.

⁶² Nicolas Slonimsky, *Thesaurus of Scales and Melodic Patterns* (New York: Charles Scribner’s Sons, 1975).

⁶³ *Ibid.*

⁶⁴ Nicolas Slonimsky, “The Age of Absurdity,” in *Nicolas Slonimsky: The First Hundred Years*, ed. Richard Kostelanetz and Joseph Darby (New York: Schirmer Books, 1994), 59–60. This source offers an interesting account of Slonimsky’s meeting with Frank Zappa.

⁶⁵ Aside from writings directly relating to Slonimsky’s *Thesaurus*, several scholars have discussed the properties of musical patterns like those found in Slonimsky’s work. See Stephen C. Brown, “Dual Interval Space in Twentieth-Century Music,” *Music Theory Spectrum* 25/1 (Spring 2003): 35–57, and Edward Gollin, “Multi-Aggregate Cycles and Multi-Aggregate Serial Techniques in the Music of Béla Bartók,” *Music Theory Spectrum* 29/2 (Fall 2007): 143–176.

⁶⁶ Joseph Smith, “Using Slonimsky’s *Thesaurus* (Of Scales & Melodic Patterns),” *Piano Stylist and Jazz Workshop* (January-February 1995): 25, 36.

valuable to performers seeking unconventional exercises that build technique for contemporary pieces, yet, from a theoretical perspective, his approach is misleading. For example, Smith supplies a chart that gives “the formula for constructing mirrors for any Slonimsky passage, or, in fact, for any passage whatsoever.”⁶⁷ His formula shows how the pitches are inverted around the axis of pcs D–A $\flat$, yet Smith neglects to mention that an axis of symmetry can be shifted to *any* pitch level. As all the patterns in Slonimsky’s *Thesaurus* begin with C, Smith selects an initial minor sixth consonance for these two-handed contrary motion patterns.

Jeff Bair’s dissertation traces the influence of John Coltrane’s improvised jazz compositions to Slonimsky’s *Thesaurus*.⁶⁸ According to Bair, Coltrane freely extrapolates and embellishes Slonimsky’s patterns.⁶⁹ Although a connection between Coltrane’s improvisations and Slonimsky’s *Thesaurus* is undeniable, it is difficult to ascertain the degree of influence that Slonimsky’s book had in Coltrane’s music because most of Coltrane’s improvisations do not perfectly match the patterns found in the *Thesaurus*. The extent to which a composer’s alterations obscure Slonimsky’s original patterns is significant: by freely drawing notes from a pattern, a composer utilizes an unordered pitch-class set approach, rather than an ordered series of pitch classes, greatly diminishing the degree of influence.

Stephen Heinemann’s article entitled “Pitch-Class Set Multiplication in Theory and Practice” provides the most detailed and accurate description of Slonimsky’s *Thesaurus*.⁷⁰ Heinemann approaches Slonimsky’s transpositionally symmetrical patterns through pitch-class multiplication. These patterns, which form the main core of Slonimsky’s book, can be conceived through pitch-class multiplication by “transposing the notes of one segment to the pitch levels defined by another

⁶⁷ Ibid., 36.

⁶⁸ Jeff Bair, “Cyclic Patterns in John Coltrane’s Melodic Vocabulary as Influenced by Nicolas Slonimsky’s *Thesaurus of Scales and Melodic Patterns*: An Analysis of Selected Improvisations” (Ph.D. diss., University of North Texas, 2003).

⁶⁹ Ibid., 63.

⁷⁰ Stephen Heinemann, “Pitch-Class Set Multiplication in Theory and Practice,” *Music Theory Spectrum* 20/1 (Spring 1998): 72–96.

segment.”⁷¹ Each one of Slonimsky’s second segments consists of a cyclic set that generates an entire cycle through a recurring interval. Slonimsky’s Pattern 402, shown as Figure 2.4, illustrates a segment that is multiplied by a C3-cycle <0369>.⁷² In Heinemann’s notation for multiplication, the ascending pattern would be represented as 0–5–4 ⊗ <0369> = 0–5–4–3–8–7–6–e–t–9–2–1, where the multiplicand, multiplier, and the product are all ordered segments. The descending pattern forms the retrograde of the original pattern and is notated as 0–1–2 ⊗ <0963> = 0–1–2–9–t–e–6–7–8–3–4–5.



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Figure 2.4: Slonimsky’s Pattern 402 from the *Thesaurus of Scales and Melodic Patterns*

Heinemann also discusses some interesting properties of the patterns found in Slonimsky’s *Thesaurus*. The first and most obvious concerns repeated tones: comparing the respective interval-class vectors of a multiplicand and multiplier reveals the number of repeated tones in the product. The interval-class vectors of the operand sets <054> and <0369> that are illustrated in Figure 2.4 do not have interval classes in common; thus, there are no repeated pitch-classes in their product.⁷³ As the operation yields twelve pitch-classes, the result is a derived twelve-tone series, which is generated by either one of the recurring operands. In Heinemann’s words, “two operand

⁷¹ Joseph Straus, *Introduction to Post-Tonal Theory*, 2d ed. (New Jersey: Prentice Hall, 2000), 199–202.

⁷² When discussing Heinemann’s theory of multiplication, I will be using pitch-class integers in place of letter names. This convention entails substituting pitch classes C–B with integers 0–11. To avoid confusion of integer notation, the shorthand for A# and B will be “t” and “e,” respectively.

⁷³ An operand is a set that undergoes a mathematical operation.

sets A and B with no interval classes in common will produce a set with a cardinality equal to $|A| \times |B|$.⁷⁴ If one interval class is shared between operands, one note will be repeated in the product (with the exception of ic 6, which is transpositionally symmetrical and therefore yields two repeated pcs), resulting in a total of $|A| \times |B| - 1$. This method of predicting set cardinality is severely limited in most other instances.

Heinemann's article describes the *Thesaurus* only to illustrate the principle of simple multiplication, leaving aside many questions about the organization of Slonimsky's book. How are the patterns arranged? Are some patterns omitted? And how do Slonimsky's so-called non-symmetric patterns relate to those described by Heinemann? To gain a better understanding of Slonimsky's book, I will now describe its content and organization more fully. This will, in turn, provide a way of discussing melodic patterns in Adams's music.

In the *Thesaurus*, Slonimsky classifies his patterns according to whether they divide the octave into two, three, four, six, or twelve parts—labeled as tritone, ditone, sesquitone, whole-tone, and semitone progressions, respectively.⁷⁵ The pitches that divide the octave into equal distances are in turn ornamented through the addition of notes below (infrapolation), between (interpolation), and/or above (ultrapolation) these given notes. Figure 2.5 shows how these ornamentations can be used together. This example is categorized as a tritone progression. In Heinemann's notation for multiplication, the ascending form of this pattern is written as $\underline{0-e-2-7} \otimes \langle 06 \rangle$.



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Figure 2.5: Infra-Inter-Ultrapolation from Slonimsky's Pattern 141

⁷⁴ Heinemann, 79.

⁷⁵ Slonimsky's prefix "sesqui" signifies the addition of a semitone to a given interval.

The patterns within each cycle are organized in a systematic manner. For instance, when considering the interpolation of two notes within a C6-cycle, the multiplicands are ordered in the following way: 0–1–2, 0–1–3, 0–1–4, 0–1–5, 0–2–3, 0–2–5, 0–3–4, 0–3–5, 0–4–5. From this arrangement of patterns, we can see that Slonimksy did not consider inversionally or rotationally related sets as equivalent. Given that a pattern “can be transposed to any tonal center according to a composer’s requirements,” 0–1–2 ⊗ <06>, 0–1–5 ⊗ <06>, and 0–4–5 ⊗ <06> are related by rotation.⁷⁶ The remaining C6-cycle patterns belong to the same set class, Forte’s 6–30 [013679], and are related by rotation and inversion: 0–1–3 ⊗ <06>, 0–2–5 ⊗ <06>, and 0–3–4 ⊗ <06> are inversionally related to 0–1–4 ⊗ <06>, 0–2–3 ⊗ <06>, and 0–3–5 ⊗ <06>. Slonimksy offers no explanation for why the linear segment 0–2–4 ⊗ <06>, known as the whole-tone collection, does not appear in this list, though it can be found elsewhere in the *Thesaurus*. From this, it seems evident that Slonimsky tried to avoid the replication of this pattern, as well as other “modes of limited transposition” such as the octatonic collection, which can be included within a C3- and a C6-cycle.⁷⁷

Not all of the patterns in the *Thesaurus* are based on the principle of transpositional symmetry. Some are labeled non-symmetric and feature only inversional symmetry or none at all. Aside from all these patterns, there are also numerous heptatonic and pentatonic scales which are not based or arranged according to a cyclic division of the octave. Since these scales do not feature transpositional symmetry, Slonimsky arranges them differently from the patterns. The grouping of heptatonic scales, for instance, is determined by their number of augmented seconds (zero, one, or two).

Slonimsky’s systematic approach to the organization of his book has often misled musicians to believe that the *Thesaurus* is indeed an exhaustive book of patterns. Jeff Bair inaccurately states:

⁷⁶ Nicolas Slonimsky, *Thesaurus of Scales and Melodic Patterns* (New York: Charles Scribner’s Sons, 1975), vi.

⁷⁷ Olivier Messiaen, *The Technique of My Musical Language*, trans. John Satterfield (Paris: Alphonse Leduc, 1956), 58–63. Messiaen’s “modes of limited transposition” consist of several pitch collections (e.g., whole-tone, octatonic, enneadic/enneatonic) that feature transpositional symmetry.

Nicolas Slonimsky's *Thesaurus of Scales and Melodic Patterns* is an exhaustive work. In addition to the approximately seven hundred cyclic patterns constructed on the intervals that divide one octave equally, there are almost as many cyclic patterns for intervals that divide multiple octaves into equal parts.⁷⁸

During the latter years of his life, Arnold Schoenberg skimmed the *Thesaurus* and made a similar assertion: "I looked through your whole book and was very interested to find that you have in all probability organized every possible succession of tones. This is an admirable feat of mental gymnastics."⁷⁹ John Adams likewise describes the *Thesaurus* as an "exhaustive compendium of scales and melodic patterns."⁸⁰ Slonimsky, on the other hand, never made such a claim. To dispel the misconception, Table 2.1 shows all possible patterns featuring the interpolation of three notes within a C6-cycle. The table reveals that one of the patterns is missing from the *Thesaurus*; this is no singular exception as there are countless excluded patterns throughout the book. As can be seen in this table, Slonimsky's approach to the organization of the book via interval cycles is problematic. Pattern 20, for example, is duplicated as pattern 392, while pattern 393 is only illustrated once. These two patterns comprise two (of three) different forms of the octatonic collection. A more systematic approach for organizing these linear segments could be attained by disregarding interval cycles altogether, and arranging each section according to given cardinalities and types of contour—intraposition, interpolation, and extrapolation. The downside to this approach is that Slonimsky's determinant for establishing similarity between linear patterns would no longer be apparent.

⁷⁸ Bair, 11.

⁷⁹ Schoenberg's quotation can be found on the back cover of Nicolas Slonimsky's *Thesaurus of Scales and Melodic Patterns*.

⁸⁰ Adams, liner notes to *John Adams Earbox*, 65.

Table 2.1: Interpolation of Three Notes in a C6-cycle

Pattern Number	(Multiplicand $\otimes$ Multiplier)	Product
14	<u>0-1-2-3</u> $\otimes$ <06>	<u>0-1-2-3-6-7-8-9-0</u>
15	<u>0-1-2-4</u> $\otimes$ <06>	<u>0-1-2-4-6-7-8-t-0</u>
16	<u>0-1-2-5</u> $\otimes$ <06>	<u>0-1-2-5-6-7-8-e-0</u>
393	<u>0-1-3-4</u> $\otimes$ <06>	<u>0-1-3-4-6-7-9-t-0</u>
17	<u>0-1-3-5</u> $\otimes$ <06>	<u>0-1-3-5-6-7-9-e-0</u>
18	<u>0-1-4-5</u> $\otimes$ <06>	<u>0-1-4-5-6-7-t-e-0</u>
19	<u>0-2-3-4</u> $\otimes$ <06>	<u>0-2-3-4-6-8-9-t-0</u>
20 & 392	<u>0-2-3-5</u> $\otimes$ <06>	<u>0-2-3-5-6-8-9-e-0</u>
21	<u>0-2-4-5</u> $\otimes$ <06>	<u>0-2-4-5-6-8-t-e-0</u>
Missing	<u>0-3-4-5</u> $\otimes$ <06>	<u>0-3-4-5-6-9-t-e-0</u>

Melodic Procedures in Adams's Instrumental Works

Slonimsky's *Thesaurus* has been an influential source of melodic patterns in Adams's recent instrumental works. The simplest way in which Adams utilizes the *Thesaurus* consists of replicating a complete pattern or scale in its entirety. Since all of Slonimsky's patterns prioritize their initial pitch class—metrically and by virtue of being first and last—above all others, Adams frequently opts for incomplete representations of a pattern that avoid placing an unwanted emphasis on the initial pitch or pitch class. In other instances, Adams creates the same kinds of materials as Slonimsky, using ordered sets that are related through transposition or forming new scales, though they do not actually appear in the *Thesaurus*.

Adams frequently modifies the patterns and scales found in Slonimsky's *Thesaurus* as well as his own patterns by using additive and subtractive processes. Block additive and subtractive processes, which involve the gradual accumulation or reduction of notes, are characteristic to Adams's music.⁸¹ Adams applies these and other processes not only to patterns from or similar to Slonimsky's *Thesaurus*, but also to reiterating

⁸¹ Dan Warburton describes some of these processes in "A Working Terminology for Minimal Music," *Intégral 2* (1998): 146–59. Warburton's definition of block additive/subtractive processes requires a predetermined and unchanging time frame. To adapt this notion into a more general definition that applies to Adams and other post-minimalists, a sense of pulse must be felt, though it can be altered.

fragments and ostinatos. As Gretchen Horlacher notes, reiterating fragments differ from ostinatos in two ways: (1) they are separated by rests, and (2) they can be modified.⁸²

Figure 2.6 lists techniques that Adams uses to alter patterns, scales, and repeated motives such as reiterating fragments and ostinatos. The catalog of variation techniques contains many commonly used modifications, but it is by no means an exhaustive list. These short excerpts, drawn from Adams's "Chain to the Rhythm" movement from *Naive and Sentimental Music*, are representative of the types of alterations found in Adams's recent instrumental works.

This illustration elaborates on Warburton's notion of block additive and subtractive processes, and also includes other modifications such as inversion, beat- and pitch-class transposition. From the first two modification categories, *add a note/chord or group of notes*, and *remove a note/chord or group of notes*, comprise Warburton's block additive and subtractive processes. To maintain a gradual additive process, the number of notes that Adams adds to a pattern is almost always less than four. Notes can also be inserted within a musical pattern, as in *internal expansion*. Likewise, note removal may occur either at boundary points or within a given pattern.

The third modification, which changes a note or group of notes, is called *free variation*. The musical excerpt provided in this category resembles transposition, but closer inspection shows that the two patterns share the same ascending contour but form different set classes. Also, the first pattern spans seven semitones, while the second pattern spans eleven semitones. The excerpt shows only one scenario for free variation, but this category clearly encompasses myriad possibilities.

Transposition and *inversion* (modifications 4 and 5) are sometimes tonal, thereby maintaining a particular mode, and at other times real, thereby keeping the same set class. *Beat transposition*, shown as modification 6, conveys the repetition of a musical pattern at a specific time interval, which is expressed as bT_n .⁸³ Naturally, reiterating fragments are separated by rests, and their displacement contributes to the unfolding

⁸² Gretchen Horlacher, "The Rhythms of Reiteration: Formal Development in Stravinsky's Ostinati," *Music Theory Spectrum* 14/2 (Autumn 1992): 180.

⁸³ I have adopted Michael Buchler's shorthand of beat-class transposition as bT_n . John Roeder expresses the same concept as t_n —time transposition by n beats.

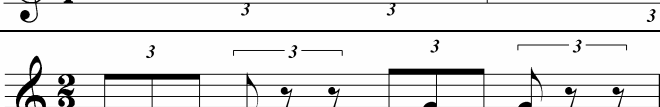
Modifications	Measures	Instruments	Examples (In written pitch)
1a. Add a note	167–169	Piccolo	
1b. Add a group of notes	202–203	Cello 1	
1c. Internal Expansion	49–50	Contrabassoon	
2a. Remove a note	194	Bass Clarinet 1 in B $\flat$	
2b. Remove a group of notes	76–77	Bassoon 1	
3. Free Variation	392–393	Violin 1	
4. Transpose a group of notes	213	Cello 1	
5. Invert a group of notes	232–233	Bass 1	
6. Beat and beat-class transposition	146–150	Vibraphone	

Figure 2.6: Representative Pattern Modifications from *Naive and Sentimental Music*

of additive/subtractive processes. Warburton describes this as “rhythmic displacement,” more commonly known as beat and beat-class transposition.⁸⁴ In mm. 146–150 (shown in Figure 2.6), the vibraphone plays a pattern three times. If the beat divisions are interpreted to be the length of an eighth-note, the second statement is offset from the first by seven eighth-notes or bT_7 , and the third group of notes is related to the second group by bT_6 . These distances can also be conveyed with *beat-classes* in *mod*5 space to reflect the 5/8 meter, whereby bT_7 becomes bcT_2 , and bT_6 becomes bcT_1 . Richard Cohn and John Roeder have developed beat-class models to analyze Steve Reich’s music, and these can likewise be helpful in examining the music of John Adams.⁸⁵

Adams deploys the complete octatonic collection and diatonic modes more frequently than any other patterns or scales found in the *Thesaurus*. While Adams identifies his *Chamber Symphony* (1992) as the first work influenced by the *Thesaurus*, an apparent use of the octatonic collection can be found in an earlier orchestral work entitled *El Dorado*. Since there is a wide body of literature on the properties of the octatonic and diatonic collections, I will focus my attention on the other patterns encountered in his instrumental works.

Adams’s quotations of complete patterns from Slonimsky’s *Thesaurus* appear sparingly throughout the recent instrumental works. When present, these complete representations assume a primordial dominance over an extended passage of music. Unlike Slonimsky, Adams does not establish a palette of similar patterns that can be intertwined. During and after the completion of one of Slonimsky’s patterns, Adams refrains from including other patterns, except for an occasional subset of the original, which may or may not be included within the *Thesaurus*. As an example, Figure 2.7, drawn from the third movement of Adams’s piano concerto entitled *Century Rolls*, includes Slonimsky’s complete Pattern 425 in prime and retrograde form—there are no other patterns from Slonimsky surrounding this passage. Slonimsky classifies this pattern as having an extrapolation of three notes within a “Sesquitone Progression” or

⁸⁴ Warburton, 148–52.

⁸⁵ Richard Cohn, “Transpositional Combination of Beat-Class Sets in Steve Reich’s Phase-Shifting Music,” *Perspectives of New Music* 30/2 (Summer 1992): 146–77; John Roeder, “Beat-Class Modulation in Steve Reich’s Music,” *Music Theory Spectrum* 25/2 (Fall 2003): 275–304.

C3-cycle <0369>. Slonimsky begins all of his patterns on pc 0, but here Adams transposes this pattern to T_6 to accommodate the surrounding musical space. In Heinemann's notation, Slonimsky's pattern can be stated as: ascending $0-4-t-6 \otimes \langle 0369 \rangle = 0-4-t-6-3-7-1-9-6-t-4-0-9-1-7-3$, and its retrograde $0-3-7-1 \otimes \langle 0963 \rangle = 0-3-7-1-9-0-4-t-6-9-1-7-3-6-t-4$. Here, the tetrachord 4–25 [0268], which can be realized as the familiar $Mm7\flat 5$ or as a French augmented sixth chord, is transposed around the cycle. Together, they form an octatonic collection. As I have stated before, Adams uses the octatonic collection more frequently than other patterns; thus, his choice of this particular pattern seems deliberate. Aside from Adams's own transposition and the rhythmic swing effect, his excerpt is identical to Slonimsky's pattern.



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Figure 2.7: Slonimsky's Pattern 425 in Adams's "Hail Bop" from *Century Rolls*

Complete replications of Slonimsky's patterns frequently undergo a series of modifications such as those found in Figure 2.6. A straightforward illustration of such a process can be seen in the opening measures of Adams's Violin Concerto, first movement (1993). Figure 2.8 reproduces the upper orchestral line, taken from the piano reduction score. In the incipit, Adams features Slonimsky's Pattern 10, transposed to

4

7

10

Retrograde:

note interchange

note interchange

note interchange

Bb

C

D#

E

F#

Bb

D#-E

C

C#

A

E

C

A-F#

C

F#-E

<+2 +3 +1 +2 +3 +1>

Figure 2.8: Slonimsky's Influence in Adams's Violin Concerto, first movement

Adams's approach to creating new patterns varies between works; nevertheless, it is clear that at times he deliberately employs or emulates Slonimsky's patterns. By way of illustration, Figures 2.9(a) and 2.9(b) show a reworking of the excerpts given in Figures 2.7 ("Hail Bop") and 2.8 (Violin Concerto), respectively. In both of these works, Adams's original patterns appear only *after* Slonimsky's original ones have been presented. The new patterns are indebted to the original pattern and can be interpreted as variations. In Figure 2.9(a), the recurring tetrachord from Pattern 425, a member of 4–25 [0268], is no longer present, yet Adams's new patterns resemble Slonimsky's in their contour; moreover, both the prime and retrograde forms appear in the score.⁸⁶ Adams's variations alternate between two pitch-class collections (with the exception of the [026] trichord in m. 134, which is nevertheless a subset of the [0258]-type tetrachord heard in the following measure). Each variation utilizes two pitch-class collections: variation 1 contains [0258] or its subset [026], as well as [0146]; variation 2 includes [0147] and [0135]; variation 3 employs [036] and [0156]. Adams's newly composed patterns form three different hexachordal collections: 6–21 [023468] in mm. 134–35, 6–Z40 [012358] in mm. 144–47, and 6–Z28 [013569] in mm. 152–55. In Figure 2.9(b), Adams reworks Pattern 10 from the opening of the first movement by transposing that pattern at T_2 . The ordered pitch intervals in parentheses, which are omitted in the score, help to show how Adams forms the new pattern. A reductive analysis of Adams's melodic unit shows that the middle portion of the pattern is enclosed within its initial transposition. This technique can be traced back to at least as far as *El Dorado* (1990).

Throughout his instrumental works, Adams also creates melodic materials that resemble those found in the *Thesaurus*, but do not seem to have directly descended from one of Slonimsky's patterns. It seems plausible that such patterns and scales were influenced by the *Thesaurus*. As an example of one of these new scales, the R.H. piano pattern in m. 44 from Adams's work entitled *Slonimsky's Earbox* begins with the ordered semitone pitch intervals $\langle +1+2+2+4+2+1 \rangle$. There is no pattern quite like it in the *Thesaurus*, even allowing for rotational equivalence, but one could interpret this pattern as a heptatonic subset of Slonimsky's Pattern 1038 $\langle +1+2+2+2+2+2+1 \rangle$. Though this

⁸⁶ The presence of set-class 4–25 in Pattern 425 is coincidental. Slonimsky's first publication of the *Thesaurus* in 1947 predates Forte's list of set classes, published in *The Structure of Atonal Music* (1973).

does not seem like too much of an interpretive leap, it is at times far more difficult to find Slonimskian antecedents for Adams's lopsided patterns, even those that appear in the piece Adams named after Nicolas Slonimsky.

(a) Slonimsky's Pattern 425 Reworked in "Hail Bop" from *Century Rolls*



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Adams's Variation 1

134

Woodwinds

[026] [0146] [0258] [0146]

6-21 [023468]

Variation 2

144

Piano

[0147] [0135] [0147] [0135] retrograde

6-Z40 [012358]

Variation 3

152

Piano

[036] [0156] [036] [0156] retrograde

6-Z28 [013569]

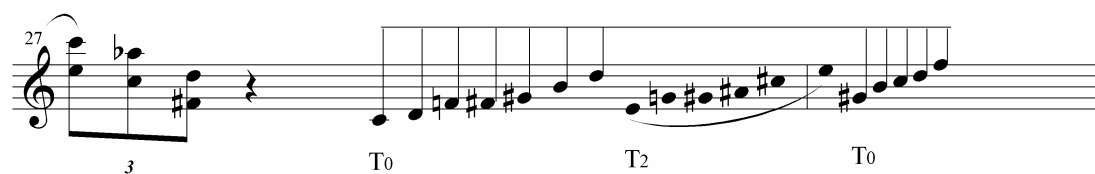
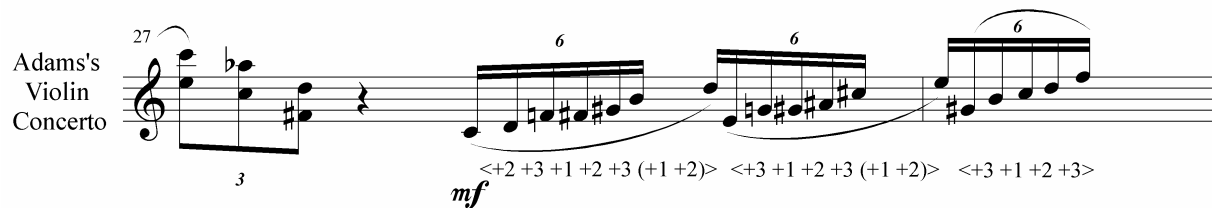
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Figure 2.9: Adams's Reworked Patterns

(b) Pattern 10 Reworked in Violin Concerto



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Figure 2.9 – continued

CHAPTER 3

TWO-VOICE PATTERNS

Introduction

Adams's linear approach to his recent instrumental compositions can be understood by focusing on the contrapuntal relationship of two voices, either in isolation or within a larger texture. As I will illustrate in this chapter, Adams's works since the Chamber Symphony (1992) often employ polyrhythms in simultaneous musical lines, with a slower rhythm that is a partially ordered subset of a larger one. This technique has the markings of a mensuration canon, but on a very small scale. I will shortly illustrate that Adams removes one or more notes from the slower rhythm every beat and vertically realigns the patterns every downbeat at the unison/octave. I will discuss different polyrhythms that Adams's procedure generates, as well as other issues that arise from his technique, such as how Adams chooses which note(s) to omit from the slower patterns in order to create this interesting effect. When Adams employs polyrhythms to displace unisons or octaves, the effect blurs each attack point, thereby creating a subtle reverb. Unison displacements do not always maintain the same contour; the *comes* or following voice frequently moves to a different register, creating more independence between the lines through contrary motion.

One of the most important aspects of two-voice patterns pertains to consonant and dissonant intervals. Through the aid of an analytical tool I call the *consonance/dissonance similarity index*, or CDSIM, I will compare the distribution of consonant and dissonant harmonic intervals between two-voice patterns, including simultaneous ostinati and reiterating fragments, which are commonly encountered in Adams's works, as well as some compositions by other minimalist and post-minimalist composers. The CDSIM function will provide a springboard for addressing issues of prominence, structure, and organization of two-voice patterns.

In many of Adams's two-voice patterns, strict and free canonic procedures play a crucial role. Adams weaves contrapuntal patterns throughout a variety of instrumental

ensembles, including his orchestral compositions *My Father Knew Charles Ives* (2003) and *Naive and Sentimental Music* (1997–98), the piano concerto *Century Rolls* (1996), a work for two pianos entitled *Hallelujah Junction* (1996), and the *Chamber Symphony* (1992). I will show how Adams uses a strict canonic procedure, defined by having exact imitation throughout a musical passage, primarily as a supporting structure to more prominent textures.⁸⁷ Adams also employs freer canonic textures where imitation at times deviates in pitch and/or rhythm. A third type of canonic method which I call *developing imitation* will also be discussed in this chapter. Developing imitation involves repeating a single melodic unit in its entirety, first in strict form, and gradually altering that unit over time. The following study of Adams's canonic passages will demonstrate his individual approach and highlight intervallic relationships and voice-leading procedures.

Polyrhythms and Unison Displacement

Many of Adams's polyrhythmic patterns from his recent instrumental works can be attributed to a technique I call unison (or octave) displacement.⁸⁸ Unison displacements can be defined as two or more representations of a single pattern that are rhythmically altered through the use of polyrhythms, whereby the slower rhythm contains a partially ordered subset of the faster one. The most common polyrhythm Adams uses juxtaposes triple and quadruple subdivisions of a beat.⁸⁹ Like some earlier composers, Adams views this rhythmic relationship as rather natural and even "consonant."⁹⁰ The composer speaks about this subject in an interview:

⁸⁷ Harold Owen defines a canon as having strict imitation that is sustained throughout a work or a section of a work. See Harold Owen, *Modal and Tonal Counterpoint: From Josquin to Stravinsky* (New York: Schirmer Books, 1992), 364. Looking back to the sixteenth century, Robert Gauldin notes that canons were not fully "strict" in the sense that *musica ficta* was sometimes used for cadential formulas or to correct the tritone. Robert Gauldin, *A Practical Approach to Sixteenth-Century Counterpoint* (Prospect Heights: Waveland Press, 1995), 53.

⁸⁸ I have found this technique in *My Father Knew Charles Ives* (2003), *Naive and Sentimental Music* (1997–98), *Century Rolls* (1996), *Slonimsky's Earbox* (1996), and the *Chamber Symphony* (1992). Unison displacements do not appear in solo instrumental works.

⁸⁹ Adams notates the three-against-four polyrhythms in simple meter.

In the creation of temporal relationships there seems to be a point beyond which musical time itself begins to sound dissonant. This is a funny way of describing things, but I feel that there's a natural way of dividing time and then there's a dissonant way of dividing time. I don't know where that dissonance begins. Two against three obviously does not feel dissonant to me; it has a wonderful texture to it, as does three against four. Three against five begins to push the envelope. I guess that, when you get beyond that, we get to an area of cognition—we get into Fred Lerdahl's area—and perhaps it's a question of whether something is learned or not. It may be that one can learn these things and get to a point where they feel absolutely natural.⁹¹

Other polyrhythms used by Adams include 2:3, 4:5, 5:6, 5:7, and 5:8. Some of these combinations may seem more temporally dissonant than others, yet Adams's procedure for displacing segments is dictated by other factors that I will examine shortly.

Adams composes a wide variety of melodic lines for displaced unisons. Although quick ascending patterns are most often encountered, virtually any musical line is susceptible to this kind of treatment: ascending arpeggios, broken chords, scalar patterns, and other types. The musical patterns from Slonimsky's *Thesaurus*, which I discussed in Chapter 2 (most of which are transpositionally symmetrical), are not used to displace these polyrhythms. Instead, Adams uses motives that feature a variety of set classes.

There are two types of polyrhythmic passages that exhibit displaced unison patterns. In the first type, pitch contour is maintained throughout. The result is a subtle displacement of unisons/octaves where attack points merge into a single sound and create a sort of reverb effect. A quick tempo is vital to the sense of reverb; without it, polyrhythms are perceived as separate units rather than a single wash of sound. In the second type, some (but not all) pitch contours are retained. Counterpoint and a greater

⁹⁰ Many *Charakterstück* (character-pieces) and other piano works from the Romantic Period treat this and other simple polyrhythms (e.g., three-against-two) as a very natural blend between melody and accompaniment. I am reminded of Chopin's posthumous *Etude* No. 1 in F minor, from *Trois Nouvelles Etudes*, a technical exercise specifically composed to develop a pianist's sense of the three-against-four polyrhythm, yet in the hands of Chopin, *Etudes* are also works of art. As has been documented, Adams himself finds appeal in the music of the nineteenth century. See John Adams, *John Adams: Minimalism and Beyond*, produced by Jim Berrow and directed by Barrie Gavin, 52 min, films for the Humanities & Sciences, 1992, Videocassette. The subject of polyrhythms and their effect on meter has been discussed by Harald Krebs and others. See, for example, Harald Krebs, "Some extensions of the Concepts of Metrical Consonance and Dissonance," *Journal of Music Theory* 31/1 (Spring 1987): 99–120.

⁹¹ John Adams, Rebecca Jemian, and Anne Marie de Zeeuw, "An Interview with John Adams," *Perspectives of New Music* 34/2 (Summer 1996): 96. I have not encountered any passages in Adams's music that use a 3:5 polyrhythm.

rhythmic activity can be sensed; therefore, displacements are heard as two separate but closely related entities.

Adams's orchestral piece *Slonimsky's Earbox* (1996) utilizes displaced unisons to a significantly greater extent than do other works, and is the only work whose opening measures begin with unison displacements. Figure 3.1(a), extracted from the opening measures of *Slonimsky's Earbox*, presents two melodic lines that create a 3:4 polyrhythm in a lively *con brio* tempo of 136 quarter notes per minute. The polyrhythms coexist for a longer span than shown here, but for the purpose of illustrating Adams's approach, this short incipit will suffice. As is customary in orchestral scores, Adams makes use of what Samuel Adler, Alfred Blatter, and others have described as "dovetailing," which is a way of dividing a musical lines between two or more instruments to help "create the effect of a continuous line."⁹² For the ease of reading, I have reconstructed the polyrhythms as two continuous lines, and I have rewritten the first note of each segment at the unison, though in the score they appear at the unison and/or octave. Pitch contour and note spelling, however, remain unchanged.⁹³

Figure 3.1(a) demonstrates a passage of unison displacements where only some contour is retained. The third iteration (mm. 5–6) creates a slight reverb effect because it maintains the same contour between the two lines, while the other segments sometimes differ in pitch contour, producing a contrapuntal effect. Another factor that enhances the distinctiveness of the lines concerns the harmonic seconds at the end of mm. 1 and 8 (minor second, followed by a major second), which temporarily breaks the regularity of unisons. In order to create each set of three triplets, Adams removes a note from each set of four sixteenths.⁹⁴ Downbeats always share the same pitch, while

⁹² Alfred Blatter, *Instrumentation/Orchestration* (New York: Schirmer Books, 1980), 89 and Samuel Adler, *The Study of Orchestration* (New York: W.W. Norton & Co., 1989). Orchestration dovetailing is not the same as structural dovetailing, which I discuss in the section on polyphony.

⁹³ I preserve Adams's note spelling throughout my dissertation, even when there is a diminished second/ninth in lieu of a perfect unison/octave.

⁹⁴ It is difficult to determine Adams's compositional process: does the composer remove a sixteenth note to derive each triplet figure or does he insert a triplet to create sixteenth-note groups? If we examine the orchestral score, we will note that the triplet figures in m. 3 are scattered through the use of dovetailing, while the sixteenth notes are played in their entirety by the bass clarinet. It seems probable that the sixteenth notes might have been conceived first.

interior notes (notes within each group) tend to produce unisons or octaves that are slightly displaced as a result of the dual rhythms.

(a) 3:4 Polyrhythm in *Slonimsky's Earbox*

omitted 16th note: 3rd 3rd 3rd? 3rd? 3rd 3rd 3rd 2nd 3rd 3rd

omitted 16th note: 3rd 3rd 2nd 3rd 3rd 3rd 3rd

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(b) Subdivision of 3:4 Polyrhythm

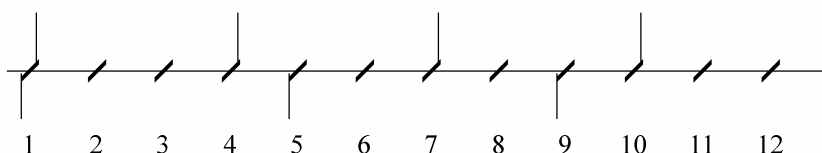


Figure 3.1: Unison Displacement in *Slonimsky's Earbox*

Since three of four notes from a set of sixteenth notes create each set of triplets, one note must be removed at every beat. When using a 3:4 polyrhythm (and in most other cases), downbeat unisons are vertically aligned. This means that the first sixteenth note will always be present in the triplet figures. With the exception of the circled notes C and A $\flat$ 5, which occur in the second and third iterations, Adams consistently omits the third sixteenth-note from each group—this high level of consistency is another unique feature

of this excerpt. The temporal proximity that coexists between notes in a 3:4 polyrhythm may be a factor in omitting a note every beat. Figure 3.1(b) shows a subdivision of 3:4, which is realized by finding the lowest common multiple between three and four (twelve). The third sixteenth note stands apart from its triplet neighbors at a greater distance than other notes. Thus, in this example, Adams chooses notes that are closest in temporal proximity.

Temporal proximity does not always determine which note(s) will be omitted from a slower rhythm. In measures where contour is maintained between patterns, the choice for note removal tends to be irregular, whereas measures that alter contour exhibit greater consistency of note removal. Figure 3.2(a), drawn from the first movement of the piano concerto *Century Rolls* (1996), shows another passage using 3:4 displacements.⁹⁵ Figure 3.2(b) summarizes the notes that are omitted from each set of eighths to derive the quarter-note triplets. Each number represents the *n*th note of each beat in the faster rhythm that is omitted to form the pitch material from the slower part. I use the letter C (for contour) when contour is preserved between musical lines and VC (for varied contour) when contour varies. Because of the rests, some omissions cannot be determined; they are indicated by a half-note rest. In measures 312–13, the contour between the musical lines is varied, and yet the notion of temporal proximity—removing the third note from the faster rhythm in 3:4—does not factor in the choice for note omission. Nevertheless, the notes omitted from the piano (4 / 4 / - / 2 / 2) create a sense of balance by lying rhythmically next to the least proximal rhythmic placement in the 3:4 polyrhythm. The rest at the end of m. 312 behaves much like a "dead interval," whereby a momentary silence initiates a new beginning.⁹⁶ This excerpt shows less long-range consistency in note omission than seen in Figure 3.1.

⁹⁵ I have notated the violin part using the *ottava* marking for the sake of clarity, even though violinists are accustomed to reading ledger lines in their highest register.

⁹⁶ A dead interval interrupts the flow of a musical line with a momentary rest. Robert Gauldin's *A Practical Approach to Sixteenth-Century Counterpoint*, (Prospect Heights: Waveland Press, 1995), 17.

(a) 3:4 Polyrhythm in *Century Rolls*

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(b) Omitted Notes in *Century Rolls*, first movement, mm. 310–318

Measures	310	311	312	313	314	315	316	317	318
Omitted Notes	— / 3 / 4 / 3 & 4	3 / 2 & 4 / 3 / 1 & 4	3 / 4 / 4 / —	2 / 2 / 2	3 / 2 / 2	3 & 4 / 2 / 3	3 / 2 / 3	— / 3 / —	3 / 2 / —
Contour C/V/C	— / C / C / C	C / C / C / C	C / V / C / —	V / C / C	C / C / C	C / C / C	C / C / C	— / C / —	C / C / —

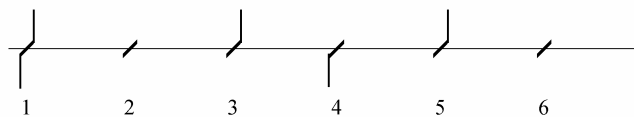
Figure 3.2: Unison Displacement in *Century Rolls*, first movement

I have shown that temporal proximity is not the sole determinant for note omissions in Adams's 3:4 rhythmic juxtapositions. In Figure 3.2, for example, the third sixteenth-note was omitted only 45% of the time. The same can be said of all Adams's contour-preserving combinations. Moreover, the concept of temporal proximity is not applicable to all cross-rhythms. For example, in the 2:3 polyrhythm shown in Figure 3.3(a), the second and third triplets are equidistant from the second eighth-note. Instead of hearing a reverb during a unison displacement, the merged effect is one of combined rhythms (even in a rapid tempo): long-short-short-long.

Due to the inapplicability of temporal proximity to the 2:3 polyrhythm, it will be useful to examine a passage that features this polyrhythm to discover other factors that might influence note removal. Figure 3.3(b), extracted from the first movement of *My Father*

Knew Charles Ives (2003), features 2:3 unison displacements. The measured tremolo in the strings can be perceived as being part of a 2:3 cross rhythm, rather than 3:4 since the tremolo ends before the musical line, thereby downplaying 3:4. Because there are fewer possibilities for note omission in this simple cross-rhythm, there is inevitably greater compositional regularity than in more complex polyrhythms. The first factor that might affect note removal pertains to the rises and falls of a musical line. We can observe that the contour of the string pattern creates an unbroken arch, which corresponds to the choice for note omission in m. 319 (beat four), and m. 320 (beats two and three). Another factor in note removal pertains to having pitch-interval variety in the slower part. As an example, the presence of omitted note 3 in m. 319 (beat two) produces the pitch intervals –4–1–2–3. By removing the second triplet from beat two, the eighth-note pattern would have shown more repetition, having pitch intervals 4–1–4–1. Although each musical passage exhibiting displaced unisons is unique, the linear considerations outlined above are important to all, no matter the type of polyrhythm in use.

(a) 2:3 Polyrhythm



(b) 2:3 Displaced Unisons

Omitted Notes: 2 2 3 2 2 2 2 3 2

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Figure 3.3: Displaced Unisons in *My Father Knew Charles Ives*, “Concord”

In some cases where there are displacements, Adams treats them in a very free temporal manner, sometimes beginning two musical lines in unison and with the same rhythm, and soon after displacing them or moving back and forth between being in-phase and out-of-phase, and at other times changing the polyrhythms while maintaining the original motivic character.⁹⁷ Figure 3.4 presents an excerpt from the first movement of *Naive and Sentimental Music* (also entitled “Naive and Sentimental Music”).⁹⁸ Circled notes in the clarinet line show note omissions from the celesta. This passage progresses through various polyrhythms (3:4→not polyrhythmic or in-phase→5:6) while maintaining the same motivic character. Here, unison displacements extend beyond the excerpted passage, moving back and forth between being in-phase and having a 5:6 cross-rhythm. The excerpt illustrates Adams's freer approach of omitting notes when displacing unisons across changing meters. Concerning the faster note values in the 5:6 polyrhythm, the third, fourth, or fifth notes are extracted at various points.

Cl. I in Bb
(concert pitch)

polyrhythm: 2:3 *mp* none 5:6

Celesta

Leo. * *Leo.* ³ * *sim.*

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Figure 3.4: Displaced Multiple Polyrhythms in “Naive and Sentimental Music”

The cross-rhythms I have presented consist of two individual lines with note values that are unvarying within their respective rhythmic pattern, but there are also instances

⁹⁷ The effect of these displaced polyrhythms is somewhat similar to the in-phase and out-of-phase moments in Reich’s *Piano Phase* (1967), a seminal work in the minimalist aesthetic.

⁹⁸ For the purpose of analysis, I have notated Adams’s excerpt in concert pitch. Adams notates his recent instrumental works in written pitch, but without the use of key signatures.

when displaced unisons include changing note values (e.g., four sixteenth-notes against a quarter-note and eighth-note triplet). For these patterns, metrical proximity, linear considerations, and linear intervallic variety continue to play a role in the process of displacement.

Prominence and Counterpoint

Perceptual studies have shown that our capacity to process large amounts of information is limited; we therefore hear sounds in a selective manner and rank the data. Whatever we hear and consciously process is considered prominent, and might well be more salient. Describing and comparing prominent features is a goal of some modes of musical analysis. Certain music-theoretical tools can be employed to compare musical segments; for example, interval-class vectors can highlight particularly numerous intervals of a pc collection.

We can infer prominence in counterpoint by examining the intervallic content of a musical passage. Intervals can become more pronounced by brute repetition or also by virtue of being infrequent. The least occurring interval(s) have the opportunity to be prominent for their exceptional difference from other intervals. Grouping intervals into consonant and dissonant categories can also provide a useful way to compare musical segments.

Adams's specific compositional choices can also affect what stands out as particularly prominent or unique. Dissonant intervals seem tense and ultimately dependent on consonance, whereas consonant intervals exhibit greater freedom and elicit a broader range of meaning. Dissonance and consonance maintain this asymmetrical relationship in Adams's music, though the specific resolution of dissonant intervals is not necessarily dependent upon traditional tonal and contrapuntal norms.

There are varying degrees of consonance and dissonance; without a musical context, intervals whose ratios consist of integers larger than six are often considered dissonant (e.g., major second [9:8]).⁹⁹ While consonance or dissonance can be

⁹⁹ Brian C. J. Moore, "Consonance: Psychoacoustic factors," *Grove Music Online*, ed. Laura Macy, accessed on May 2, 2006, <<http://www.grovemusic.com>>.

prominent, dissonant intervals are typically more noticeable in Adams's music. Yet contextual influence is so strong that it determines what elements are prominent in a work. More specifically, contextual influence affects our perception of what intervals stand out or are more striking.¹⁰⁰

The Interval Series and Prominence

Adams's approach to ostinati and reiterating fragments reveals an attention to intervallic content that can be illustrated through a tool I call the *interval series*. The interval series lists the possible intervallic permutations of two or more patterns. With this tool, we can compare simultaneous ostinati and/or reiterating fragments—or any two-voice melodic patterns for that matter. The interval series examines intervallic relationships in a manner resembling the way we have students label intervals in species counterpoint exercises: all harmonic intervals are labeled. The interval series can help evaluate why recurring patterns might be offset by certain time intervals, and why the reappearance of a pattern may be irregular and unexpected. In *Lollapalooza*, for instance, Adams repeats motives throughout, yet they are drawn out to the extent that one may not associate a pattern with the established meter.

When examining a passage where dissonance is particularly prominent, the interval series will highlight the most dissonant intervals by indicating their interval quality (e.g., minor seconds, tritones, and major sevenths). An example of a interval series where dissonance is prominent might look something like this: <6,3,5,4,3,M7,m2>. In this series, a string of consonant intervals is succeeded by a pair of dissonant ones. The quality of thirds and sixths is not stated since we are most interested in dissonance in this scenario. The same principles apply to fourths and fifths, when they are perfect. In other words, this interval series is an abbreviated form of <6,3,P5,P4,3,M7,m2>, with either major or minor thirds and sixths.

¹⁰⁰ Charles Seeger's notion of "dissonant counterpoint," where the treatment of writing consonant and dissonant intervals is reversed, provides one such musical context whereby consonant intervals are more salient.

Figure 3.5 provides a classification of interval types, borrowed from Hindemith's *Craft of Musical Composition*.¹⁰¹ According to Hindemith, the intervals that are shown at the beginning of each grouping have a similar effect to their inversions, yet they are more stable.¹⁰² While Hindemith's model is primarily designed for constructing two-voice patterns and finding chord roots, gradations between consonance (towards the left side) and dissonance (towards the right) are implicit. In Hindemith's classification, the interval of the fourth is problematic. While its inversion (P5) is consonant and stable, traditionally the harmonic fourth is considerably more unstable in tonal music contexts than suggested by this model. The perfect fourth is, admittedly, a difficult interval to classify. Harold Owen, for example, argues for a rather subjective understanding of this interval: "to some ears the minor seventh and perfect fourth seem consonant, whereas to other ears these intervals seem dissonant."¹⁰³ As Robert Gauldin notes, our sense of consonance and dissonance is strongly influenced by musical context.¹⁰⁴ In a tonal context, both Gauldin and Owen consider the perfect fourth dissonant in two-part music. Yet the acoustic aspect of the perfect fourth is consonant since it exists in the lower partials of the overtone series. Thus, it must be weighed with its contextual surroundings.

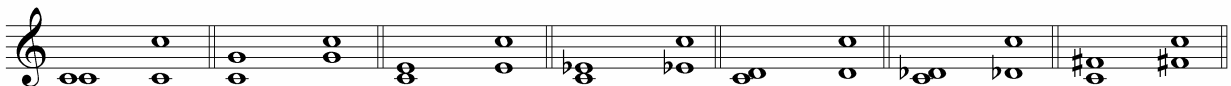


Figure 3.5: Hindemith's Interval Types

¹⁰¹ Paul Hindemith's *Craft of Musical Composition*, Book 2 (London: Associated Music Publishers, 1941), 20.

¹⁰² *Ibid.*, 20-21.

¹⁰³ Harold Owen, *Modal and Tonal Counterpoint: From Josquin to Stravinsky* (New York: Schirmer Books, 1992), 22.

¹⁰⁴ Robert Gauldin, *Harmonic Practice in Tonal Music*, 2d ed. (New York: W.W. Norton & Company, Inc., 2004) 17.

Hindemith's categorization of perfect fourths seems fitting in the context of minimal music, where they seem considerably more consonant than in two-voice tonal music. In an interview published in *Perspectives of New Music*, Adams describes the second-inversion major triad as being "very pleasant" and having a "sonically user-friendly" intervallic content that is "quite wonderful," even though it contains a perfect fourth between a bass note and an upper tone.¹⁰⁵ The composer uses this sonority at the beginning of the Violin Concerto and as the last chord in one of his pop-style songs from his stage work *I Was Looking at the Ceiling and Then I Saw the Sky* (1995). For Adams, chordal inversion does not affect harmonic stability in major triads, and the fourth may occur between a bass line and a top voice in a final sonority. Adams's stated view of the perfect fourth is in accord with Hindemith's interval classification chart and with my own hearing of Adams's music, which does not adhere to the tonal norms of common-practice music.

Figure 3.6(a), drawn from *Lollapalooza*, shows the possible permutations of a fixed ostinato in the bass and a reiterating fragment in the treble. There are only six distinct interval series because Adams combines these repetitive segments at eighth-note distances in the work. The intervals resulting from these permutations are measured as simple intervals in Figure 3.6(b). On the left side, I include the interval series, which illustrates harmonic intervals. The middle column shows an expansion of the interval series that takes rests into account. In this column, sixteenth notes that are followed by a rest will be treated identically to eighth notes. This elaborates, for example, interval series 1 (IS1) <6,6,m7,d7> into expanded IS1 (or EIS1) <6,3,6,5,m7,d7,6>. The IS_n will always be a subset of EIS_n. I include these implicit intervals in the expanded interval series because, particularly at a relatively fast tempo, we often continue to hear the note before the rest. The EIS also adds a rhythmic component to the IS: since the syncopated notes in Figure 3.6(a) last longer than the sixteenth notes, they are accounted for two times (see italicized intervals in IS2 and IS3). Both series are useful descriptors for contrapuntal activity, but, generally speaking, the more important elements of a series are those that belong to IS. In the present analysis, EIS does not

¹⁰⁵ John Adams, Rebecca Jemian, and Anne Marie de Zeeuw, "An Interview with John Adams," *Perspectives of New Music* 34/2 (Summer 1996): 99.

(a) Permutations of an Ostinato and Reiterating Fragment

(b) Interval- and Expanded-Interval Series from *Lollapalooza*

<u>Interval series</u>	<u>Expanded Interval series</u>	<u>Composite Attack Points</u>
1. <6,6,m7,d7>	<6,3,6,5,m7,d7,6>	9
2. <4,8,d8,m7,6>	<4,8,8,d8,d8,m7,6>	8
3. <6,d4,8,m7,8>	<6,d4,m2,8,8,m7,8>	8
4. <4,M2,8,3,5>	<d7,4,M2,8,3,m2,5>	10
5. <m7,4,4,m7,3>	<m7,4,4,3,m7,6,3>	10
6. <m2,8,5,5>	<m2,6,8,m7,5,4,5>	9

Figure 3.6: Interval and Expanded-Interval Series from *Lollapalooza*

hold much weight, though one can imagine a more practical instance where an EIS highlights a recurring interval that cannot be accounted for in IS. The right column shows the composite attack points of each series; thus, it provides a summary of rhythmic activity. By examining attack points of two or more patterns, we can determine the level of interaction and rhythmic activity. The composite attack points will be counted in mod 12 beat-class space, reflecting the work's triple meter and quadruple subdivision.

Examining the interval series in conjunction with composite attack points in Figure 3.6(b) informs a more meaningful interpretation. We can make the following observations: IS2 features the only diminished octave, or enharmonically respelled major seventh (the minor second in IS6 is comparably dissonant); IS2 and IS3 have the fewest composite attack points; the syncopations between reiterating fragment and ostinato are vertically aligned in IS3.¹⁰⁶

The graph in Figure 3.7 shows the order in which interval series are heard in *Lollapalooza*, mm.12–41. Adams introduces all other interval series types before IS2 takes place in m. 28 (which is near a mini golden section division of mm. 12–41). This series stands out since it emerges after all the others and is the only one that repeats consecutively; the immediate repetition helps to make IS2 more emphatic than other interval series. I have placed a double oval to mark this event. Other patterns are also illustrated by the shapes I have drawn: IS5-IS1 with a rectangle, IS4-IS5 an octagon, IS6-IS3 a pentagon, and IS3-IS5 a circle.

There are various ways of looking at interval series order in *Lollapalooza*. If we segment the diagram into groups of threes as I do with brackets, IS5, an unmarked series that lacks strong dissonances (such as m2 or d8), initiates each group and creates a sense of regularity by recurring at every third series. Yet the arrangement of interval series shows more coherence when segmented in pairs rather than triples. Generally, we can see that each shape reappears once at a distance of three geometric

¹⁰⁶ In this musical example, unusual spellings of intervals will be considered in their normal enharmonic form. One particular perception study shows that stream segregation increases as the duration of tones increases. Michael W. Beauvois, "The Effect of Tone Duration on Auditory Stream Information," *Perception and Psychophysics* 60/5 (July 1998): 852–61. Since the reiterating fragment and ostinato from *Lollapalooza* consist of sixteenth notes in a quick tempo, I remain unconvinced that we can perceive each stream as belonging to a different tonal center.

shapes (or six interval series). The exceptions to this ordering are the double oval (a particularly notable series), the octagons, and the overlapping circle, which breaks large-scale coherence. The third interval series that begins in m. 36 is not enclosed in a familiar geometric shape because it temporarily breaks the regularity established earlier, though ultimately, it is IS2 that dissolves the interplay between the patterns. Whether segmenting the passage into groups of two or three, the interval series is flexible enough to permit different interpretations that draw attention to different interval series or groupings.

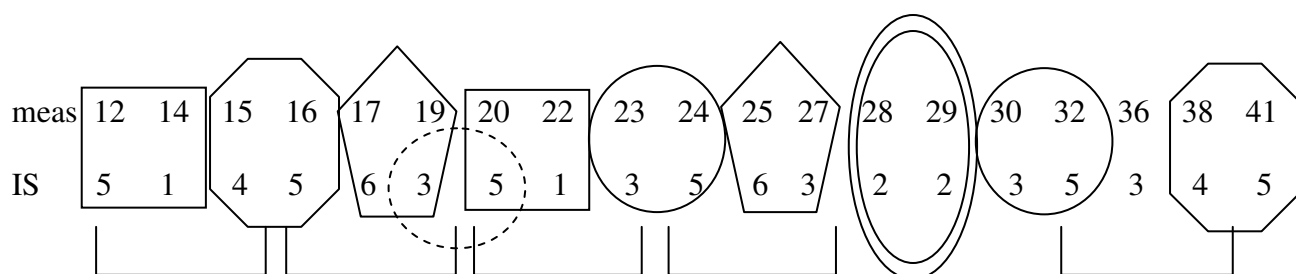


Figure 3.7: Ostinato and Reiterating Fragment Schema from *Lollapalooza* mm. 12–41

Adams reintroduces the ostinato figure and reiterating fragment soon after the beginning of a formal recapitulation in m. 124.¹⁰⁷ Once again, the two patterns undergo a chain of permutations, but unlike the opening, the second interval series emerges before all others. Also unlike the exposition section, IS2 does not appear consecutively in the recapitulation. The new interval series order in the recapitulation suggests a *recontextualization* of the patterns. According to Dora Hanninen, a pattern recontextualization affects the manner in which the repetition of a pattern is transformed by musical context.¹⁰⁸ Although we experience a return of the original motives, there are

¹⁰⁷ Formal divisions in *Lollapalooza* can be understood through the various transformations of the main musical motive C-C-C-E_b-C (emphasis on the E_b). Adams refers to this quasi-Beethovenian theme as “a kind of idée fixe” because it appears prominently throughout. The main motive or fixed obsession denotes the title of the work through onomatopoeia: both have a comparable number of units (syllables versus musical notes) and an emphasis on the penultimate syllable/note. Adams fuses the *Lollapalooza* motive (C-C-C-E_b-C) in m. 24 with its T₃-related companion (E_b-E_b-E_b-G_b-E_b) in m. 58 to form a new motivic unit (E_b-E_b-E_b-G_b-C) starting in m. 75. Stated in pitch integers, [03] and [36] create the diminished triad [360]. The minor third transformation delineates formal boundaries that resemble sonata form, having an exposition, development, and recapitulation.

discernable differences in the surrounding musical context: new textures are introduced, the interval series order has changed, and the ostinato figure bears a slight alteration—the initial G2 in the bassoon part is replaced by E♭2 at every other repetition.

The grouping structure depicted in Figure 3.7 raises an important question: to what degree is one series related to another? As listeners, we often intuit a sense of how patterns relate simply in terms of consonance and dissonance—without necessarily judging specific intervals. We might notice, for example, that a texture has certain types of intervals at its beginning and/or end. In order to discuss interval series resemblance, I will classify pitch-class intervals into four different categories: very consonant (i.e., unisons, thirds, perfect fifths, and sixths), consonant (perfect fourths), dissonant (major seconds and minor sevenths), and very dissonant (minor seconds, tritones, and major sevenths). Earlier, I asserted that the perfect fourth seems rather consonant in minimal music, though not as consonant as thirds or sixths, or unison/octaves. Perfect fifths are included in the very consonant category as they have an open and neutral sound and also because of their importance in the overtone series. These are, admittedly, very crude but useful distinctions. Clearly, this is not the only way to classify intervals, and one might well find interesting results with different interval taxonomies.

Table 3.1 shows the general level of consonance or dissonance of each series. We observe that IS3 and IS5 occur more frequently than the others, yet their interval content is quite distinct—IS3 has four very consonant (VC) intervals and one dissonance (D), whereas IS5 has two dissonant and two consonant intervals (C), and one very consonant interval. We will (arbitrarily) translate dissonances into negative point values and consonances into positive point values to yield a specific sum for comparison. I (also arbitrarily, but consistently) assigned values that vary by 0.5 point increments: VC = 1, C = 0.5, D = -0.5, VD = -1. A value of zero will represent an equilibrium between consonance and dissonance. Using this point system, it becomes apparent that IS3 is, generally speaking, more consonant than IS5. All of the interval series have an overall consonant distribution, reflected by the positive sum of their elements. The least consonant interval series are 2 and 5, both of which seem more

¹⁰⁸ Dora A. Hanninen, “A Theory of Recontextualization in Music: Analyzing Phenomenal Transformations of Repetition,” *Music Theory Spectrum* 25/1 (Spring 2003): 61.

aurally distinctive—due to their overall dissonance and unfolding process illustrated in Figure 3.7—then other series.

Table 3.1: Degree of Consonance and Dissonance in Interval Series from *Lollapalooza*

<u>Interval Series</u>	<u>Interval Types</u>	<u>Degree of Cons./Diss.</u>	<u>Adjusted Cons. Value</u>
1. <6,6,m7,d7>	<VC,VC,D,VC>	+2.5	0.625
2. <4,8,d8,m7,6>	<C,VC,VD,D,VC>	+1	0.2
3. <6,d4,8,m7,8>	<VC,VC,VC,D,VC>	+3.5	0.7
4. <4,M9,8,3,5>	<C,D,VC,VC,VC>	+3	0.6
5. <m7,4,4,m7,3>	<D,C,C,D,VC>	+1	0.2
6. <m9,8,5,5>	<VD,VC,VC,VC>	+2	0.5

Deriving a point system with an equilibrium that lies at zero—an equal distribution of consonance and dissonance—addresses issues of having interval series of different cardinalities. However, when more elements are contained within a series, the range of possible values increases, and the point system I have described can produce incommensurate values when we compare the level of consonance in a series to the maximum consonance given that cardinality. Consider a four-element series with a consonance value of +4 and an eight-element series with the same consonance value. In this case, the longer series has only 50% or half of the total possible consonance, while the shorter series is maximally consonant.

The interval series in Table 3.1 contain two different cardinalities—four and five. Once we adjust each series to consider maximum consonance for its cardinality, the resulting values represent a more uniform consonance level. The numbers in the fourth column represent the adjusted level of consonance ranging from zero (not particularly consonant) to one (maximum consonance).¹⁰⁹ Now that I have considered different cardinalities, the fourth column shows that IS1 is, for its size, more consonant than IS4—even though the unadjusted degree of consonance is greater for IS4. The adjusted average consonance value for any given series will normally lie in the

¹⁰⁹ A resulting value of –1 is conceivable when an interval series consists of strictly very dissonant intervals.

consonant end of the spectrum because there are more consonant intervals than dissonant ones.

Pertaining to an issue raised earlier, the degree to which series are related, I have created a linear similarity measure—called the *consonance/dissonance similarity index* or CDSIM—for comparing consonance and/or dissonance between two interval series. First, we take the adjusted consonance values, which accommodated different cardinalities, and subtract one value from another. If the resulting value is a negative integer, it will be converted to the absolute value, such that $A - B = |C|$, whereby A and B are adjusted consonance values, and C is the resulting absolute value. If the difference between two series equals zero, they have an equal level of dissonance and consonance. The transitive property of equality (*if $a = b$ and $b = c$, then $a = c$*), is not applicable to the resulting values since each value reflects a difference between two averages. Similarity relations, by definition, lack transitivity when they weigh more than one element—as they all do. As Richard Hermann purports, similarity measures should not be rejected on the grounds of transitivity because much value will be lost.¹¹⁰

Table 3.2 provides a comparison matrix that lists the CDSIM values between the ostinato and reiterating fragment in *Lollapalooza*, mm. 12–41.¹¹¹ The smallest non-zero values in the matrix occur between IS1 and IS3–4. These three interval series contain just one dissonant element each and have the highest general consonance. The only equivalent interval series are IS2 and IS5—the former was deemed significant for dissolving the interplay between ostinato and reiterating fragment, while the latter helped establish formal coherence.

Table 3.2: CDSIM Comparison Matrix of Ostinato and Reiterating fragment in *Lollapalooza*

1. <6,6,m7,d7> <VC,VC,D,VC>	2. <4,8,d8,m7,6> <C,VC,VD,D,VC>	3. <6,d4,8,m7,8> <VC,VC,VC,D,VC>	4. <4,M9,8,3,5> <C,D,VC,VC,VC>	5. <m7,4,4,m7,3> <D,C,C,D,VC>	6. <m9,8,5,5> <VD,VC,VC,VC>
1. 0.0					
2. 0.425	0.0				
3. 0.075	0.5	0.0			
4. 0.025	0.4	0.1	0.0		
5. 0.425	0.0	0.5	0.4	0.0	
6. 0.125	0.3	0.2	0.1	0.3	0.0

I have now examined prominence in intervals from two different levels of detail: (1) individual intervals in the interval series that stood out when compared with other series, and (2) overall consonance and/or dissonance of a series via the CDSIM function. Used in conjunction, these two approaches contextualize individual intervals and interval series that can be drawn from ostinati, reiterating fragments, or other linear patterns. But like all similarity measures, CDSIM has specific limitations. Perhaps the most obvious one is that CDSIM compares only unordered sets of intervals, and thereby not fully confronting the idiosyncrasies of linear patterns.

Canonic Procedures

Various canonic procedures can be observed in the music of Adams: (1) strict canons, (2) freely imitative passages where certain notes and rhythms are altered yet retain a loosely canonic structure, and (3) what I refer to as *developing imitation*.¹¹² For each of these canonic types, points of imitation normally begin with perfect intervals—most commonly the unison or octave.¹¹³ The temporal distance between leader and follower (or *dux* and *comes*) varies, though points of imitation are frequently offset by a beat (usually quarter note). Even in passages that feature other points of imitation, the follower often includes smaller motivic cells that imitate the leader a quarter-note after. To make their presence more notable, these canonic passages are sometimes doubled by other instruments of the same family. Percussion instruments are the only ones that do not participate in Adams's imitative processes.

Strict canons occur less often than free canons, but they still form an important part of Adams's contrapuntal language. Figure 3.8(a) illustrates a strictly canonical excerpt from the first movement of *Century Rolls*.¹¹⁴ The *comes* imitates the top line a quarter

¹¹² This term plays on the concept of *developing variation*, in which a theme contains motive forms that are derivatives of one another. Schoenberg coined developing variation to draw connections between Brahms's music and his own in order to validate his new compositional practice—dodecaphony—as the next logical step in musical evolution.

¹¹³ Two notable exceptions that begin imitation at the interval of the compound third (tenth and twenty-fourth, respectively) include “Put Your Loving Arms Around Me,” mm. 148–51 from *Gnarly Buttons* (1996), and “Aria with Walking Bass,” mm. 33–49 from the Violin Concerto (1993).

¹¹⁴ A similar canon is found in “Naive and Sentimental Music” (mm. 157–72).

note later at the melodic interval of the unison. Since the canon melody is triadic, suggesting a B-minor sonority, close imitation at the unison produces a higher number of consonant intervals than would a very stepwise melody. The relative frequency of harmonic intervals of this passage are shown in Figure 3.8(b). The temporal relationship between imitative voices maximizes intervals from the lower partials of the overtone series, particularly vertical fifth projections. The perfect fifth also begins and concludes the excerpt, ending abruptly in m. 117. Parallel fifths occur in every measure, merging the sound of the two patterns into one, yet a sense of individual lines can still be perceived by the resonating effect created by the lowest and highest points of each rise and fall.

(a) Strict Two-Voice Canon

The musical score is for Violin I, measures 110-117. It is in 4/4 time. The score is divided into two systems. The first system (measures 110-113) is marked 'on the string' and 'f' (forte). The second system (measures 114-117) is marked 'pizzicato' and 'mp' (mezzo-piano). The music is a strict two-voice canon, with the 'Odd' and 'Even' parts of the Violin I staff. The melody is triadic, and the canon is based on a perfect fifth interval. The score shows parallel fifths in every measure, which is a key feature of the passage.

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Figure 3.8: Strict (Canonic) Imitation in *Century Rolls*, first movement, mm. 110–117

(b) One-to-One Correspondences

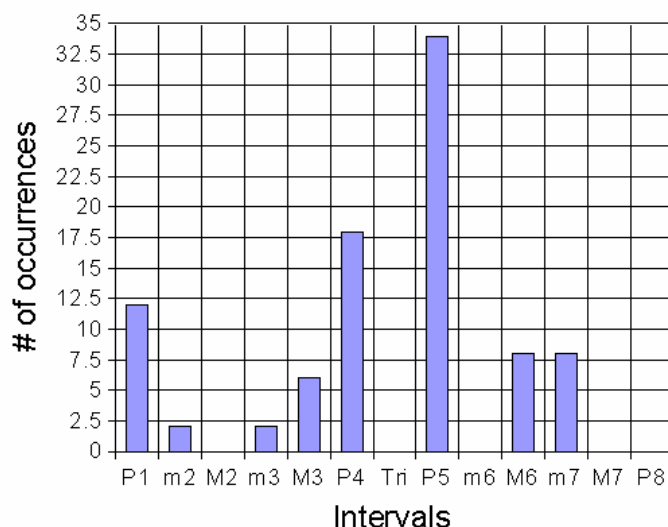


Figure 3.8 – continued

The directional relationship between the two voices seen in Figure 3.8(a) is common to Adams's strict canons and can be used to establish guidelines that can be extended to other canonic types. The types of relative motion utilized include: voice crossing, overlapping, motion to a dissonance frequently not preceded by step, and fourths and fifths that move by contrary, parallel, and similar motion. Oblique motion, on the other hand, is not encountered in Adams's canons.

A free type of imitation that preserves a canonic design can be found more frequently in Adams's works than other imitative types such as strict canons and developing imitation. Figure 3.9, extracted from the first movement of Adams's *Chamber Symphony* ("Mongrel Airs"), shows the use of free imitation between the piccolo and synthesizer.¹¹⁵ As in the previous excerpt from *Century Rolls*, the *comes* (synthesizer) imitates the *dux* at the unison. If both parts were rearranged to begin at the same time, one would discover that aside from one note and several rhythmic displacements, the entire passage features a strict canon. A fully strict canon would require that the pitch D5 of the synthesizer in m. 118 be replaced with E5, and the rhythmic alterations in measures 115, 117, and 119 be restored to their original form. Both parts do not end

¹¹⁵ To make the *dux* more prominent, a clarinet in E $\flat$ doubles the piccolo until m. 121.

simultaneously; rather, the piccolo returns to the initial four-note group, thereby creating a minute ABA structure. As in the previous example of contrapuntal accompaniment, there are no consecutively repeated tones.

The subtle differences between leader and follower in Figure 3.9 can be illustrated through their contrapuntal interrelation. The rhythmic delay of the note E5 in m. 119 creates greater rhythmic activity by adding an extra attack point. The altered pitch D5, heard in m. 118 of the synthesizer part, precedes B♭5 in the piccolo. These two notes form the melodic interval of a minor sixth. Looking back to m. 115, the minor sixth produced the first harmonic interval after the anticipated unison.

The image displays a musical score for two parts: Piccolo (Picc.) and Synthesizer (Synth.). The score is divided into three systems, with measures 113-116, 117-120, and 121-124. The Piccolo part features a complex rhythmic pattern with triplets and sixteenth notes. The Synthesizer part provides a harmonic accompaniment, often in unison with the Piccolo. Key annotations include:

- unison**: A box highlighting a measure where both parts play the same notes.
- offset by quarter**: A box highlighting a measure where the Piccolo part is shifted by a quarter note relative to the Synthesizer.
- P1 m6**: A label indicating a perfect first minor sixth interval between notes in different parts.
- rhythmic alteration**: A box highlighting a measure where the Piccolo part has a rhythmic change.
- rhythmic delay**: A box highlighting a measure where the Piccolo part has a rhythmic delay.

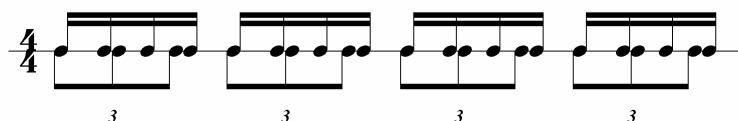
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Figure 3.9: Free Imitation in “Mongrel Airs” from *Chamber Symphony*

Unlike the earlier example, in “Mongrel Airs” the *dux* and *comes* are separated by two measures (eight beats). Clearly, their distance is greater than in the previous

example, yet by segmenting each part into smaller motivic units, these smaller segments appear in close proximity between the voices. The presence of a four-note group is perceived from the outset and doubled by synthesizer in m. 115. It is significant (and perhaps no coincidence) that the first real displacement of the four-note group, which is stated three times in m. 116, is offset by a quarter-note beat—Adams favors this point of imitation. After the first system, this and other motivic groups are echoed at different distances, thereby creating much rhythmic variety.

In choosing an imitation point, Adams apparently strives for greater rhythmic activity between voices; this excerpt provides a good illustration of what is commonly encountered in Adams's literature. Counting the number of sixteenth notes between voices, we can observe in Table 3.3 that Adams offsets the *comes* by two measures in order to create more composite attack points between both voices. To find the level of rhythmic interplay between voices, we compare the number of attack points to the maximal number of attacks within a given metrical grid—in this case, common time. Our common time grid for this excerpt consists of 16 sixteenth-notes per measure. An attack point that is shared between voices in the same metrical placement does not enhance the rhythmic fabric and is counted only once. Thus, if there are nine sixteenth-notes in one voice and six in another voice, and they share two attack points, the composite value will be thirteen out of a possible sixteen. There are two types of note values in the excerpt, sixteenth-notes and eighth-note triplets. Where there are two different pulse streams, I will take the faster one as the denominator. Since the triplets mimic the sixteenth note pattern in m. 115, they will be considered as such for the purposes of counting attack points. To match a group of eighth-note triplets to a unit of four sixteenth notes in order to avoid double counting,



the second triplet counts as the second sixteenth-note, and the third triplet as the fourth sixteenth-note, since these notes fall closer together in time.

Table 3.3 shows the total rhythmic saturation from Figure 3.9, as well as two hypothetical points of imitation. In each instance, the imitation between voices will only be accounted for up to m. 121 because the *dux*, represented by the synthesizer, ceases to imitate the *comes* material at m. 122; hence, each point of imitation will yield a different maximum value of attack points. Adams's point of imitation creates a composite rhythmic activity of: $86 / 112 = 0.7678$. Had Adams begun imitation a measure earlier or later, the attack points would yield composite rhythmic values of $93 / 128 = 0.7265$ and $73 / 96 = 0.7604$, respectively. Although the level of rhythmic activity between m. 115 (0.7678) and m. 116 (0.7604) is not substantially different, the first allows one more measure of counterpoint between voices.

Table 3.3: Rhythmic Activity in "Mongrel Airs" from Chamber Symphony

(a) Imitation starting in m. 114

Measures	113	114	115	116	117	118	119	120	121	122	123
Piccolo attacks	6	8	9	7	8	8	8	8	9	(initial return)	
Synthesizer attacks		6	8	9	7	8	8	8	8	9	
Composite Attacks		9	10	14	12	13	12	11	12		

Total rhythmic saturation is $93 / 128 = 0.7265$

(b) Imitation starting in m. 115

Measures	113	114	115	116	117	118	119	120	121	122	123
Piccolo attacks	6	8	9	7	8	8	8	8	9	(initial return)	
Synthesizer attacks			6	8	9	7	8	8	8	8	9
Composite Attacks			9	14	14	11	13	13	12		

Total rhythmic saturation is $86 / 112 = 0.7678$

(c) Imitation starting in m. 116

Measures	113	114	115	116	117	118	119	120	121	122	123
Piccolo attacks	6	8	9	7	8	8	8	8	9	(initial return)	
Synthesizer attacks				6	8	9	7	8	8	8	8
Composite Attacks				11	13	14	12	11	12		

Total rhythmic saturation is $73 / 96 = 0.7604$

Another factor to weigh when examining various points of imitation is the intervallic content between voices. Table 3.4 tallies the number and types of intervals used at each point of imitation given earlier—compound intervals have been reduced to simple intervals. We can observe several trends from this data. The imitative point (m. 114) has a preponderance of perfect unisons, imitation at m. 115 has a nearly equal distribution of unisons and sevenths, and imitation at m. 116 has a more even distribution of intervals. Due to the differences in total attack points, the *adjusted consonance value* explained earlier in this chapter will give a more accurate reading for overall consonance or dissonance. The resulting values are as follows: (m. 114) $15 / 34 \approx 0.456$; (m. 115) $3 / 25 = 0.12$; (m. 116) $3.5 / 21 \approx 0.166$. From this, it is apparent that Adams chooses the least consonant point of imitation (m. 115), which may seem atypical in strict canons; however, free canons frequently exhibit a greater proportion of dissonant intervals.

Table 3.4: Interval Content of Canonic Passage in “Mongrel Airs,” mm. 114–121

Intervals	Imitation at m. 114	Imitation at m. 115	Imitation at m. 116
P1	<u>18</u>	<u>7</u>	1
m2	1	2	2
M2	2	0	1
m3	0	0	1
M3	1	0	0
P4	3	1	2
A4/d5	1	2	4
P5	1	1	1
m6	1	2	5
M6	0	2	2
m7	4	<u>5</u>	2
M7	2	<u>3</u>	0
Total	34	25	21

The last type of canonic technique I will discuss is developing imitation. In the previous two examples, I showed that the order of notes between voices remains consistent (or nearly so). Although developing imitation features altered notes and rhythms that can resemble those of free imitation, it does not comprise a single canon. Rather, a canonic or imitative unit serves as a point of departure. Aside from the use of less strict imitation, developing imitation differs from other canonic types in that it typically establishes a discernable sense of development by progressing to new patterns or transpositions without a sense of return.

Figure 3.10, drawn from the first movement of *Hallelujah Junction*, shows a lengthy example of this technique.¹¹⁶ In the excerpt, developing imitation coincides with the opening of the development section in what might be described as a sort of sonata-rondo form.¹¹⁷ The initial imitative pattern serves as an introductory link. The leader and follower are separated by an irregular rhythmic displacement of seven-and-one-half beats (as compared to quarter-note displacement), yet the follower bears a stronger connection to the leader's succeeding pattern that is stated a quarter-note beat later, thereby creating the same resonating effect as seen in the other canonic types. Thus, the role of *dux* and *comes* are effectively reversed.

As usual, the first harmonic intervals between the leading and following voices are perfect consonances. Likewise, the first instance of the imitative pattern in the second piano part ends with perfect intervals. The perfect octave is prominent at beginning points of many of the patterns, yet other intervals such as thirds and minor sevenths are also introduced. As in previous examples, oblique motion created by note repetition in

¹¹⁶ In an e-mail forwarded from this author to John Adams through Sarah Baird from Boosey & Hawkes, Adams confirms that the first movement of the published score has a misprint in m. 86: the pitch E3 should be E♭3. Since this typographical error only appears at the beginning of the canon (before imitation occurs), it seems plausible that Adams wrote the *comes* before the *dux*, and forgot to insert the accidental. This perhaps suggests Adams planned in advance the counterpoint and temporal distance between the voices.

¹¹⁷ Adams's frequent use of rondo form during this compositional period has been documented. The composer does not restrict this formal schema to concluding movements. In the *Perspectives of New Music* interview with Rebecca Jemian and Anne Marie de Zeeuw, Adams affirms the use of rondo form in the third movement of the Violin Concerto (1993) and the first movement from *Road Movies* (1995). The opening movement of *Hallelujah Junction* (1996) can be interpreted as a type of sonata-rondo form since the second episode is unstable from a centric standpoint. Moreover, this contrasting section has formal ramifications that affect the rest of the work.

either of the voices is absent. A thorough study of the intervallic content in this passage would reveal more interesting features, yet they would be unique to this imitative passage and would not yield a general overview of canonic passages as a whole. We can see that the initial imitative pattern is repeated throughout the passage, first in strict form, but soon afterwards both leading and following voices undergo a series of various modifications. The encircled notes and rests indicate pitch alterations from the initial imitative pattern either to a different pitch, from a note to a rest, or via octave displacement. These types of note alterations also arise in free imitation. The brackets shown in the first piano part indicate pattern expansion, whereby the length of a motivic unit is increased by inserting new pitches. In Chapter 2, I referred to this as the modification *add a group of notes* within a pattern. Finally, the encircled operation T_3 in the first piano part refers to transposition of the entire imitative pattern by three semitones, while f_3 in the second piano part signifies a *signature transformation* (both of these changes remain until developing imitation ends in m. 105). Coined by Julian Hook, a signature transformation “reinterprets any diatonic object in the context of a different key signature.”¹¹⁸ In other words, the pitches retain their letter names as a different key signature is applied to the passage—this is tantamount to a change of diatonic mode. In the example from *Hallelujah Junction*, the initial imitative pattern includes two accidentals— $B\flat$ and $E\flat$ —while the pattern beginning in m. 95 of the second piano part includes a key signature with five accidentals— $B\flat$ $E\flat$ ($A\flat$) $D\flat$ and $G\flat$. The change in key signature is notated as f_3 because it shifts three notches *flatwise* (counter-clockwise around the standard circle of fifths) to form a new key.¹¹⁹ A signature transformation brings characteristic changes in coloration, but more importantly, it contributes to the development in this passage.

In this chapter, I have illustrated various contrapuntal features found in Adams's two-voice patterns. First, I discussed Adams's technique of displaced unisons, which is

¹¹⁸ Julian Hook, “Signature Transformations,” presented at the Society for Music Theory Annual Meeting. Madison: November 7, 2003, abstract. For a well known minimalist work that relies heavily on the principle of signature transformation, see Michael Torke’s “Yellow Pages” from *Telephone Book*.

¹¹⁹ Since the pitch-class $A\flat$ is not used by either piano part before the signature transformation takes place, we can interpret the initial key signature as having two or three flats; hence, the transformation will be f_2 or f_3 . This same pitch class is not used by the first piano, even after the transformation.

a method of creating multiple melodic lines that are partially-ordered subsets of one another and utilize different rhythmic units. Next, I suggested a way of interpreting the interaction of repeating patterns such as ostinati and reiterating fragments by examining their intervallic content. Last, I discussed various types of canons found in Adams's music, including strict and free canons, as well as a canonic procedure I referred to as developing imitation.

The image displays a musical score for two pianos, Piano 1 and Piano 2, spanning measures 85 to 102. The score is written in 3/4 time and features a key signature of one flat (B-flat). The notation includes various musical elements such as notes, rests, and dynamic markings. Key features include:

- Measure 85:** Piano 1 begins with a melodic line, while Piano 2 is silent. A dashed box labeled "imitative pattern" highlights a sequence of notes in Piano 1.
- Measure 89:** Piano 1 continues its melodic line, and Piano 2 enters with a similar melodic pattern.
- Measure 93:** Piano 1 features a trill (T₃) and a forte (f₅) dynamic marking.
- Measure 97:** Piano 1 includes a "expansion" marking, indicating a development of a previous motif.
- Measure 101:** Piano 1 features a "expansion" marking, indicating a development of a previous motif.

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Figure 3.10: Developing Imitation in *Hallelujah Junction*, first movement

CHAPTER 4

THREE OR MORE VOICES

Introduction

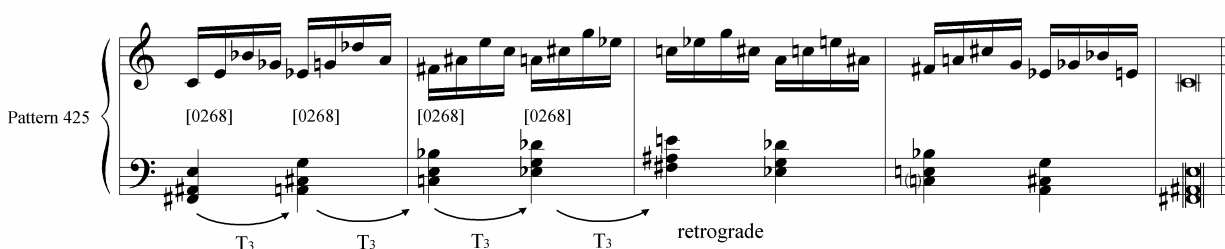
The topics explored in the previous chapters will now be applied to textures with three or more voices. First, I will discuss Slonimsky's melodic patterns and compare his suggested harmonic structures to Adams's own harmonization of these patterns. I purport that Adams's harmonies are either directly derived from what Slonimsky terms "master chords" or Adams finds distinctive ways of constructing harmonies and multiple-voice textures based on linear patterns from the *Thesaurus*. Next, I will consider an example of three-voice polyrhythmic unison displacement from *Naïve and Sentimental Music*. Using this technique, a texture is reinforced through multiple versions of a single pattern. I also explore the juxtaposition of dual-imitative patterns, as well as the juxtaposition between unison displacements and imitative patterns. In the former instance, two distinct yet related imitative patterns occur simultaneously, potentially creating many strata with a single musical character. Concerning the latter technique, Adams's music shows that these two linear processes are not mutually exclusive, but rather complement each other throughout *Slonimsky's Earbox*. Last, I discuss the affective quality that Adams's imitative figures create.

Harmonization of Slonimsky's Patterns

In Chapter 2, I discussed the influence of Slonimsky's *Thesaurus* on Adams's own linear patterns. On several occasions, Adams borrows verbatim from Slonimsky's book of scales and patterns. I showed evidence of this in the Violin Concerto and *Century Rolls*, where Adams includes the prime and retrograde forms of their respective patterns in the same manner that Slonimsky presents them in the *Thesaurus*.

Slonimsky often suggests one or more possible homophonic harmonizations for his patterns, yet his book is arranged according to linear patterns, which suggests that harmony was conceived as an afterthought—indeed, most of the harmonizations are shown at the end of the book. Slonimsky primarily recommends the use of "master

chords” to harmonize the linear patterns. These master chords consist of dominant-seventh chords (also known as major-minor seventh chords) without a fifth. Figure 4.1 shows Slonimsky’s suggested harmonization for Pattern 425 through the use of master chords related by T_3 when ascending and retrograded when descending. The bass of each root-position chord is a tritone apart from the melodic notes that fall on each beat. The pitches from every beat (the chord in combination with the melody note on the beat) form the whole-tone subset 4–25 [0268].



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Figure 4.1: Slonimsky’s Suggested Harmonization of Pattern 425

When Adams borrows Slonimsky’s patterns, he either uses Slonimsky’s prescribed harmonization, or he conceives new harmonies and sets them polyphonically. In “Hail Bop” from *Century Rolls*, for example, Adams harmonizes the ascending form of Pattern 425 the same way as Slonimsky, but with an added perfect fifth above the bass (mm. 126–129). In Chapter 2, I mentioned that Adams generally modifies Slonimsky’s patterns after presenting them in their original form. Comparing Adams’s harmonic or multi-voice approach to Slonimsky’s, Figure 4.2 revisits one of Adams’s modified patterns that retains the same pitch contour as Pattern 425 (in mm. 134–41).¹²⁰ The melodic content is the sole determinant for harmonic accompaniment. Each circled segment is heard harmonically on beats two and four (I have only circled the first three

¹²⁰ More detail on the melodic character of this melodic pattern is provided in Chapter 2. I have revised the left-hand piano part in m. 134, which was incorrectly notated in treble clef. Holly Mentzer, the editorial manager from Boosey & Hawkes, confirmed this typographical error through e-mail correspondence.

measures, but this process applies to the entire passage). Adams's harmonies are drawn from segments that begin on offbeats, while Slonimsky's Pattern 425 consists of T_3 operations of a recurring master chord. When a melodic segment forms a trichord in the excerpt from "Hail Bop," the respective harmony will contain three notes, whereas when a segment consists of a tetrachord, its harmony will yield four notes.

The image displays a musical score for the piece "Hail Bop". It consists of two systems of staves. The first system includes a Woodwinds staff and a Piano staff. The Woodwinds staff begins at measure 134 and contains a melodic line with numerous triplets and slurs, marked with a forte 'f' dynamic and the instruction 'swing couplets'. The Piano staff provides accompaniment with chords and single notes, also featuring triplets. The second system continues the music, with the Woodwinds staff ending at measure 138. The Piano staff continues with harmonic accompaniment.

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Figure 4.2: Linear Influence on Accompaniment in "Hail Bop"

The opening measures of the Violin Concerto, shown in Figure 4.3, illustrate Adams's multiple-voice approach to Slonimsky's Pattern 10, which is transpositionally symmetrical around a 6-cycle $\langle 06 \rangle$ (the pitch intervals consist of $\langle +2+3+1+2+3+1 \rangle$). Years after composing the concerto, Adams vaguely recalled how he used Slonimsky's *Thesaurus of Scales and Melodic Patterns* and "derived the rising figure as a diatonic figure which [he] then submitted to modal transpositions."¹²¹ The result is a linear

¹²¹ John Adams, Rebecca Jemian, and Anne Marie de Zeeuw, "An Interview with John Adams," *Perspectives of New Music* 34/2 (Summer 1996): 99.

succession of Pattern 10 in three different and simultaneous transpositions, vertically forming second-inversion major triads. The various superimpositions of Slonimsky's pattern in this excerpt give rise to a more polyphonic effect (rather than Slonimsky's homophonic master-chords), since each line is first and foremost governed by its intervallic structure. Adams states the same point in a different light:

A major triad is a very pleasant and sonically user-friendly interval. But when they're perfectly parallel and follow lines that are essentially atonal, it creates a very interesting effect where I think the atonality dominates over the tonality of the vertical arrangement.¹²²

In other words, Adams purports that we perceive the linear aspect of these measures more strongly than the vertical structures.



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Figure 4.3: Harmonization of Slonimsky's Pattern 10 in the Violin Concerto

Three-Voice Unison Displacement

In Figure 4.4, from the third movement of *Naive and Sentimental Music* (1997–98), entitled “Chain to the Rhythm,” Adams extends his unison displacement technique to three simultaneous polyrhythms—5:7, 5:8, and 7:8. The combination of these polyrhythms produces a very high lowest-common-multiple (LCM 280), and even their individual lowest common multiples produce integers that are considerably larger than

¹²² Ibid.

the 2:3 and 3:4 polyrhythms examined in Chapter 3. Earlier, I identified metrical proximity as one factor that clarifies how displaced patterns interact. Considering polyrhythms of a high lowest-common-multiple (i.e., complex or multiple simultaneous polyrhythms), Adams exhibits a more free and intuitive approach. As Adams states of his recent compositional process, “I rely a lot more on my intuitive sense of balance. . . . I’ve stopped worrying about whether intuiting a structure is right or not.”¹²³ K. Robert Schwarz concurred with Adams’s self-evaluation of his compositional style:

The legacy of minimalism continues to permeate the surface of Adams’s works written since 1978, but the underlying structures are far freer, and no attempt is made to achieve systematic purity. What Adams’s career displays is a shift from process to intuition, from an aesthetic that demands rigorous systematization of structure to one that picks and chooses from an eclectic range of historical and vernacular styles.¹²⁴

In the example, the piano and harp have nearly identical material since they share seven of eight notes (except in m. 267, where the piano inserts a foreign note); the celesta, on the other hand, only draws five notes from the harp texture. Although the three motives outline the same contour, their combined effect resembles the feeling of being out-of-phase (rather than having an echo effect), especially since the quintuplets temporally displace unisons at a greater distance than do the septuplets and sixteenth-notes. Furthermore, a denser texture is aided by the celesta, which sometimes produces vertical minor thirds—rather than unisons—on the downbeats. As the polyrhythms progress after the illustrated measures, a thicker linear texture is established by occasionally exchanging unisons for other intervals.

¹²³ K. Robert Schwarz, “Process vs. Intuition in the Recent Works of Steve Reich and John Adams,” *American Music* 8/3 (Autumn 1990): 247.

¹²⁴ *Ibid.*, 246.

The image shows a musical score for three instruments: Piano, Celesta, and Harps. The score is in 2/2 time and spans measures 267 to 271. The Piano part (top) features a melody with a 7:8 ratio indicated. The Celesta part (middle) features a melody with a 5:8 ratio indicated. The Harps part (bottom) features a melody with a 7:8 ratio indicated. The score is marked with a forte (ff) dynamic and includes asterisks (*) indicating specific points of interest or displacement.

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Figure 4.4: Three-Voice Unison Displacement in “Chain to the Rhythm”

Three-Voice Imitation

Earlier I stated that canons involving two voices are abundant in Adams’s recent works; three-voice canons, however, appear less frequently. Figure 4.5 presents an instance of a three-voice imitation (imitation extends from mm. 438–53), notated in written pitch. Formally speaking, this excerpt presents a strict canon, though since the iterations are offset at considerable distances throughout the passage, we may perceive them simply as imitation. Due to the nature of repetitive patterns like reiterating fragments, differentiating between standard canons and those that sound more like imitation is particularly relevant to Adams’s music to post-minimal music in general. Adams uses a strict-canon technique that is comparable to two-voice strict canons in that it provides support and melodic activity to more prominent textures—in this case, the large string section, not illustrated here, overpowers the clarinets. The leading voice is imitated at the unison and temporally offset from the followers at eighth-note and

quarter-note beat distances. Stated differently, the interaction between adjacent staves is offset by half a beat.

In Figure 4.5, I label harmonic intervals from the lowest pitch up (notice voice-crossing). Moreover, they are only accounted for when three voices play simultaneously. While the first harmonic intervals between voices do not contain perfect intervals (as is often encountered in two-voice imitation), there is a profusion of perfect intervals throughout these measures. In the first two imitative segments, the combined voices form a triple succession of melodic perfect fifths, which contribute to a sense of pervading perfect intervals. The figured bass reveals a majority of the intervals (12 of 28) are perfect. Returning to the categorization between types of intervals that I introduced in Chapter 3, there are 14 very consonant intervals, 5 consonant intervals, 5 dissonant intervals, and 4 very dissonant intervals, resulting in a +10 degree of consonance, and an adjusted consonance value of $10 / 28 \approx 0.357$.

Clars. in A

1

2

3

Figured Bass: M6 P5 P5 P8 m6
m7 P5 M7

M6 m3 m2 M2
m7 P4 P4 M7

m3 M3
P4 M7

m3 P4
m7 P8

P4 M2
P8 P5

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Figure 4.5: Three-Voice Imitation in *Slonimsky's Earbox*

Juxtaposing Dual-Imitative Patterns

Another exceptional approach to imitation in Adams's recent works entails the juxtaposition of two different yet simultaneous imitative patterns. Figure 4.6 shows two simultaneous strict-canonic patterns found in the first movement from Adams's piano

concerto *Century Rolls*.¹²⁵ The point of imitation in the cellos begins with a perfect unison, while imitation in the violas commences at the major third. Adams chooses a point of imitation for the violas that will provide variety from the unison imitation and at the same time yields notes from the same collection as heard in the cello motive. Another common feature between violas and cellos is their displacement in time between leader and follower. This displacement of 1.5 quarter-note beats seems influenced by the intervallic relationship between voices: the violas and the cellos begin imitation when their first possible octaves can be vertically aligned (this trend stems from two-voice imitation). As can be observed in the figured bass symbols, perfect intervals continue to be important; in this case, they are reiterated each time the following voices initiate the imitative process. Furthermore, the figured bass shows that trichords dominate the passage—only after five measures worth of imitation do tetrachords begin to appear. The length of the cello motive is gradually increased from seven to ten notes, and then eleven notes, slightly altering each grouping of intervals as outlined in the figured bass.

184 *detache*

Vla. A *ff* P8 P5 P5 P1 P5

Vla. B *ff* *detache*

Vcl. A *ff* *arco, detache* P8 P8

Vcl. B *ff* *arco, detache*

figured bass: P5 P4 m3 M3 P5 P4 m3 M3 P5 P5 m3 M3 m3 M2 m2 P5 P4 m3 M3 m3 m3 M7
P8 P8 m7 M7 P8 P8 m7 M7 P8 P8 m7 M7 m6 M3 m6 P8 P8 m7 M7 m6 P8 P8

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Figure 4.6: Dual-Imitative Pattern in *Century Rolls*

¹²⁵ Dual-strict imitation of this passage extends in the same fashion for a longer period than presented here—refer to mm. 184–202 in the score.

Juxtaposing Imitation and Unison Displacement

I have considered imitation and unison displacement separately; however, these two techniques are not mutually exclusive in Adams's works. The juxtaposition of imitation and unison displacements permeates *Slonimsky's Earbox*. Figure 4.7 shows how both techniques are used together in the opening measures of this orchestral work. I have previously discussed unison displacements in this incipit; considering imitation, we can observe the following qualities about the follower or *comes*: (1) it normally follows at eighth-note distances, (2) it sometimes states part of the *dux* using harmonic dyads, and (3) it has a free nature, allowing rhythmic and pitch alterations. The harmonic dyads in the imitative voice, seen on the top staff, are not gathered necessarily in an ordered approach. In the first measure, for example, the minor-third dyad is drawn from the first and third notes of beat two, while the perfect fourth dyad is taken from the second and fourth notes of beat two.¹²⁶ These characteristics are generally observed throughout the work to varying degrees.

¹²⁶ The accuracy of the minor-second dyad in m. 3 is in question. The E $\flat$ clarinet has a written note C $\sharp$ (sounding E $\flat$), while the English horn plays a written note B $\sharp$ (sounding E $\sharp$), yet these two instruments play almost entirely in unison for the remainder of the time; moreover, when material from m. 3 reappears in m. 155, the English horn plays a written B $\flat$. Therefore, the English horn is most likely simply missing an accidental in m. 3.



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Figure 4.7: Imitation and Unison Displacement in *Slonimsky's Earbox*

The Affective Quality of Imitative Techniques

Rebecca Leydon purports that minimalist repetitive patterns are “capable of projecting a broad range of differentiated affects.”¹²⁷ She defines six different repetitive tropes—maternal, mantric, kinetic, totalitarian, motoric, and aphasic—that help describe various minimal works.¹²⁸ These tropes can be applied to John Adams’s *ostinati*,

¹²⁷ Rebecca Leydon, “Towards a Typology of Minimalist Tropes,” *Music Theory Online* 8/4 (December 2002).

¹²⁸ According to Leydon’s definition, tropes tell “different kinds of stories” about musical subjects. The following descriptions of Leydon’s repetitive tropes are drawn directly from her Figure 4: MATERNAL – repetition evokes a “holding environment,” or regression to an imagined state of prelinguistic origins (e.g., Raymond Scott’s *Soothing Sounds for Baby*); MANTRIC – repetition portrays a state of mystical transcendence (e.g., Arvo Pärt’s “liturgical minimalism”; John Adams’s *Shaker Loops*); KINETIC – repetition depicts (or incites) a collectivity of dancing bodies (e.g., *Spring Hell Jack*; various electronica); TOTALITARIAN – repetition evokes an involuntary state of unfreedom (e.g., Rzewski’s *Coming Together*; Andriessen’s *De Staat*); MOTORIC – repetition evokes an indifferent mechanized process (e.g., Nyman’s

reiterating fragments, and imitative patterns with varying degrees of success. The mantric trope, which portrays “a state of mystical transcendence,” seems to describe the discursive repetition of *Shaker Loops* (1978, 1983) particularly well.¹²⁹ On the other hand, descriptors like involuntariness, indifference, and impairment, words used to describe the totalitarian, motoric, and aphasic tropes, do not generally seem to fit Adams’s compositional aesthetic.

As in other minimalist repetitive techniques, Adams’s imitative patterns produce unique expressive effects. Looking back at Figure 4.6, for instance, the steady rhythmic drive and additive process in the cello *divisi* part parallels Leydon’s example from Frederic Rzewski’s *Coming Together*, which is characterized as a totalitarian trope. Compared to Rzewski’s work, the excerpt from Adams’s *Shaker Loops*, which features an ongoing rhythmic drive, sounds more motoric and yet reflective and unimpaired. The unconstrained feel of this passage can be attributed to the subtle nuances in each repetition of the imitative patterns. As mentioned earlier, rather than having a fixed pattern, the cello motives gradually increase in length.

Leydon’s totalitarian trope explores a dark side of the human condition, which can more fittingly be replaced by a sense of anguish and helplessness, as conceived in Adams’s *On the Transmigration of Souls* (2001), a work written for orchestra and chorus in memory of those who died in the terrorist attack on September 11, 2001.¹³⁰ As an instance of the motoric trope, which “evokes an indifferent mechanized process,” Leydon cites Adams’s fanfare entitled *Short Ride in a Fast Machine*. Here, the portrayal of a mechanized process is conspicuous, though I would argue that it is not indifferent. Adams’s fanfare is more about the experience of riding in a fast car for the first time,

Musique à Grande Vitesse; Adams’s *Short Ride in a Fast Machine*); APHASIC – repetition conveys notions of cognitive impairment, madness, or logical absurdity (e.g., Nyman’s *The Man Who Mistook His Wife for a Hat*; Satie’s *Vexations*). Leydon’s musical example for the maternal trope would more accurately be categorized as infantile, a descriptor she uses in her prose. The maternal in music suggests something soothing, such as a cradle song or some other musical concoction. The melody in Raymond’s Scott’s *Soothing Sounds for Baby* generally lies above the pitch C6, which detracts from any sense of comfort associated with a maternal trope.

¹²⁹ Ibid.

¹³⁰ This work depicts “the transition from living to dead, but also the change that takes place within the souls of those that stay behind, of those who suffer pain and loss and then themselves come away from that experience transformed.” John Adams, “*On the Transmigration of Souls*,” *Adams’s Official Website*, accessed on February 25, 2008, <<http://www.earbox.com/W-transmigration.html>>.

rather than just the motorized process of a machine. The composer introduces the piece in the same manner:

The image that I had while composing this piece was a ride that I once took in a sport car. A relative of mine had bought a Ferrari, and he asked me late one night to take a ride in it, and we went out onto the highway, and I wished I hadn't [laughs]. It was an absolutely terrifying experience to be in a car driven by somebody who is not really a skilled driver.¹³¹

Last, Leydon's aphasic trope, which conveys notions of cognitive impairment, madness, or logical absurdity, describes the works she discusses effectively, yet seems unsuitable for my purposes. I do not perceive these qualities in Adams's works, though they are sometimes playful, other times more solemn and sincere, exploring heartfelt subjects and memories or reminiscences (e.g., recalling Schoenberg in *Chamber Music* or the piano roll music of the 1920's in *Century Rolls*). In place of the aphasic trope, we could conceive of a more fitting emotive descriptor. Music critics and Adams himself have described several of his pieces as having a trickster element at times.¹³² Hence, we can conjure up a *trickster* trope, whereby repetition incites a state of playful mischievousness.¹³³

While Leydon's tropes are useful in defining common emotions among repetitive patterns in minimal works, some tropes are very general and only touch on the surface of the music. The motoric trope, for example, serves as an umbrella term that encompasses many subtleties. In order to delve deeper into the affective state of motoric tropes, we ought to consider all musical parameters.

I have shown that Adams extends his contrapuntal techniques of canons and unison displacements to three voices. His procedure for unison displacements resembles that of two voices, but has a slightly freer approach in maintaining unisons throughout. There is also freedom in the note relationship between patterns, which I considered earlier through the temporal proximity of unisons that are created through

¹³¹ Ibid.

¹³² Edward Strickland, "From *Nixon in China* to Walt Whitman: An Interview with John Adams," *Fanfare* 13/3 (January-February 1990): 56, 58.

¹³³ In his interview with Strickland, Adams interprets *Grand Pianola Music* as a trickster piece rather than a conscious parody of earlier musical styles. This trickster persona reappears sporadically in the recent instrumental works.

polyrhythms. Canonic techniques maintain a similar approach as well, including the same entry points between following voices and an abundance of perfect intervals. The quality of these canonic passages is clearly motoric as Leydon describes, but with a sense of freedom unknown to earlier minimalist motoric pieces, such as Reich's *Piano Phase*. Last, canonic passages and polyrhythmic displacements are not mutually exclusive, but are at times juxtaposed, while generally maintaining the same writing principles as their two-voice counterparts.

CHAPTER 5

OTHER POLYPHONIC STRUCTURES

Introduction

In this chapter, I will discuss other polyphonic textures in Adams's recent instrumental music that do not feature the techniques discussed from earlier chapters, such as the use of canons or unison displacements. The passages under consideration, drawn from *My Father Knew Charles Ives* (2003), *Guide to Strange Places* (2001), *Naive and Sentimental Music* (1997–98), and *Slonimsky's Earbox* (1996), will show multiple parts working together to create a uniform sound.

These textures will be examined from pitch *and* pitch-class perspectives. A pitch-space approach will reveal Adams's norms on doubling and overlapping, voicing and scoring, pitch range, and other features, whereas a pitch-class perspective focuses attention on the pitch-class ordering and also the types of simultaneities that these polyphonic lines generate. Since polyphony presents unique analytical challenges, I will suggest some general guidelines for segmentation that are suitable for these passages. Once I have segmented each polyphonic passage, I will compare the pitch-class collections using a similarity index, which will be discussed shortly.

Exploring Polyphony

The following discussion addresses five passages that are realized in a polyphonic style; their full-page graphs are grouped together in Figures 5.1–5.10. Each passage has been graphed in pitch and pitch-class space. The pitch-space graphs are illustrated in color to show the melodic path of individual instruments, instrument families, or doubled instruments, depending on the graph viewed. Not all of the measures are spaced evenly: their width expands or contracts according to changes in meter that

occur in the score. The length of each beat has been preserved across changing meters; thus, temporal distances are not distorted by the graphs.¹³⁴

Although pitch-class space highlights more general observations about a musical passage, it obscures features that can only be captured in pitch space. In a recent article entitled “Zones of Impingement: Two Movements from Bartók’s *Music for Strings, Percussion, and Celesta*,” Jonathan W. Bernard attempts to “invert the customary relationship between pitch and pitch class by conducting a basically pitch-space analysis that [incorporates] observations derived from pitch-class (pc-) space analysis.”¹³⁵ Bernard’s graphs of Bartók’s musical excerpts are in pitch space, while noting relationships that pertain to the pitch-class space realm, which he calls zones of impingement. My approach bears some resemblance to Bernard’s methodology, since it considers both spaces vital to musical analysis.

Turning our attention to the graphs in pitch space, we can observe that the doubling of different instruments occurs either for the entire duration of a polyphonic passage or in sporadic bursts. The former type of doubling serves to strengthen a melodic line. For instance, in *Slonimsky’s Earbox*, mm. 464–92, Adams doubles the lowest melodic line, using bassoons, a trombone, bass clarinet, and tuba. The other type of doubling practice, which appears irregularly, results in added color or timbre. In this scenario, a pitch is doubled (or even tripled). Doubling does not necessarily persist for the entire duration of a pitch. One instrument sometimes drops out before a pitch subsides, or an instrument might double in a gradual manner, that is, entering sometime after the pitch has emerged, giving an effect of changing color. In the excerpts provided, such sporadic doubling (and tripling) first appears near the middle of a passage—for example, as in the graph in Figure 5.5, from *My Father Knew Charles Ives*, mm. 126–145.

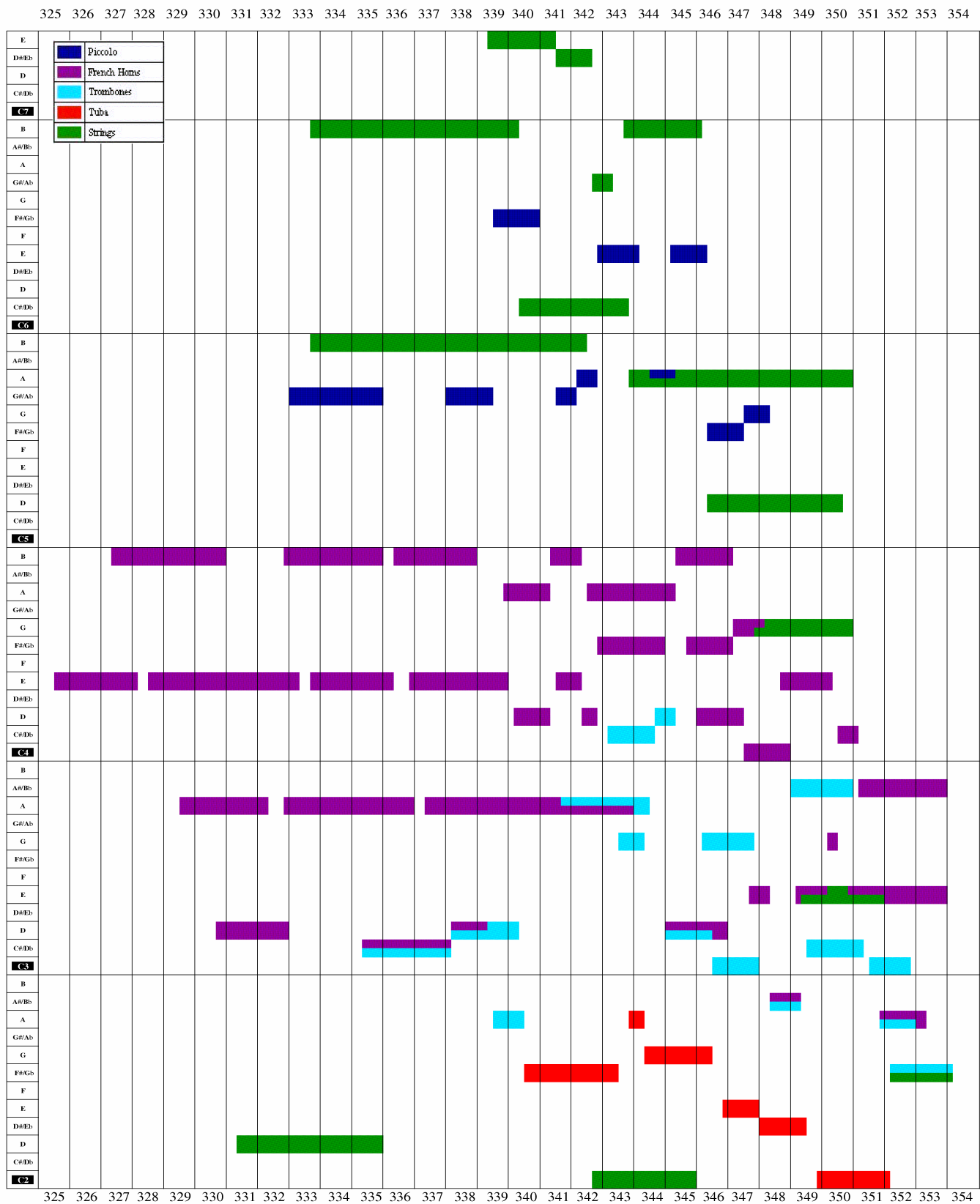
¹³⁴ To ensure accuracy, each graph has been created using hidden cells that represent eighth-note or quarter-note subunits; the result is an accurate temporal depiction of each passage. Since Adams’s excerpts are expressed in simple meter, triplet figures go against the metrical grid and are thus approximated to their nearest subunit. I do not include repeated notes since they are not discernable in the relevant passages.

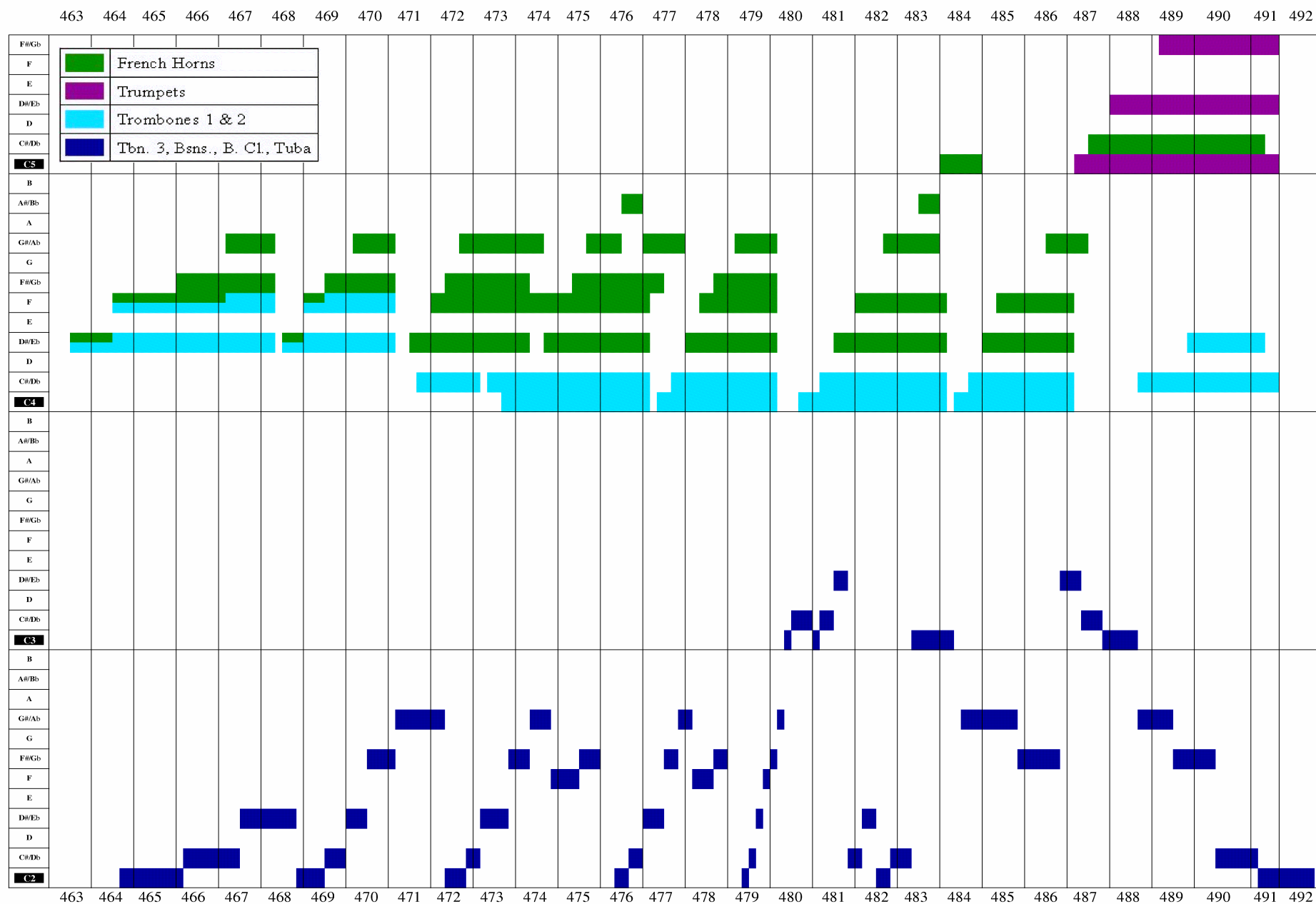
¹³⁵ Jonathan W. Bernard, “Zones of Impingement: Two Movements from Bartók’s *Music for Strings, Percussion, and Celesta*,” *Music Theory Spectrum* 25/1 (Spring 2003): 5. See also Jane Piper Clendinning, “Contrapuntal Techniques in the Music of György Ligeti” (Ph.D. diss., Yale University, 1989). My pitch space graphs stem from more closely from Clendinning’s range graphs, which she uses to analyze the music of György Ligeti.

Pitch-space graphs also illustrate other features, such as the range of single instruments and orchestra as a whole, as well as entrance points. Perhaps the most obvious observation in all these passages is that Adams introduces each pitch through a gradual additive process. The instruments that appear from the onset of a polyphonic passage have greater presence than those that are inserted towards the end.

Orchestral pitch range varies from approximately three to five octaves. At times, musical lines of individual instruments and instrument families have a repetitive quality, such as the French horns in Figure 5.2, from *Slonimsky's Earbox*, mm. 463–83. In other instances, their intervallic succession is more active, such as in Figure 5.3, from “Naive and Sentimental Music,” mm. 181–200, where individual instruments exhibit numerous leaps and a wide pitch range. Yet in all the polyphonic passages (despite their level of activity), there are no tertian triadic arpeggiations. Clearly, one can gather more detailed information such as the interaction of instruments and instrument families from the pitch-space graphs, but I will exclude such further discussion since it would primarily show the distinctive traits of each passage at a more microscopic level than would pitch-class analysis; nevertheless, such an endeavor could prove worthwhile within the confines of intra-opus analysis.

We can focus on the more general elements in the polyphonic passages through pitch-class based analysis. The pitch graphs in Figures 5.1–5.5 have been transformed into pitch-class space in Figures 5.6–5.10. Four of the pc graphs feature an additional row with unordered sets labeled *simultaneous textures*, which will be discussed later. The manner in which pcs are introduced varies in each graph. In “Naive and Sentimental Music,” for example, the order in which Adams initiates new pitch classes emphasizes adjacent major and minor seconds <t-e-7-5-4-2-0>, while in *Slonimsky's Earbox*, mm. 325–354, interval-class five is more prominent <4-e-9-2-8-1-6-3-0-7-t>. Comparing the excerpts shows that Adams utilizes a wide variety of intervals to introduce new pitch classes.



Figure 5.2: Polyphony in *Slonimsky's Earbox*, mm. 463–92

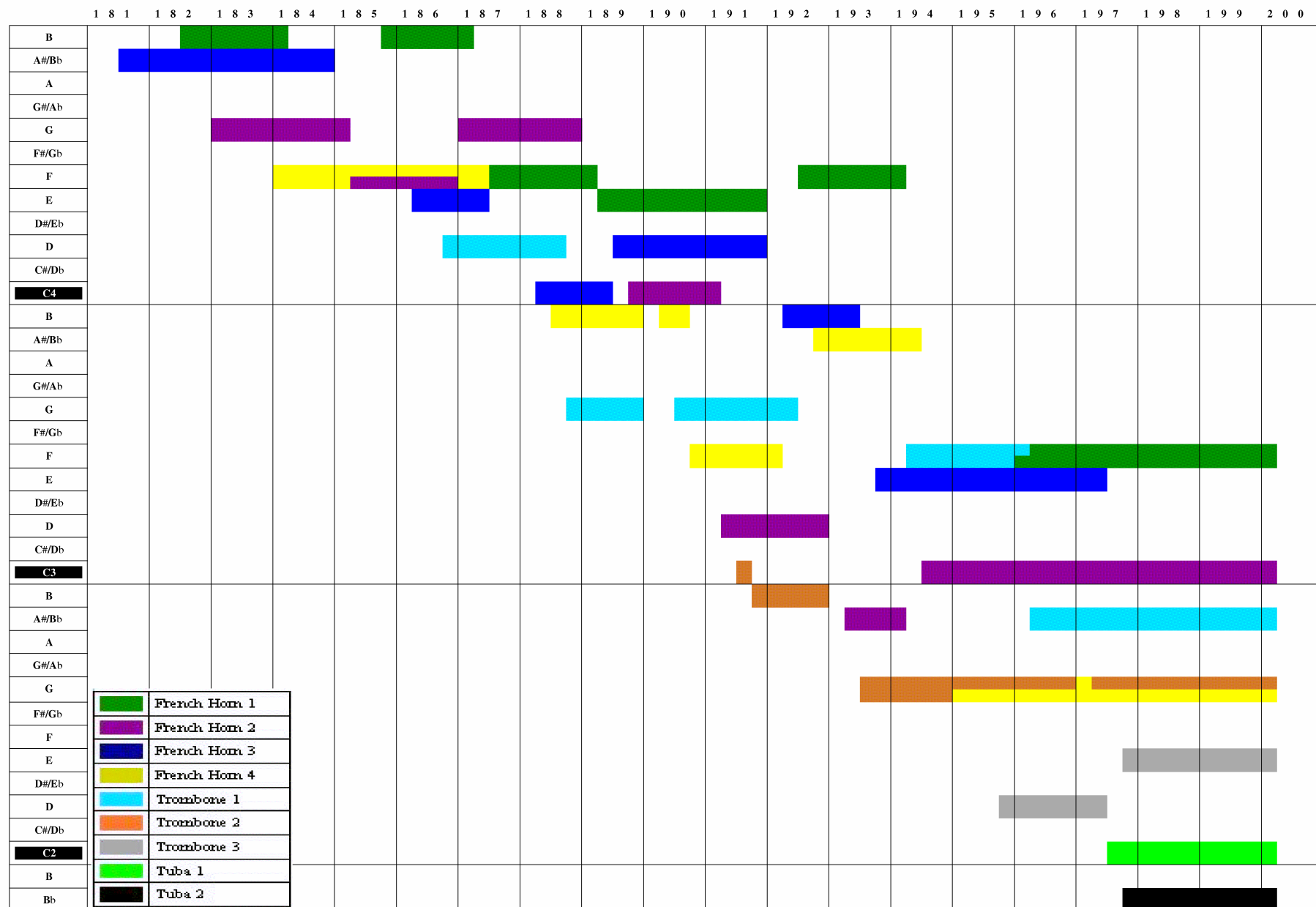


Figure 5.3: Polyphony in “Naive and Sentimental Music,” mm. 181–200

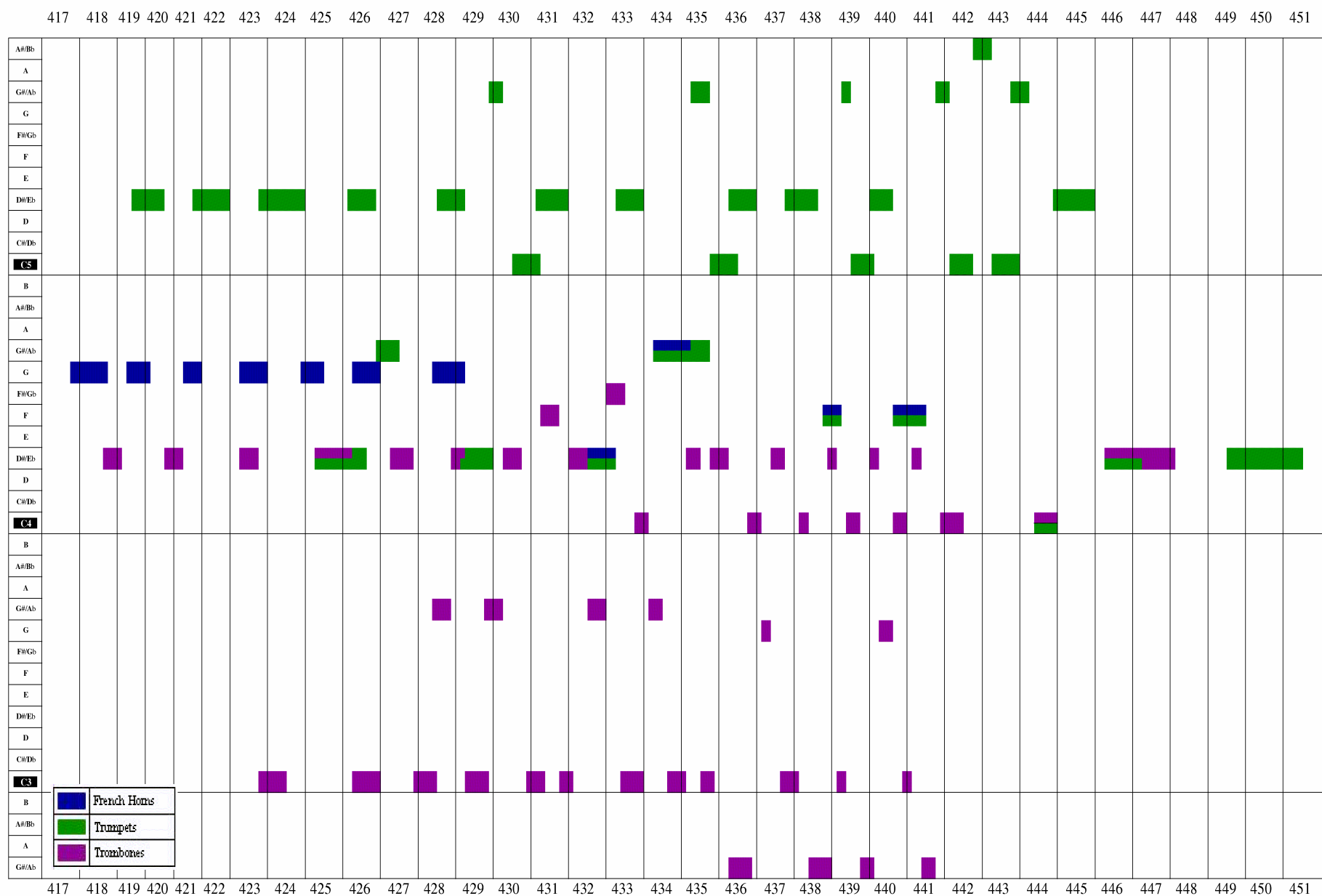


Figure 5.4: Polyphony in *Guide to Strange Places*, mm. 417–51

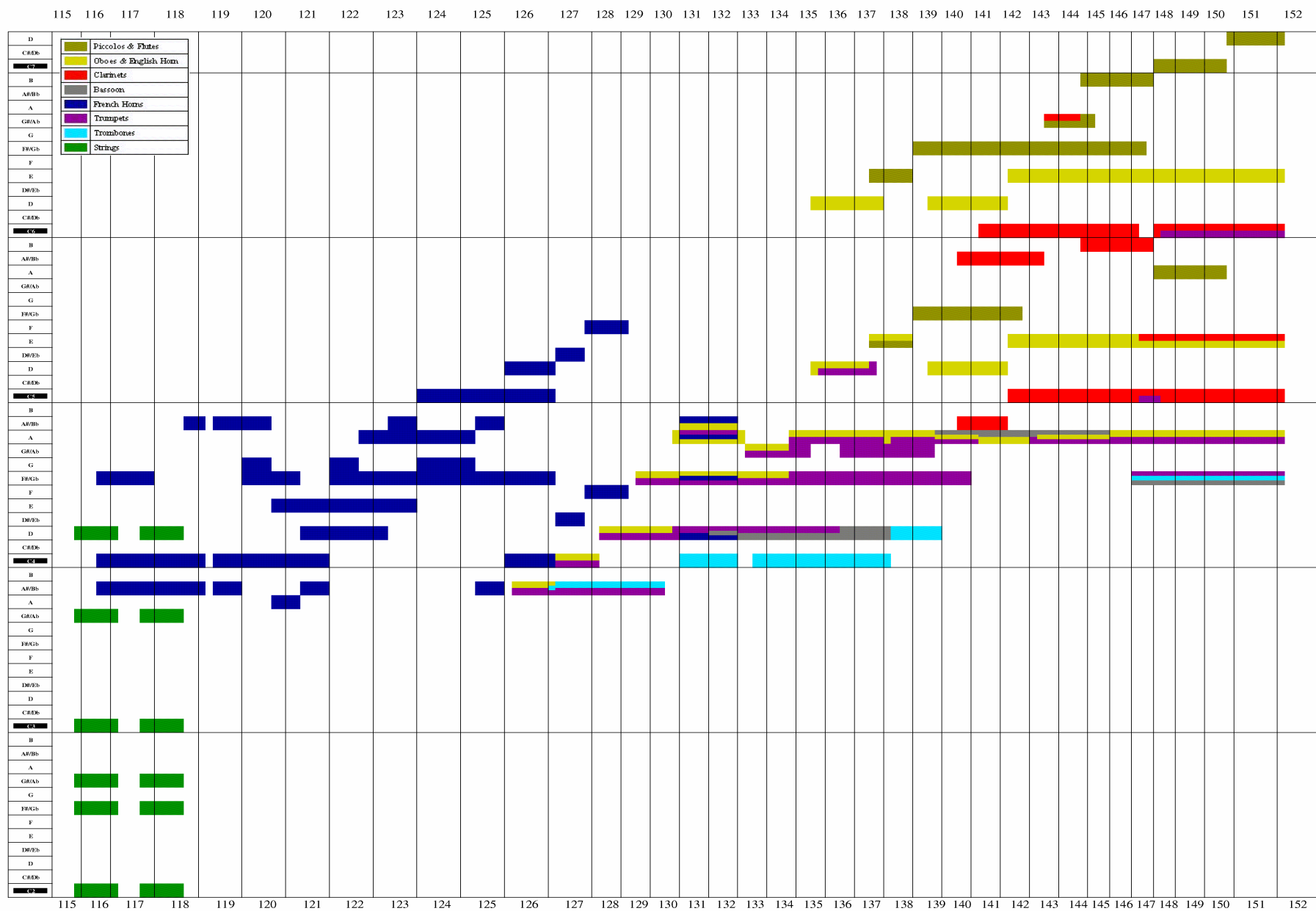


Figure 5.5: Polyphony in *My Father Knew Charles Ives*, “The Mountain,” mm. 115–52

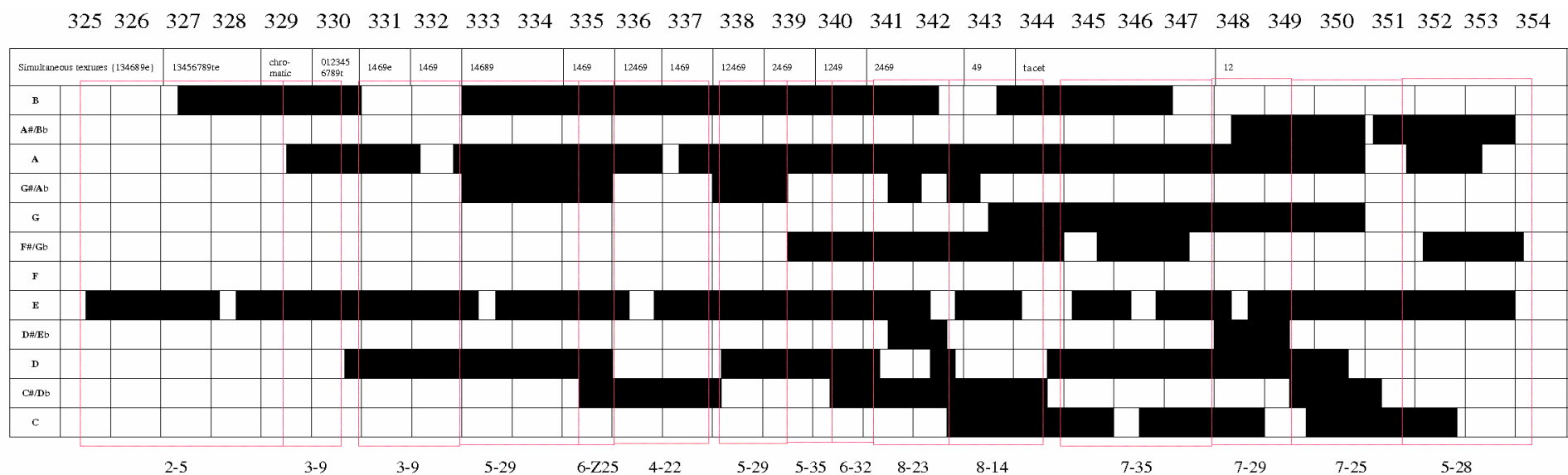


Figure 5.6: Polyphony Pitch-Class Graph from *Slonimsky's Earbox*, mm. 325–54

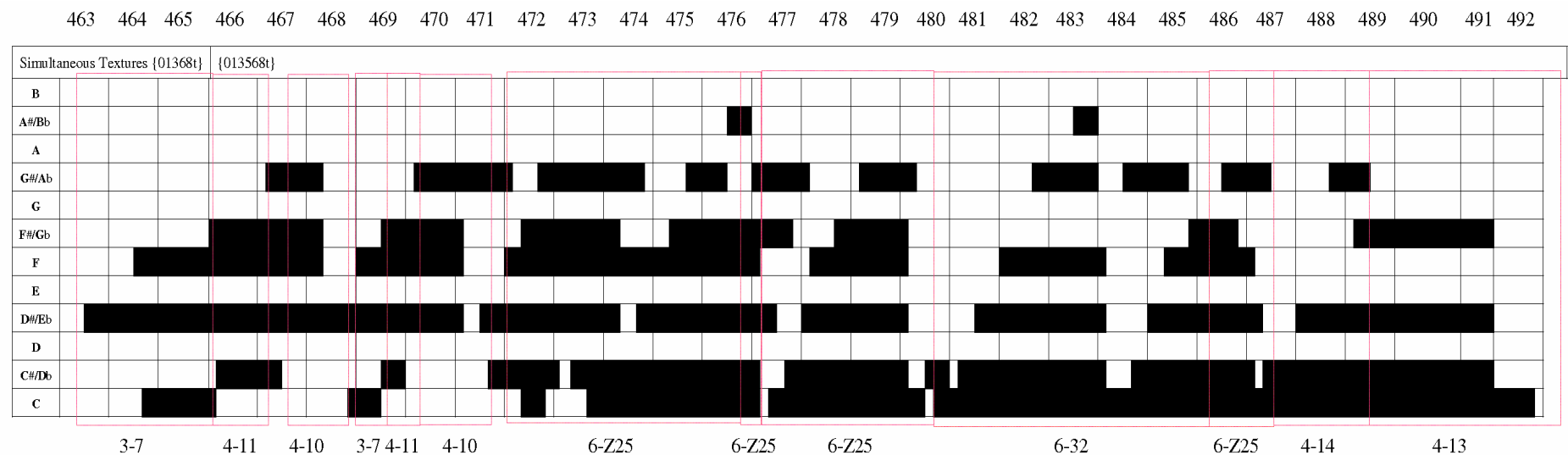


Figure 5.7: Polyphony Pitch-Class Graph from *Slonimsky's Earbox*, mm. 463–92

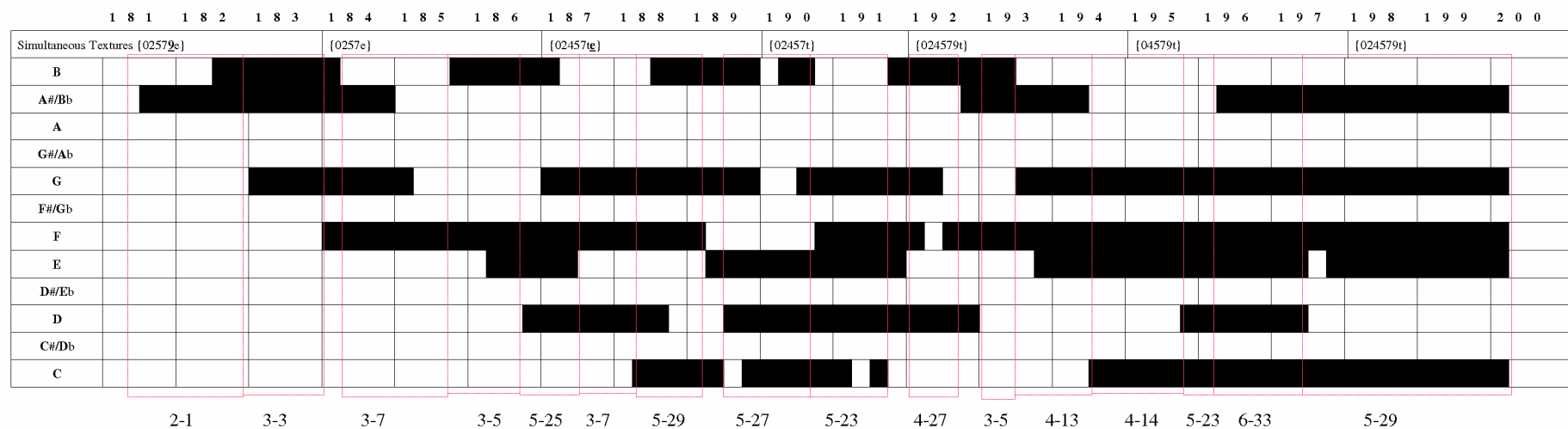


Figure 5.8: Polyphony Pitch-Class Graph from “Naive and Sentimental Music,” mm. 181–200

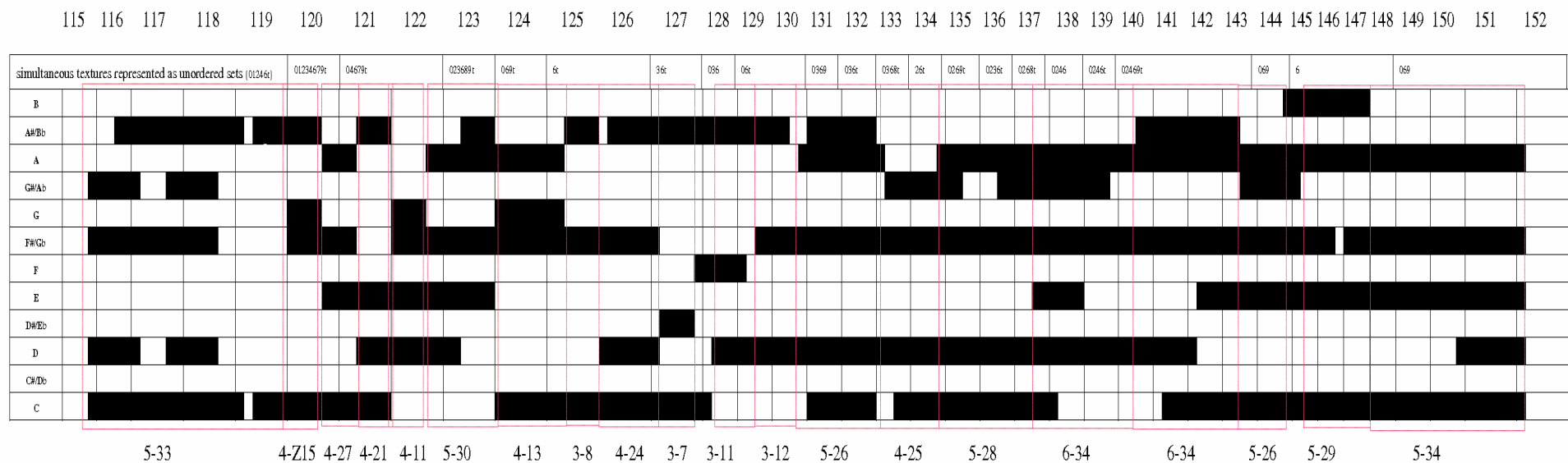


Figure 5.9: Polyphony Pitch-Class Graph from *My Father Knew Charles Ives*, “The Mountain,” mm. 115–52

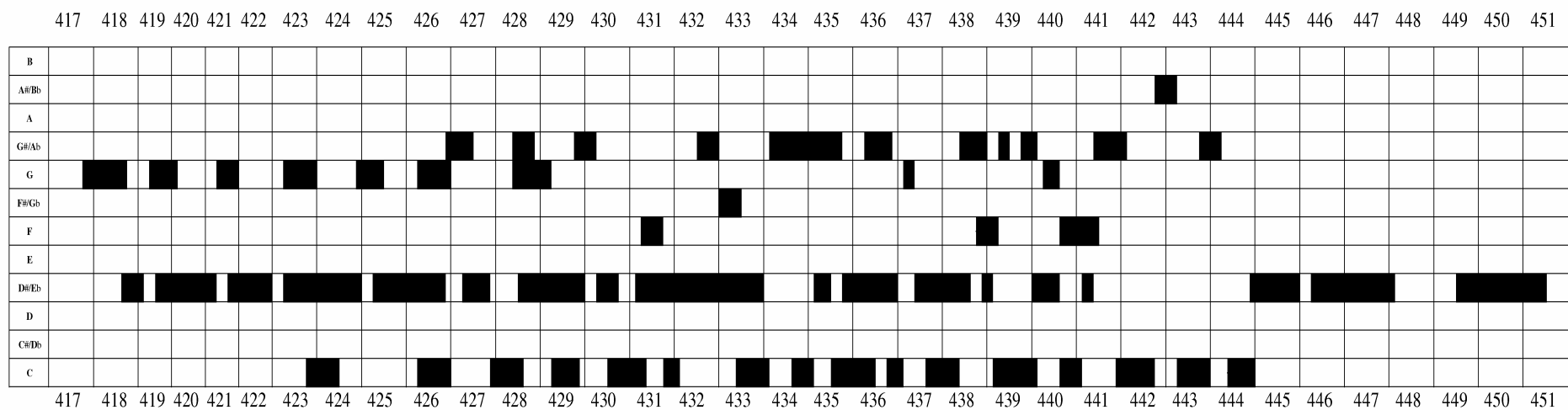


Figure 5.10: Polyphony Pitch-Class Graph from *Guide to Strange Places*, mm. 417–51

By considering all pitch classes from a passage as a single collection, we can compare their interval class vectors (abbreviated as ICV) as shown in Table 5.1. Their respective cardinalities consist of either septachords or what can be referred to as the “undecachord” collection, which has eleven pitch classes. The underlined ICV values represent the lowest possible inclusion of an interval, given its particular cardinality, while the values in bold represent their maximal saturation. The three septachords have more consonant intervals than dissonant ones; ic5 carries most emphasis.

Table 5.1: Collections from Representative Polyphonic Passages

	Forte Label	Set Class	Interval Class Vector
<i>Slonimsky’s Earbox</i> (325–54)	11–1	[0123456789t]	<ttttt5>
<i>Slonimsky’s Earbox</i> (463–92)	7–35	[013568t]	< <u>2</u> 54 <u>3</u> 6 <u>1</u> >
<i>Naïve and Sentimental Music</i>	7–29	[0124679]	<344 <u>3</u> 52>
<i>Guide to Strange Places</i>	7–23	[0234579]	<354 <u>3</u> 5 <u>1</u> >
<i>My Father Knew Charles Ives</i>	11–1	[0123456789t]	<ttttt5>

Aside from the pitch and pitch-class space graphs of *Guide to Strange Places* (Figures 5.4 and 5.10), which stand apart from others in pitch content, individual musical lines tend to combine to form non-tertian sonorities—a trend that is not surprising in light of his earlier instrumental works. Rebecca Burkhardt notes that even as early as *Shaker Loops* (1978), “the tonal centers [Adams] uses are supported through an additive harmonic process that produces sonorities resembling tone clusters instead of the traditional minimalist triad.”¹³⁶ While I do not propose a tonal center in the recent works, Burkhardt’s description of *Shaker Loops* seems to fit the recent instrumental works as well. Considering the excerpt from *Guide to Strange Places* shown in Figures 5.4 and 5.10, it is an exception rather than a norm, since a triadic sonority is prolonged through polyphony. Timothy Johnson’s system for harmonic analysis in the music of John Adams seems useful for this passage in particular, since Johnson’s method favors

¹³⁶ Rebecca Louise Burkhardt, “The Development of Style in the Music of John Adams from 1978 to 1989” (Ph.D. diss., The University of Texas at Austin, 1993), 107.

triads and seventh chords.¹³⁷ This is particularly true of this excerpt, yet we should bear in mind that Adams, like Stravinsky and other modern composers, draws on a plurality of techniques that form his unique style.¹³⁸ In a sense, both Burkhardt and Johnson offer germane assessments of Adams's music, which may at times draw on triadic structures, or conversely, may rely upon tone clusters and other types of vertical figures. Indeed, by combining these two methodologies, we can attain a greater understanding of Adams's music.

Although polyphony in general is assembled in a linear fashion, listeners can perceive the interaction of melodic parts in smaller vertical units. It is not easy to arrive at hard and fast rules for breaking down the polyphonic passages in smaller and workable units, and, in a way, breaking down these passages into vertical units is a highly subjective endeavor. I will establish some general guidelines that will nevertheless permit different possibilities for examining the vertical structures presented in the pitch-class space graphs. Looking at the musical scores, two characteristics of these polyphonic passages are widespread: (1) Adams reduces motivic character to a bare minimum, and (2) durations of notes are drawn out to the extent that meter and rhythm become take a subsidiary role to vertical pitch structures. Based on the second observation, it becomes evident that the onset of vertical events need not coincide with barlines. At times, a vertical unit can be split into two smaller units, thereby providing more detail; it will remain the choice of the analyst to determine the level of specificity. Clearly, a pitch class of long duration will be accounted for within more than one vertical unit. For instance, in Figure 5.9, from *My Father Knew Charles Ives*, pitch-class F# sounds uninterrupted from mm. 129–46. To derive only one unit for these measures is impractical because much detail would be lost. Pitch classes that emerge at nearly the same time are normally accounted for within the same segment (see, for example, set

¹³⁷ Timothy Alan Johnson, "Harmony in the Music of John Adams: From *Phrygian Gates* to *Nixon in China*" (Ph.D. diss., State University of New York, Buffalo, 1991).

¹³⁸ Dmitri Tymoczko, "Stravinsky and the Octatonic: A Reconsideration," *Music Theory Spectrum* 24/1 (Spring 2002): 68–102. When dealing with Stravinsky's works, Dmitri Tymoczko calls for a "methodological hodge-podge" of analytical tools. As Tymoczko states, a number of different components jointly produce the "Stravinsky sound." My understanding of John Adams's music is largely based on the same bottom-up approach.

class 5–26 in mm. 130–32). Last, a pitch class that ceases soon after a new unit and resumes before the unit ends is considered a member of that set class. To elucidate this point further, pitch-class G# in mm. 135–37 does not prove a strong presence at the beginning of set class 5–28, yet it reappears within the unit, thereby reinforcing its status.

Following these basic guidelines, I have divided the passages into constituent set classes that can be meaningfully compared. The four graphs where set classes have been identified comprise a total of 38 different collections, ranging from dyads to octachords.¹³⁹ The most frequent set classes include 3–7 [025], 5–29 [01368], and 6–Z25 [013568], each represented in three of the four graphs. Set classes 3–7 and 5–29 are both subsets of 6–Z25; set class 6–Z25 is, in turn, a subset of the diatonic collection. As might be expected, there are a greater variety of set classes in the graphs where Adams utilizes the undecachord collection, while there are fewer set classes and greater repetition in graphs that draw pitches from their respective septachord collection. For example, *Slonimsky's Earbox*, mm. 463–92, composed from a 7–35 collection, has repetitions of four different set classes. This septachord has relatively few subset types compared to other collections of the same cardinality. Segments that are adjacent and have the same set class are labeled independently *only* when they represent different sets. For instance, in *Slonimsky's Earbox*, mm. 472–76 (see Figure 5.7), the adjacent versions of set class 6–Z25 are related by inversion: {013568} maps onto {01356t} at T₆I. The transformation is not very meaningful in this particular passage; nevertheless, I have identified the segment to show the relation to its preceding neighbor segment. Moving on to the relationship between initial and concluding set classes, the former often consists of an abstract subset of the latter set class. Perhaps a more significant aspect of the opening structure is the first note or two notes of each passage, which remain prominent throughout and normally persist until the end.

¹³⁹ I have not subjected the passage from *Guide to Strange Places* to this kind of analysis because, unlike the other excerpts, it merely prolongs one or two collections throughout its entire duration. For this graph, it would be more useful to think in diatonic space since it is centric, based on a C-minor triad.

Now that I have discussed some aspects of Adams's polyphony, we shall consider the relation of pitch-class collections within each passage. One possible approach for comparing collections entails using similarity measures, which give a value for similarity between two collections. Several of these measures devised by theorists are designed to only compare set classes of equal cardinality.¹⁴⁰ Since I have identified segments of varying cardinalities, such measures will not suffice. There are other similarity measures that can manage unordered sets of different sizes. I will be using Michael Buchler's cyclic saturation similarity index (or CSATSIM), since it deals with different cardinalities particularly well. Buchler's CSATSIM focuses on the partitioning of set classes into interval cycles. This measure also seems suitable for Adams, given his affinity for Slonimsky's *Thesaurus*, a book arranged according to interval cycles. CSATSIM measurements are based on the notion that set classes containing consecutive elements within an interval cycle will project that interval class more strongly. In this regard, 4–13 [0136] projects a 3-cycle slightly more than 4–3 [0134], even though they share an equal representation of minor thirds, because the former embeds a longer 3-cycle segment.

The algorithms behind CSATSIM are elaborate and outside the scope of this dissertation, yet we can examine the average values of similarity that CSATSIM produces for sets of equal or differing cardinalities.¹⁴¹ Table 5.2 recreates Buchler's statistical summary of CSATSIM values ranging from dyads to decachords; it will be used to contextualize set-class comparisons in Adams's polyphonic passages.¹⁴² The numbers outside of each cell represent the cardinality of a set. As an example, to

¹⁴⁰ For instance, Allen Forte's R relations can only relate sets of the same size. To account for different cardinalities, Forte also developed the what he calls the K relation. Allen Forte, *The Structure of Atonal Music* (New Haven: Yale University Press, 1973), 47–49, 93–97. Aside from Forte, Eric Isaacson, Marcus Castrén, Robert D. Morris, Michael Buchler, and various other scholars have developed similarity measures and discussed their work in music-theoretical journals.

¹⁴¹ A detailed explanation can be found in Michael Buchler, "Broken and Unbroken Interval Cycles and Their Use in Determining Pitch-Class Set Resemblance," *Perspectives of New Music* 38/2 (Summer 2000): 52–87. Buchler has developed a computer program (called *Setmaker*) to speed computations involving CSATSIM and other similarity measures. For a freeware copy, see "Michael Buchler's Homepage," accessed on May 30, 2007, <<http://mailer.fsu.edu/~mbuchler>>.

¹⁴² Idem, "Broken and Unbroken Interval Cycles and Their Use in Determining Pitch-Class Set Resemblance," *Perspectives of New Music* 38/2 (Summer 2000): 83.

compare a trichord with a pentachord, we would look at the cell on the second column from the left, and fourth row from the top. Looking at the values within each cell, starting counterclockwise from the upper left corner, the first number represents the lowest value generated by any two sets of those cardinalities; the second number is the lowest non-zero value, the third number represents the average value, the fourth number shows the total quantity distinct values, and the fifth number shows the highest possible value. The values in each cell range from 0 (maximally similar), to 1 (least similar, which is a hypothetical value).

Table 5.2: Buchler's CSATSIM Set-Class Comparison

#2		#3		#4		#5		#6		#7		#8		#9		#10	
#2	0.000 0.333 0.333 2 0.278	#3		#4		#5		#6		#7		#8		#9		#10	
#3	0.000 0.597 0.103 0.149 0.359 18	#4		#5		#6		#7		#8		#9		#10			
#4	0.107 0.574 0.107 0.082 0.413 51	#5		#6		#7		#8		#9		#10					
#5	0.231 0.730 0.231 0.148 0.520 102	#6		#7		#8		#9		#10							
#6	0.226 0.795 0.226 0.206 0.579 195	#7		#8		#9		#10									
#7	0.217 0.779 0.217 0.123 0.540 156	#8		#9		#10											
#8	0.069 0.727 0.069 0.154 0.502 128	#9		#10													
#9	0.116 0.688 0.116 0.056 0.450 56	#10															
#10	0.021 0.743 0.021 0.066 0.441 30																

The pitch-class graphs from Figures 5.6–10 have been calculated for CSATSIM analysis in Figures 5.11–5.14 (except for *Guide to Strange Places*, which, as stated earlier, is unlike the other graphs).¹⁴³ The cells that are shaded black represent adjacent

¹⁴³ The CSATSIM values have been generated through Buchler's computer freeware *Setmaker*.

set classes, which form the most discernable connections since a listener will perceive these changes directly. The unshaded cells compare set classes that are not temporally adjacent. Numbers marked in bold have a higher-than-average CSATSIM value, given their cardinality; numbers marked in italics indicate the lowest possible CSATSIM value for their group; numbers that have an asterisk symbol match the average CSATSIM value (refer to Table 5.2). I have excluded opening dyads from my comparisons because the relationship of dyads to sets of higher cardinalities is considerably less meaningful than comparisons among larger sets due to the unary quality of their interval-class vectors. Adjacent repetitions of the same set class are also omitted from my analysis. Moreover, in order to avoid a bias towards favoring non-adjacent repeated set classes, I have omitted the cells that are duplicated as a result of comparing identical set classes (the purpose of this will become clear shortly).

By calculating the deviation of CSATSIM values from their respective CSATSIM averages, the degree of similarity between sets can be better understood. This procedure will bring to light the interrelation of pitch materials Adams utilizes in polyphonic passages, whether they are closely or distantly related, or lie near the average. Since each group of cardinalities yields a different average value, finding a uniform method for comparing deviation for all groups will help interpret the data. The raw data will be converted into percent above or below average CSATSIM values. The formula for percent above and below is as follows:

$$\text{Percent above or below} = 100 (\text{CSATSIM value of two sets} - \text{Average CSATSIM value}) / \text{Average CSATSIM value}$$

Take, for instance, set classes 4–10 [0235] and 4–11 [0135] from *Slonimsky's Earbox*, mm. 463–66, which yield a CSATSIM value of 0.100. The average CSATSIM value for comparing tetrachords is 0.258. Then clearly, the two sets are rather similar; they each contain two major seconds and also project a 2-cycle (4–10 also projects a 3-cycle). As Table 5.2 shows, 0.100 lies near the lowest possible CSATSIM value between two tetrachords, which is 0.091. To measure the percent above or below, we apply the given formula, such that: $100 (0.100 - 0.258) / 0.258 \approx -61.2\%$, or 61.2% below the average CSATSIM value.

	1 3-9 [027]	2 5-29 [01368]	3 6-Z25 [013568]	4 4-22 [0247]	5 5-29 [01368]	6 5-35 [02479]	7 6-32 [024579]	8 8-23 [0123578t]	9 8-14 [01245679]	10 7-35 [013568t]	11 7-29 [0124679]	12 7-25 [0234679]	13 5-28 [02368]
1	0.000												
2	0.317	0.000											
3	0.381	0.128	0.000										
4	0.235	0.226	0.332	0.000									
5	0.317	0.000	0.128	0.226	0.000								
6	0.177	0.189	0.264	0.170	0.189	0.000							
7	0.280	0.193	0.157	0.280		0.129	0.000						
8	0.154	0.173	0.193	0.159		0.075	0.090	0.000					
9	0.342	0.205	0.189	0.240		0.289	0.281	0.234	0.000				
10	0.198	0.184	0.191	0.195		0.041	0.068	0.060	0.287	0.000			
11	0.393	0.086	0.070	0.302		0.250*	0.196	0.191	0.159	0.202	0.000		
12	0.380	0.140	0.129	0.371		0.303	0.239	0.300	0.242	0.286	0.084	0.000	
13	0.468	0.171	0.234	0.299		0.360	0.364	0.372	0.257	0.374	0.157	0.229	0.000

Figure 5.11: CSATSIM Matrix of *Slonimsky's Earbox*, mm. 325–54

	1 3-7 [025]	2 4-11 [0135]	3 4-10 [0235]	4 3-7 [025]	5 4-11 [0135]	6 4-10 [0235]	7 6-Z25 [013568]	8 6-32 [024579]	9 6-Z25 [013568]	10 4-14 [0237]	11 4-13 [0136]
1	0.000										
2	0.154	0.000									
3	0.154	0.100	0.000								
4	0.000		0.154	0.000							
5	0.154	0.000		0.154	0.000						
6	0.154	0.100	0.000		0.100	0.000					
7	0.374	0.317	0.252			0.252	0.000				
8	0.386	0.348	0.283				0.157	0.000			
9	0.374	0.317	0.252				0.000	0.157	0.000		
10	0.154	0.109	0.191				0.269	0.255	0.269	0.000	
11	0.153	0.201	0.100				0.199	0.334		0.201	0.000

Figure 5.12: CSATSIM Matrix of *Slonimsky's Earbox*, mm. 463–92

Key: shaded boxes = adjacent set classes; non-shaded boxes = non-adjacent set classes; italics = lowest CSATSIM value for that group; asterisk = average CSATSIM value; numbers in bold = higher-than-average CSATSIM value

	1 3-3 [014]	2 3-7 [025]	3 3-5 [016]	4 5-25 [02358]	5 3-7 [025]	6 5-29 [01368]	7 5-27 [01358]	8 5-23 [02357]	9 4-27 [0258]	10 3-5 [016]	11 4-13 [0136]	12 4-14 [0237]	13 5-23 [02357]	14 6-33 [023579]	15 5-29 [01368]
1	0.000														
2	0.298	0.000													
3	0.298	0.298	0.000												
4	0.349	0.251	0.277	0.000											
5	0.298	0.000	0.298	0.251	0.000										
6	0.333	0.261	0.335	0.097	0.261	0.000									
7	0.238	0.285	0.409	0.170		0.105	0.000								
8	0.280	0.255	0.330	0.186		0.089	0.090	0.000							
9	0.266	0.153	0.351	0.204		0.195	0.193	0.258	0.000						
10	0.298	0.298	0.000	0.277		0.335	0.409	0.330	0.351	0.000					
11	0.266	0.153	0.237	0.122		0.113	0.193	0.176	<i>0.091</i>	0.237	0.000				
12	0.140	0.154	0.295	0.255		0.183	0.119	0.148	0.201		0.201	0.000			
13	0.280	0.255	0.330	0.186		0.089	0.090	0.000	0.258		0.176	0.148	0.000		
14	0.434	0.391	0.391	0.194		0.120	0.157	0.130	0.297		0.232	0.260	0.130	0.000	
15	0.333	0.261	0.335	0.097		0.000	0.105	0.089	0.195		0.113	0.183		0.120	0.000

Figure 5.13: CSATSIM Matrix of “Naive and Sentimental Music,” mm. 181–200

	1 5-33 [02468]	2 4-215 [0146]	3 4-27 [0258]	4 4-21 [0246]	5 4-11 [0135]	6 5-30 [01468]	7 4-13 [0136]	8 3-8 [026]	9 4-24 [0248]	10 3-7 [025]	11 3-11 [037]	12 3-12 [048]	13 5-26 [02458]	14 4-25 [0268]	15 5-28 [02368]	16 6-34 [013579]	17 5-26 [02458]	18 5-29 [01368]	19 5-34 [02469]
1	0.000																		
2	0.414	0.000																	
3	0.422	0.100	0.000																
4	0.108	0.303	0.312	0.000															
5	0.370	0.100	0.201	0.294	0.000														
6	0.346	0.165	0.255	0.291	0.192	0.000													
7	0.503	0.100	<i>0.091</i>	0.403	0.201	0.255	0.000												
8	0.268	0.226	0.237	0.222	0.295*	0.397	0.351	0.000											
9	0.100	0.312	0.321	0.141	0.303	0.247	0.412	0.247	0.000										
10	0.490	0.141	0.153	0.363	0.154	0.323	0.153	0.298	0.388	0.000									
11	0.490	0.141	0.153	0.363	0.140	0.323	0.266	0.298	0.374	<i>0.149</i>	0.000								
12	0.261	0.404	0.415	0.286	0.403	0.390	0.528	0.345	0.112	0.494	0.345	0.000							
13	0.346	0.165	0.157	0.291	0.192	0.089	0.157	0.397	0.247	0.323	0.323	0.390	0.000						
14	0.134	0.274	0.283	0.120	0.283	0.273	0.374	0.097	0.130	0.352	0.327	0.250	0.273	0.000					
15	0.377	0.131	0.122	0.355	0.174	0.193	0.122	0.256	0.363	0.281	0.281	0.510	0.105	0.247	0.000				
16	0.409	0.207	0.201	0.357	0.256	0.154	0.201	0.419	0.364	0.381	0.344	0.488	0.154	0.336	0.159	0.000			
17	0.346	0.165	0.157	0.291	0.192	0.089	0.157	0.397	0.247	0.323	0.323	0.390	0.000	0.273	0.105	0.154	0.000		
18	0.548	0.203	0.195	0.428	0.246	0.202	0.113	0.407	0.436	0.261	0.359	0.562	0.202	0.401	0.171	0.198	0.202	0.000	
19	0.360	0.211	0.121	0.291	0.191	0.195	0.203	0.344	0.299	0.270	0.245	0.473	0.195	0.264	0.179	0.140		0.188	0.000

Figure 5.14: CSATSIM Matrix of *My Father Knew Charles Ives*, “The Mountain,” mm. 115–52

Key: shaded boxes = adjacent set classes; non-shaded boxes = non-adjacent set classes; italics = lowest CSATSIM value for that group; asterisk = average CSATSIM value; numbers in bold = higher-than-average CSATSIM value

Most of Adams's adjacent set classes lie below average CSATSIM values, meaning that they are more related than average. Table 5.3(a) shows a comparison of CSATSIM values from *Slonimsky's Earbox*, mm. 463–92, to the average values for each cardinality—these values are rounded off to the nearest tenth of a percent. There are no adjacent values with a higher value than the CSATSIM average for that group. Calculating the mean average of these percentages shows an approximate value of 38% below average. In Table 5.3(b) from *My Father Knew Charles Ives*, there is a greater balance between adjunct set classes that are closely related and those that are not—seven of eighteen resulting values lie above their average. The mean average of all set classes shows a value of 8.24% below average, which is a significant difference from *Slonimsky's Earbox*, mm. 463–92. The other two CSATSIM matrices from Adams's polyphonic passages resemble Table 5.3(a) more closely in their abundance of similar set-classes.

The data discussed thus far has represented Adams's polyphonic passages from his recent compositions. The passages normally comprise collections that are closely related in pitch content. Discovering that there is a high degree of similarity between adjacent set-classes in three of the graphs I have provided raises several important questions: Does the manner in which Adams unfolds melodic parts affect the level of similarity between neighboring set classes? If so, is their high degree of similarity simply a byproduct of Adams's polyphonic style? The answer to the first question is undoubtedly yes. Since voices enter in a gradual manner, the segmentation method highlights such an additive process. When the number of melodic parts increases, preceding set classes are often embedded within succeeding ones. However, one must not assume that a gradual linear process alone generates related set classes. In *My Father Knew Charles Ives*, for instance, the overall CSATSIM values lie closer to the average, even though the polyphonic style seems to resemble that of the other passages. But why is there such a big discrepancy of CSATSIM values between *My Father Knew Charles Ives* and the other instrumental works? I believe that Adams's general artistic aim or inspiration for each work has some bearing on the polyphonic excerpts. As one music critic states of *My Father Knew Charles Ives*, "Adams skillfully channels the spirit and sound world of Ives without perpetrating any outright theft. This

is Ives filtered through Adams's memory."¹⁴⁴ In a sense, Adams's polyphonic style reflects nostalgic memories of Ives's music with all its idiosyncrasies. In the words of Adams,

Ives's music, for all its daring experiments in rhythm and polyphony, always mixed the sublime with the vulgar and sentimental, and he did so with a freedom and insouciance that could only be done by an American. . . . *My Father Knew Charles Ives* is a musical autobiography, an homage and encomium to a composer whose influence on me has been huge.¹⁴⁵

In "Naive and Sentimental Music," Adams encapsulates the naive, "for whom art is a natural form of expression, uncompromised by self-analysis or worry over its place in the historical continuum."¹⁴⁶ The mood of this movement is itself naive and complacent, and therefore reflected by the slow unfolding melodic parts in this polyphonic excerpt.

These depictions of *My Father Knew Charles Ives* and the first movement from *Naive and Sentimental Music* also help elucidate their differences between non-adjacent set classes. Of the four excerpts in which I used CSATSIM to inform my analysis, *My Father Knew Charles Ives* once again boasts the most even distribution of set classes that lie below and above the average CSATSIM value. In this graph, there is a heavier concentration of distantly related set-classes near the beginning, and, subsequently a more balanced allotment of values afterward. Interestingly, the CSATSIM value between set classes 4–13 [0136] and 4–27 [0258] in Figure 5.9, two subsets of the octatonic collection that take place between the third and seventh collections, yields the lowest possible CSATSIM value between tetrachords (0.091). On the other hand, highest CSATSIM values are not represented in any of the similarity matrices. Another factor that may account for the nearly even distribution in this graph is the fact that Adams freely draws from the undecachord collection, thereby taking advantage of a wider scope of set classes.

¹⁴⁴ Eric Valliere, "My Father Knew Charles Ives," *Andante*, accessed on May 31, 2007, < <http://www.andante.com/article/article.cfm?id=20776> >.

¹⁴⁵ John Adams, liner notes to *My Father Knew Charles Ives* (Nonesuch Compact Disc 79857-2, 2006), 7.

¹⁴⁶ John Adams, liner notes to *Naive and Sentimental Music* (Nonesuch Compact Disc 79636-2, 2002), 1.

Table 5.3: Comparison and Deviation from Average CSATSIM Values of Adjacent Set-Classes

(a) Slonimsky's *Earbox*, mm. 463–92

Set Classes	3–7 4–11	4–11 4–10	4–10 3–7	3–7 4–11	4–11 4–10	4–10 6–Z25	6–Z25 6–32	6–32 6–Z25	6–Z25 4–14	4–14 4–13
CSATSIM Value	0.154	0.100	0.154	0.154	0.100	0.252	0.157	0.157	0.269	0.201
Average Values	0.297	0.258	0.297	0.297	0.258	0.351	0.201	0.201	0.351	0.258
Percentage (%) Above/Below	-48.1	-61.2	-48.1	-48.1	-61.2	-28.2	-21.9	-21.9	-23.4	-22.1

(b) *My Father Knew Charles Ives*, “The Mountain,” mm. 115–52

Set Classes	5–33 4–Z15	4–Z15 4–27	4–27 4–21	4–21 4–11	4–11 5–30	5–30 4–13	4–13 3–8	3–8 4–24	4–24 3–7	3–7 3–11	3–11 3–12	3–12 5–26	5–26 4–25	4–25 5–28	5–28 6–34	6–34 5–26	5–26 5–29	5–29 5–34
CSATSIM Value	0.414	0.100	0.312	0.294	0.192	0.255	0.351	0.247	0.388	0.149	0.345	0.390	0.273	0.247	0.159	0.154	0.202	0.188
Average Values	0.287	0.258	0.258	0.258	0.287	0.287	0.297	0.297	0.297	0.295	0.295	0.368	0.287	0.287	0.254	0.254	0.232	0.232
Percentage (%) Above/Below	44.3	-61.2	20.9	14.0	-33.1	-11.1	18.2	-16.8	30.6	-49.5	16.9	6.0	-4.9	-13.9	-37.4	-39.4	-12.9	-19.0

Excluding *My Father Knew Charles Ives*, non-adjacent set classes tend to be closely related. In *Slonimsky's Earbox*, mm. 325–54, Adams again uses the undecachord collection, yet 44 of 59 non-adjacent set-classes (approximately 75%) lie below the average CSATSIM value. In this matrix, the main differences arise from the last two set classes, which project ic3 more strongly than other collections. The concluding set class, 7–25 [0234679], which possesses an interval class vector (ICV) of <345342>, is nearly saturated with ic3s. In the penultimate set-class, 5–28 [02368] ICV <122212>, three of its five pcs form consecutive pitches of a 3-cycle; thus, ic3 is slightly more prominent from a cyclic standpoint. In contrast to these two collections, most of the preceding collections emphasize ic5.

The passages where Adams draws from a septachord collection reveal even more similarity among non-adjacent set classes. In *Slonimsky's Earbox*, mm. 463–92, all adjacent set-classes are more similar than the average CSATSIM value. Since there are repeated non-adjacent set-classes, some comparisons will yield a value of zero. In “Naive and Sentimental Music,” mm. 181–200, most values ($68 / 77 \approx 88.3\%$) lie below the CSATSIM average.

The fact that non-adjacent subsets are very similar in excerpts that utilize a septachordal superset is partly due to the superset itself. For example, neither the septachord from *Slonimsky's Earbox* (mm. 463–92), 7–35 [013568t], nor from “Naive and Sentimental Music,” 7–29 [0124679], includes trichord subsets 3–1 [012] and 3–12 [048], which yield the least similar CSATSIM trichord value of 0.509. Perhaps Adams selected these two septachords because they are somewhat similar in this respect, especially when considering that 21 of 38 total septachords, or approximately 55.26%, have both trichords [012] and [048]. Moreover, the septachord heard in the passage from *Guide to Strange Places*, 7–23 [0234579], shares this same feature. Had Adams chosen three septachords at random, the probability that they would not contain both trichords is only $(17 / 38)^3 \approx 8.95\%$, so it seems more likely that Adams willfully selected similar collections. But these septachords do not provide a sole determinant for such similarity, since we can imagine a passage that draws from one of these septachordal collections yet contains more unrelated subsets. To summarize, in the excerpt from *My Father Knew Charles Ives*, the pitch connections between vertical

sounds are disassociated to a certain degree, while in the other excerpts, the effect is the opposite—there is a smooth connection between set classes.

The polyphonic textures we have examined normally inhabit a larger musical context that includes other textures, such as reiterating fragments, ostinati, free melodic units, and harmonic structures. I will now show how these textures relate to the polyphonic textures in pitch content, yet retain their individual status. Adams's procedure for writing polyphonic excerpts differs from his earlier compositional practice where harmony pervades and melody is a derivative process, as in *Nixon in China* (1985–87), or even in passages from recent works where musical lines are motivated by underlying harmonies, such as the walking bass-lines from *Century Rolls* (1996). In an interview conducted by the contemporary composer Robert Davidson in 1999, Adams briefly discusses his more recent compositional workings:

Davidson: Something which has continued through your musical language since the early days is an interest in vertical sonority.

Adams: That's close to the mark for my earlier music, such as *Nixon in China*, which is very vertically organized. The basic way I compose is to take a cluster of sound, like a handful of paint. First of all I give it some kind of rhythmic impetus, and then I let it go forward. There's a sense of a vehicle traveling forward across terrain. . . . I guess you're right referring to vertical sonority, it's just that vertical makes me think of up and down on the x-axis. I don't think of it so much as vertical as I think of it as a harmonic field, which expands, and to which sounds accrete, and then which suddenly goes through transformations.¹⁴⁷

Adams gives a good description of his compositional method; as we have observed in the polyphonic excerpts, his musical palette creates sonorities that unfold in a gradual manner. Moreover, his concept of a harmonic field (as opposed to simply harmony) is fitting to the polyphonic musical examples I have included.¹⁴⁸ Rather than establishing a strong dichotomy between harmony and polyphony, Adams's term highlights their symbiotic relationship.

¹⁴⁷ Robert Davidson, "A Vast Synthesizing Approach: An Interview with Composer John Adams," accessed on June 22, 2007, <<http://www.topologymusic.com/articles/adams.htm>>.

¹⁴⁸ Timothy Johnson uses the concept of a chord, sonority, and harmonic field to analyze the music of John Adams. According to Johnson, a field consists of either "a complete diatonic collection of pcs," or a "complete diatonic collection of pcs plus any strongly presented non-diatonic pcs" from a musical passage. Timothy A. Johnson, "Harmonic Vocabulary in the Music of John Adams: A Hierarchical Approach," *Journal of Music Theory* 37/1 (Spring 1993) 118.

Referring back to the pitch-class graphs from Figures 5.6–5.10, the relationship between concurrent polyphonic and non-polyphonic textures will now be examined. The orchestral excerpts to Figures 5.1/5.6 and 5.2/5.17, from *Slonimsky's Earbox*, are shown in Figure 5.15, and 5.16, respectively.¹⁴⁹ Viewing the scores in conjunction with the pitch-class graphs will help show the relationship between concurrent polyphonic and non-polyphonic textures. The row containing unordered sets in the graphs represents the pitch classes that are utilized by other musical lines. The repetition of unordered sets is not indicated in the graphs; thus, in Figure 5.7, from *Slonimsky's Earbox*, mm. 463–65, the unordered set {01368t} is present in each measure (in this passage, the notes from the unordered set are even restated every quarter-note beat). These other textures are charged with greater rhythmic activity than the polyphonic voices and are thus more contrapuntal in nature. They freely draw from set {01368t}, and soon expand into the same diatonic septachord {013568t} as used by the polyphonic voices.¹⁵⁰ The musical textures and the polyphonic voices influence each other since they revolve around the same collection. For instance, while the hexachord {01368t} determines the notes used by the polyphonic voices, pitch-class F (or 5 in integer notation) first emerges in the polyphonic texture.

¹⁴⁹ The remaining orchestral scores are not included because they reveal the same type of procedure for relating polyphonic and non-polyphonic textures as *Slonimsky's Earbox*.

¹⁵⁰ There are two exceptions that alter the given sets: in m. 467, the third clarinet plays the pitch E4, and in m. 486, the second clarinet performs the pitch D5. The motivation for the former pitch uncertain, and may possibly be a mistake. In the latter instance, the pitch D5 is rather unimportant, yet avoids a melodic unison, an interval that is otherwise not encountered by the clarinets as they play sixteenth notes here. These two notes are marginal since they are not doubled by other instruments.

(all excerpts in written pitch)

325 326 327 328 329 330

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

E♭ Clar.

Clars. in B♭ 1 2

B. Clar. in B♭

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vin. I

Vin. II

Vla.

Vcl.

Cb.

open

open

open

open

Shaker high-pitch

div. pizz.

(L.H. loco)

sustentato

sustentato

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Figure 5.15: *Slonimsky's Earbox*, mm. 325–59

331 332 333 334 335 336 337 (♩ = ♪)

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

E♭ Clar. (to Clarinet 3 in A)

Clars. in B♭ 1 2

B. Clar. in B♭

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb. I

Cb. II

uniz. arco

(arco)

(damp)

(♩ = ♪)

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Figure 5.15 – continued

$\text{♩} = 68$ *espressivo*

338 339 340 341 342 343

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2 3

B. Clar. in B $\flat$ 1 2 3

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

$\text{♩} = 68$

Vln. I *Mezzo* *loco*

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.15 – continued

This musical score page covers measures 344 through 351. The instrumentation includes:

- Woodwinds:** Piccolo (1), Flutes (1, 2), Oboes (1, 2), Eng. Hn. (1), Clars. in B $\flat$ (2, 3), B. Clar. in B $\flat$ (1), Bsns. (2, 3).
- Brass:** Horns in F (1, 2, 3, 4), Tpts. (1, 2, 3, 4), Tbns. (1, 2, 3), Tuba.
- Percussion:** Timpani, Perc. 1, Perc. 2, Perc. 3.
- Keyboard:** Piano, Keyboard 2 (with a Celecta part starting in measure 348).
- Strings:** Harp, Vln. I, Vln. II, Vla., Vcl., Cb.

The score shows various musical notations including rests, notes, and dynamic markings such as *pp* (pianissimo) and *f* (forte).

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Figure 5.15 – continued

Flexible tempo
(♩ = 60-68)

352 353 354 355 356 357 358 359

Piccolo

1

Flutes

2

1

Oboes

2

Eng. Hn.

1

Clars.
in D $\flat$

2

3

B. Clar.
in D $\flat$

1

Bsns.

2

3

1

Horns
in F

2

3

4

1

Tpts.

2

3

4

1

Tbns.

2

3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Flexible tempo
(♩ = 60-68)

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.15 – continued

462 463 464 465 466 467

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2 3

B. Clar. in B $\flat$

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

Measures 464 through 492 may be played an octave higher.

Glockenspiel

Celesta

tra (both hands tra.)

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Figure 5.16: *Slonimsky's Earbox*, mm. 462–96

468 469 470 471 472 473

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2

B. Clar. in B $\flat$

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.16 – continued

474 475 476 477 478 479

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2 3

B. Clar. in B $\flat$ 1 2 3

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbns. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.16 – continued

480 481 482 483 484 485

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in Bb 1 2 3

B. Clar. in Bb

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbn. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.16 – continued

486 487 488 489 490 491

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2 3

B. Clar. in B $\flat$ 1

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbn. 1 2 3

Tuba

Timpani

Perc. 1

Perc. 2

Perc. 3

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.16 – continued

492 493 494 495 496

Piccolo

Flutes 1 2

Oboes 1 2

Eng. Hn.

Clars. in B $\flat$ 1 2 3

B. Clar. in B $\flat$ 1 2

Bsns. 1 2 3

Horns in F 1 2 3 4

Tpts. 1 2 3 4

Tbos. 1 2 3

Tuba

Timpani

Perc. 1 Crotales felt sticks L.V. dampers rim

Perc. 2 Suspended Cymbal L.V. in Tambourine

Perc. 3 dampen

Piano

Keyboard 2

Harp

Vln. I

Vln. II

Vla.

Vcl.

Cb.

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Figure 5.16 – continued

Figure 5.17 illustrates several coexisting musical lines from *Slonimsky's Earbox*, mm. 463–92, in closer detail. Figure 5.17(a) shows that the oboes contain a reiterating fragment that is eventually altered through imitation and expanded via the modification *add a note*, which I discussed in Chapter 1.¹⁵¹ Soon after the introduction of the oboes, other instruments (including the piccolo, flutes, and English horn) join in this motivic cell. The use of reiterating fragments is common to all passages of polyphonic textures. Figure 5.17(b) extracts a representative excerpt from the strings (excluding the contrabass). In the score, the strings are mirrored by the clarinets in simplified or elaborated form. This excerpt can be explained through the notion of *step-class intervals*.¹⁵² A step-class interval (abbreviated as sci) can be defined as the directed difference (in steps) between two notes of the same collection, measured in a modulo space that represents the cardinality of that collection. For instance, given the whole-tone collection, the step intervals between C and D is one, between C and E two, between C and F#/G♭ three, and so on. If the scis are descending, the distance between F#/G♭ and C would be indicated as negative three within the whole-tone collection, between E and C as negative two, and between D and C as negative one. Looking at the step-class intervals (or scis) in Figure 5.17(b), we can see that they are equivalent in diatonic space (using the pitches of a D♭-major scale). Accordingly, the scis between adjacent staves remain the same (2, 3, and 1). Throughout *Slonimsky's Earbox*, diatonic planing is sometimes disrupted—see, for example, m. 485 from Figure 5.17(b). In the remaining measures of this work, these irregularities that alter vertical sonorities in unexpected ways become more common. Figure 5.17(c) shows the resulting pitch collections that Adams derives from diatonic planing, which involves that parallel movement of musical lines. Unlike chromatic or whole-tone planing, diatonic planing naturally yields more than one set class. The whole-tone and chromatic modes are

¹⁵¹ In the example I have provided, the imitation between oboes is considered canonic, but as the reiterating fragment progresses, iterations are offset to the extent that we may perceive them simply as imitation.

¹⁵² The topic of step classes has been discussed by Matthew Santa and other theorists. In a recent article, Christoph Neidhöfer utilizes the principle of step classes to analyze Messiaen's works that are based on the modes of limited transposition. Christoph Neidhöfer, "A Theory of Harmony and Voice Leading for the Music of Olivier Messiaen," *Music Theory Spectrum* 27/1 (Spring 2005): 1–34.

unique in this respect, since they exploit transpositional symmetry to their utmost capacity.

(a) Progression of a Reiterating Musical Fragment

Oboes

1

2

463

470

modification:
add a note

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(b) Parallel Voice-Leading Progressions

485

Vln. I

Vln. II

Vla.

Vcl.

diatonic step class intervals: +2 +1? +1 +1 +2 +1 +2 +1 +1 -1 +1 -2 +1 +1 +2 -1 +1 +1 -1

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(c) Pitch Collections Derived from Diatonic Planing

Figure 5.17: Concurrent Musical Textures from *Slonimsky's Earbox*, mm. 463–92

Looking further into parallel voice-leading progressions shows their idiosyncrasies and common features. Figure 5.18 compares the scis between the strings in mm. 469–71, and an altered repetition in mm. 483–85. These measures form part of the same texture from Figure 5.17(b). All shaded cells represent sci duplications; small range duplications, consisting of just two cells, are not shaded because they are less significant. I use the color yellow to indicate a duplication that varies from the first graph. The first instance when the four instrument groups have identical scis (shaded in blue) yields the same pitch collection, 4–13 [0136], as shown in Figure 5.17(c). When a column has four identical scis, diatonic planing is at play. Unlike Figure 5.18(a), the viola rows from Figure 5.18(b) contain two unshaded cells in m. 484—scis -1 and 0. The first of these unshaded cells (sci -1) causes the pitch collections to diverge from those of Figure 5.18(a), as shown by the cells in red, while the second unshaded sci allows a return to the pitch collections from Figure 5.18(a). During the moment I have colored in red, scis are maintained between Figures 5.18(a) and 5.18(b), while the pitch collections differ due to the unshaded cell sci -1 in the viola part. This example shows one of Adams’s approaches to voice-leading progressions based on step-class intervals; further examination of other passages would reveal an even more diverse method of composing by means of diatonic planing.

(a) *Slonimsky’s Earbox*, mm. 469–71

mm.	469										470										471									
VI. I	+1	+1	0	+1	-1	+2	+1	+1	-1	+1	+1	-1	+1	-1	+1	-1	+1	-2	0	+1	0	+1	0	+2	+1					
VI. II	-1	+1	+1	0	0	+1	0	+1	0	+1	0	0	+1	-1	+1	-1	+1	-1	+1	-3	+1	+1	0	+1	0	+2	+1			
Vla.	+1	+1	0	+1	0	+1	0	+1	0	+1	0	0	+1	-1	+1	-1	+1	-1	+1	-2	0	+1	0	+1	0	+2	+1			
Vcl.	-1	0	+1	+2	-1	+2	-1	+2	-1	+1	-1	+1	+1	-1	+1	-1	+1	-1	+1	-2	0	+1	0	+1	0	+2	+1			
										set classes 4-13										4-22 4-20										
																				4-22 4-22 4-Z29										

(b) *Slonimsky’s Earbox*, mm. 483–85

mm.	483												484												485																						
VI. I	0	+1	0	+1	-1	+2	+1	+1	-1	+1	+1	-1	+1	-1	+1	-2	0	+1	0	+1	0	+2	+1																								
VI. II	0	+1	0	+1	0	+1	0	+1	0	+1	0	0	+1	-1	+1	-1	+1	-3	+1	+1	0	+1	0	+2	+1																						
Vla.	0	+1	0	+1	0	+1	0	+1	0	+1	0	0	+1	-1	+1	-1	+1	-1	0	+1	0	0	0	+2	+1																						
Vcl.	-1	0	+1	+2	-1	+2	-1	+2	-1	+1	-1	+1	+1	-1	+1	-1	+1	-2	0	+1	0	+1	0	+2	+2																						
set classes												4-13												4-16 4-Z29												4-22 4-22 4-Z29											
												Same set classes (blue)												set classes differ (red)												same scs (blue)											

Figure 5.18: Step-Class Interval Analysis of Voice-Leading Progressions

The polyphonic and simultaneous orchestral textures from *Naïve and Sentimental Music*, mm. 181–200, are also related in pitch content—refer back to Figure 5.8. The polyphonic texture freely draws from {02457te}, which is a subset of {024579te}, the superset employed by the simultaneous musical lines. The simultaneous lines, whose pitches are listed in Figure 5.8, include a variety of unordered sets. The simultaneous musical lines introduce most of the pitches used by the polyphonic texture, while the polyphonic texture introduces pcs E (in m. 186, afterwards played by the simultaneous textures in m. 187) and B $\flat$ (first stated by polyphonic texture in m. 181 and afterwards by the simultaneous textures starting in m. 187). Moreover, the collections used by both textures mirror each other in some ways. For instance, pc B is used by both textures at first; it ceases in m. 193, and soon after B $\flat$ takes over. In the simultaneous textures, I have indicated less salient pitches from mm. 181–183 {02579e} and mm. 187–189 {02457te} in bold and underlined. They appear in the keyboard part(s) and are not doubled by other instruments. Pitch-class 9 is less important in mm. 181–83 since it vanishes along with its musical line in the piano; nevertheless, it returns and bears more prominence in m. 192. This pitch class is puzzling in the sense that it is avoided by the polyphonic texture altogether. Looking at the pitch-class graph by itself shows that harmonic minor-second relationships are important. Once the B/B $\flat$ minor second that is shared between the polyphonic and simultaneous textures ceases in m. 194, a new minor second (A/B $\flat$) emerges soon thereafter.

As I illustrated, the remaining graphs, which are drawn from *Slonimsky's Earbox*, mm. 325–54 and the third movement of *My Father Knew Charles Ives*, mm. 115–52, make use of an undecachord collection for their polyphonic texture. The first row shows that their concurrent musical lines also utilize more pitch classes than the passages that included a septachordal collection as a building block for their respective polyphonic textures. These two graphs have other more notable features in common. First, their largest unordered set, representative of the contrapuntal lines, takes place near the beginning of each passage. The simultaneous textures subside towards the end of the passage, thereby making the polyphonic textures more prominent. Next, there is a greater variety of unordered sets; successive measures tend to employ different collections, yet several pitch classes are prolonged throughout. In *Slonimsky's Earbox*,

the subset {1469} appears in a harmonic style, forming a F#m7 sonority. In “The Mountain” from *My Father Knew Charles Ives*, F# boasts a principal role within the polyphonic texture and concurrent musical lines. Even though the amalgamation of all musical lines comprise the entire chromatic aggregate in Figure 5.9, two of the most significant pitch classes are shared between the polyphonic texture and simultaneous musical lines (these are C and F#). Furthermore, F# affects the following formal section, based on an F#⁰ triad. In terms of overall structure, the end of these two polyphonic passages also marks the end of their formal section and leads the way to a new one.

In this chapter, I have illustrated some passages from Adams’s recent instrumental works with polyphonic textures, in addition to a multitude of other layers. I have addressed some problems of segmenting polyphonic textures and suggested one possible way relating their vertical segments through Buchler’s CSATIM similarity index, which is only one similarity index (among many) that can be used. This examination ultimately revealed that Adams normally selects similar sonorities for the duration of a passage. Next, I considered the polyphonic textures in relation to their simultaneous musical lines made primarily of imitative patterns and reiterating fragments. They share a mutual relationship in the compositional process; nevertheless, they are independent musical strata that merge into a unified whole. By examining the music in this manner, the listener may gain a greater awareness of and appreciation for Adams’s imitative techniques and understand their role in formal structures.

CHAPTER 6

POLYPHONY AND DOVETAILING

Introduction

This chapter will describe a process known as dovetailing, whereby formal sections of music are interlocked through a combination of textural, orchestral, and polyphonic components. When sections overlap in Adams's instrumental pieces, the new section is often signaled by a recurring set-class that is extended in a linear fashion. These harmonies can be thought of as polyphonic in a loose sense, even though they may be conceived as vertical sonorities. As Carl Dahlhaus wrote, "the assumption that the theory of counterpoint deals with the horizontal and that of harmony with the vertical dimension of music is as trivial as it is misleading. In the study of harmony, it is not just the structure of chords but also their progressions that must be dealt with; and similarly, in the theory of counterpoint it is a question not only of melodic part-writing but also of the chords formed by the parts."¹⁵³ Thus, according to Dahlhaus, harmony and counterpoint are codependent, and it would seem that polyphony also integrates with these inter-reliant musical parameters.

This chapter explores John Adams's recent approach to dovetailing as a form-defining element in "Chain to the Rhythm," from *Naive and Sentimental Music* (1997–98). The first part of the chapter provides some background to the term "dovetailing" and examines ways in which recurring motives can be modified to allow such a process. Here, I elaborate on additive and subtractive processes and include more general modifications such as transposition, beat-class transposition, and inversion. The second part illustrates different models for dovetailing and demonstrates an interrelation between formal sections and dovetailed transitional passages. The final part considers a recurring "Adamsian" set class, 4-26 [0358], which serves as a signal for new formal sections, and compares dovetailed passages in terms of duration and opening gestures.

¹⁵³ Carl Dahlhaus, "Counterpoint," in *The New Grove Dictionary of Music and Musicians*, rev. ed., vol. 6, ed. Stanley Sadie (London: Macmillan, 2001): 561.

The Process of Dovetailing

Minimalist composers have used the overlapping technique of musical “dovetailing” since the 1970s. Unlike Adams’s “gating” technique, which the composer describes as sudden and unexpected modal shifts between formal sections, dovetailing is a method of connecting neighboring formal sections of a work, allowing smooth transitions through an overlap of preceding and subsequent musical material.¹⁵⁴ Dovetailed transitions begin with the appearance of new motives during a passage that otherwise exhibits block and textural subtractive processes. A block subtractive process involves a gradual removal of notes from a pattern, while a textural subtractive process entails a reduction of instruments playing collectively. The closing stage of a dovetailed transition is signaled by the exclusion of earlier motives.

Daniel Warburton defines dovetailing as a smooth transition between two processes.¹⁵⁵ Aside from this basic description, theorists have used the term to represent slightly different musical events. Douglas Green employed the term in a tonal context to describe a seamless connection between the last two sections of a ternary form. Figure 6.1 reproduces Green’s example 8–6, featuring musical dovetailing. This excerpt is taken from Schumann’s *Romance*, Op. 28, No. 2. According to Green, dovetailing creates a conflict of tonal structure and design in order to make the connection of parts two and three more subtle than by having a dominant-tonic progression in the original key mark the restatement of the A section.¹⁵⁶ In this passage, the return of the initial theme appears in m. 18, while the tonic harmony is delayed until m. 19. For Green, dovetailing calls for the interaction of the main theme and its supporting harmony. The L.H. texture in measure 18 is identical to the opening measures of this piece—except for the low C#.

¹⁵⁴ John Adams, “*Phrygian Gates*,” *Adams’s Official Website*, accessed on August 23, 2007, <<http://www.earbox.com/W-phrygiangates.html>>.

¹⁵⁵ Dan Warburton, “A Working Terminology for Minimal Music,” *Intégral 2* (1988): 156.

¹⁵⁶ Douglas Green, *Form in Tonal Music* (New York: Holt, Rinehart and Winston, 1979): 134–136.

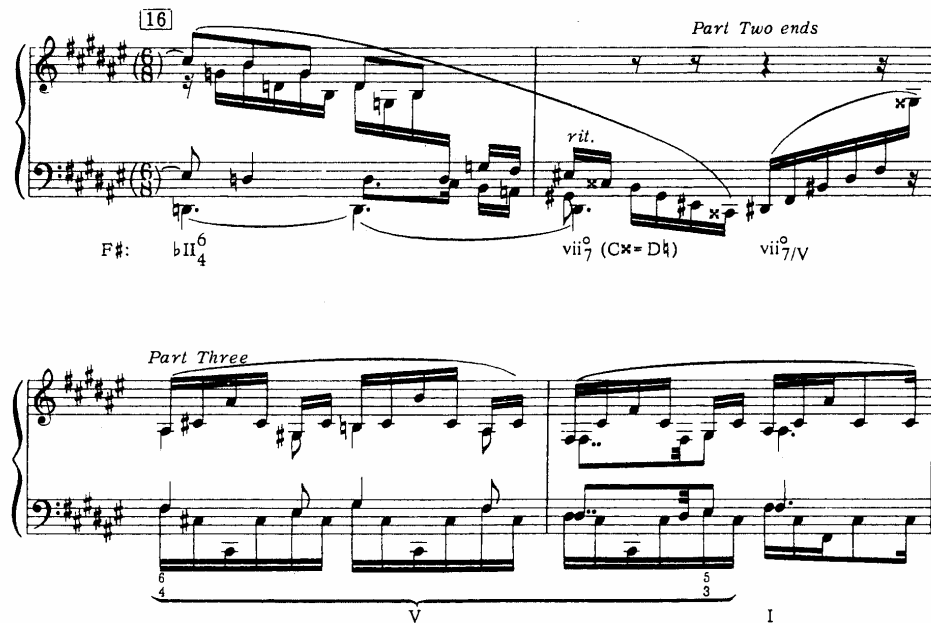


Figure 6.1: Dovetailing in Schumann's *Romance*, Op. 28, No. 2

In the realm of meter and rhythm, Harald Krebs defines dovetailing as an intermediate stage between metrical dissonance and consonance. A metrical dissonance, caused by the superimposition of different pulses or the displacement of two equal rhythms, cannot be resolved abruptly.¹⁵⁷ While conflicting rhythms eventually subside, metrical dissonance may be weakly implied for a brief span and not immediately forgotten by the listener. In this intermediate stage, metrical dissonance is “conceptually maintained.”¹⁵⁸ Clearly, the notion of dovetailing differs for Green, Krebs, and Warburton, yet each scholar agrees in some way that it entails a smooth and/or overlapping transition—whether rhythmic or within the pitch domain—between two sections.

While the term dovetailing is more generally used in carpentry as a method of interlocking two pieces of wood (see Figure 6.2), this metaphor seems useful in describing overlapping formal sections of a musical work. Given the flexibility of its

¹⁵⁷ Harald Krebs, “Some Extensions of the Concepts of Metrical Consonance and Dissonance,” *Journal of Music Theory* 31/1 (1987): 99–120.

¹⁵⁸ *Ibid.*, 116.

application to music, scholars have used the term rather freely to refer to transitions of musical processes that bear some overlap. In describing Adams's smooth formal connections, I will use the term dovetailing in two ways: both as a general method of overlapping sections and more specifically as an indicator of the interlocking technique reminiscent of woodworking, which is illustrated below.

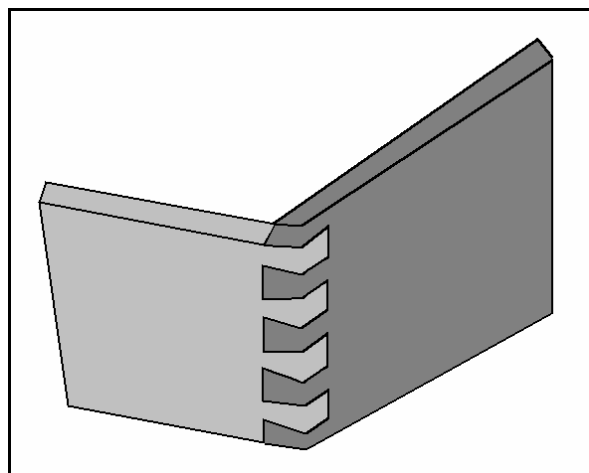


Figure 6.2: Dovetailing in Carpentry

Adams's unique approach to dovetailing is tied to the ways in which he alters motives. Looking back to Chapter 2, I included a list of techniques that Adams uses to modify repeated motives. The following discussion of dovetailing will assess the types of modifications that are used in order to enable the effect of having a smooth transition between two sections.

Dovetailing in *Naive and Sentimental Music*, "Chain to the Rhythm"

The process of dovetailing is a prominent trait of Adams's recent works. I will now explore dovetailing in "Chain to the Rhythm," which is modeled like other recent works by the composer. Playing on the title of Adams's movement, I will refer to the chain connections, which delineate formal sections as links.¹⁵⁹ Dovetailing can be realized by

¹⁵⁹ As there are no returning sections in "Chain to the Rhythm," it may be more appropriate to label formal sections as links that have a nearly equal contribution to the whole.

temporarily dropping the lower voices of a texture at the end of a link. The return of these lower voices signals the beginning of a new link. Figure 6.3 graphically shows a smooth transition between two links through the use of dovetailing. First, the lower instruments gradually drop out through the second modification category (*remove a note/group of notes*), or simply fade away. The higher instruments maintain their textures from link 1 as the lower instruments begin a new texture that eventually develops through the first modification category. Soon after, musical layers and dynamics are gradually built through a textural additive process. When the higher instruments begin their second link, the textures from the lower instruments have already increased in dynamics. This necessitates a louder dynamic level for the higher instruments at their beginning of link 2.

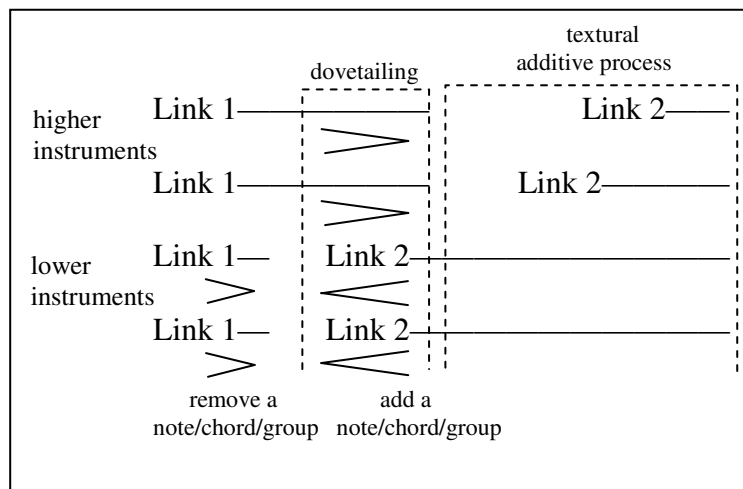


Figure 6.3: Dovetailing in Link Connection No. 1

Figure 6.4 includes a textural diagram of measures 48–100 from “Chain to the Rhythm.” The musical notes in each box represent some sound, whereas the absence of those notes represents silence. This diagram clearly shows a textural subtractive process by the gradual removal of instruments, and a textural additive process by the gradual accumulation thereof. The bass temporarily drops out; its return, aided by the overall thinning of textures in m. 68, features new motivic material that corresponds to the beginning of link 2. The orchestral excerpts that illustrate dovetailing can be found at the end of the chapter in Figures 6.8–6.12.

Dovetailing can be thought of as having two stages. The first is characterized by the introduction of new musical material, while the second part of dovetailing is defined by the removal of preceding musical material. In this manner, we can establish the length and describe the procedure for overlap. In Figure 6.4, dovetailing begins in m. 65 and ends in m. 74. Every instrumental line that is sounding in these measures takes part in the dovetailing process. Characteristic features of this example include the early entry of the cello part and the persistent trumpet line that ends in m. 74. In this example, dovetailing enables a thinning and rebuilding of textures without a complete loss of rhythmic momentum. The effect of starting and stopping or of moving abruptly to a new section is replaced by a gradual process in which dynamics and instruments are reduced at the end of a link, and slowly brought back at the onset of a new link.

I will define the formal beginning of a link as the first point when musical material from a preceding section is no longer very audible. I have marked the formal beginning of link 2 in m. 68 for several reasons. First, the contrabass, after a break of 16 measures, begins a new pattern in m. 68. The sonority at this point is significant; it consists of a 4-26 [0358] tetrachord, voiced as a minor seventh chord.¹⁶⁰ Catherine Ann Pellegrino considers the minor seventh chord a characteristic pitch-class set that Adams uses as a building block for tonal structures.¹⁶¹ We can interpret these tonal structures through a centrality supported by the minor seventh chord, particularly its root, which is stated in the bass part. Second, the horns, which are an important component of link 1, reach their high point in m. 65, and then drop out in m. 67. The horns' absence enables the growth of new musical textures and makes their entrance more discernable. Third, only two instruments from link 1 continue past m. 68: a trumpet part that is not notated in the score, and a bass drum that remains partly neutral to forming motivic unity within links 1 and 2 because it is an instrument of indefinite pitch and its sound conforms equally well to both formal sections.

¹⁶⁰ My choice for segmentation focuses on link 2 material. Timothy A. Johnson's chord preference rule 2 infers the same root.

¹⁶¹ Catherine Ann Pellegrino, "Formalist Analysis in the Context of Postmodern Aesthetics: The Music of John Adams as a Case Study," (Ph.D. diss., Yale, 1999), 60.

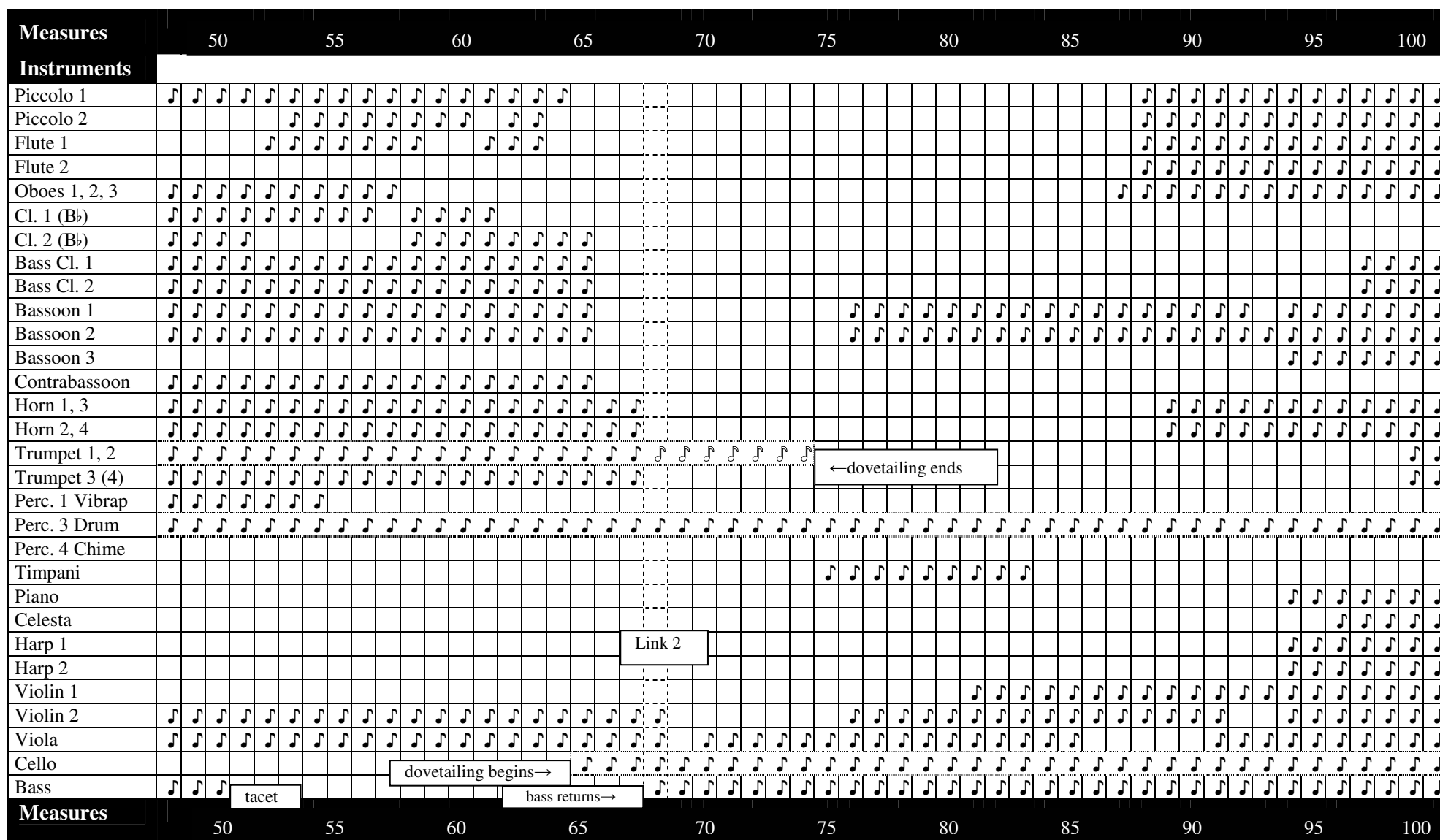


Figure 6.4: Textural Diagram of Measures 48–100

A diagram of the second link connection, shown in Figure 6.5, illustrates a different approach to dovetailing. The distinction between higher and lower instruments is not a characteristic feature here; thus, an instrument of any range may begin new link material. Block subtractive processes, such as *remove a note or group of notes*, are in turn replaced by a sudden or direct change of patterns. The removal of block additive processes (*add a note/chord/group of notes*) at the beginning of link 3 helps maintain momentum and enables a quicker transition. Between links 1 and 2, dovetailing spans 10 measures, and between links 2 and 3, dovetailing spans only 4 measures. The effect created is a more elusive transition whereby dovetailing is harder to perceive and pin down. As in the previous model, dovetailing begins with the first trace of link 3 and ends with the last trace of link 2. Instrument parts are still brought in through the use of a textural additive process.

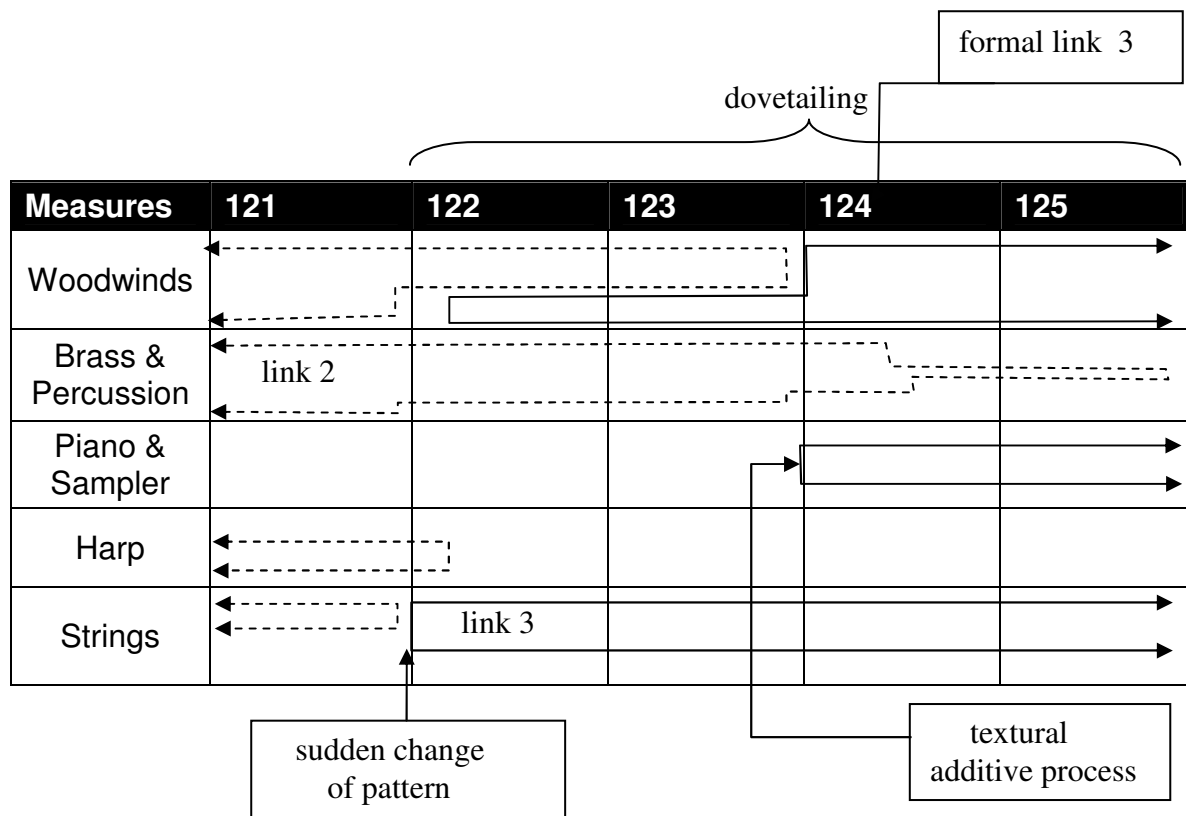


Figure 6.5: Dovetailing in Link Connection No. 2

New material from link 3 appears in m. 122, where the lower woodwinds and most of the string instruments suddenly begin a new pattern. This time, the return of the bass coincides with the beginning of dovetailing, not the formal beginning of link 3 in m. 124, with the arrival of the piano and sampler. In m. 124, the woodwinds display an offbeat, chord-like accompaniment against the foreground musical lines that show faster rhythmic figures. Other indicators of the formal beginning are the timpani and bass drum, which strike forcefully and repeatedly until the end of m. 123. Both the timpani and brass textures indicate change. They create dissonance through the juxtaposition of E $\flat$ and D $\sharp$ in the brass and timpani and E $\natural$ in the bass line. The trumpet and trombone parts in mm. 124–126 contain material that resembles the end of link 2, yet this pattern takes on a new character in these measures, so it will be considered part of link 3. The end of link 2 occurs in m. 125, where the percussion 1 line ends and its texture thereafter serves an accompanimental role.

Not all overlapping situations present the dovetailing of a new link. Each link can include new patterns that do not mark new beginnings. The insertion of these patterns may consist of a textural additive process or simply a contrast to previous music. A new link must present a considerable change in texture from the music that precedes it. New beginnings also tend to sound more stable than other parts of a link by reinforcing a particular bass note or set class.

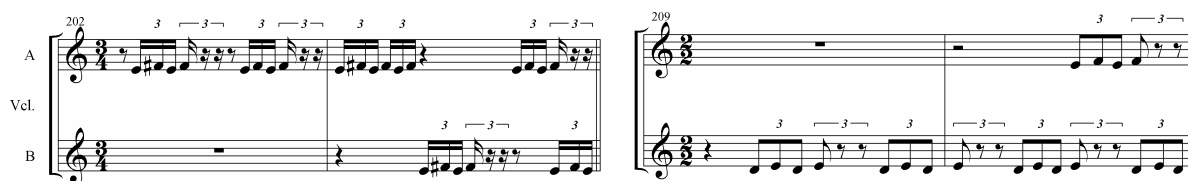
The third link connection, shown at the end of the chapter in Figure 6.10, features the same interlocking technique as Figure 6.9. So far, in all of the examples, the strings have initiated the process of dovetailing. In Figures 6.8 and 6.10, the strings play an increasingly crucial role since they start their new patterns much sooner than all other instruments. Figures 6.8 and 6.10 share two common features: both begin dovetailing with the cello and both dovetailed passages last ten measures. Returning to Figure 6.10, closure at the end of this link is produced through what Pellegrino describes as a “type of rhetorical convention [that] involves an ending in which tension, dynamics, and rhythm all decrease in intensity, fading away into oblivion.”¹⁶² All the instruments decrease in volume at the end of link 3, and the intensity of rhythm is reduced by the

¹⁶² Catherine Ann Pellegrino, “Aspects of Closure in the Music of John Adams,” *Perspectives of New Music* 40 (2002): 166.

gradual removal of instrumental lines. The formal beginning of link 4 in m. 155 exhibits a state of repose conveyed by the repeating Em7 chord.¹⁶³

The fourth link connection, shown in Figure 6.11, resembles the previous three in its use of textural additive and subtractive processes; however, there are notable differences. New link material that Adams establishes in the bass and cello parts (mm. 199 and 202) is temporarily omitted before the formal beginning of link 5 in m. 207. Figure 6.6 shows this new motivic material as it occurs towards the end of link 4 in the cello *divisi* parts (mm. 202-203), and then soon after the beginning of formal link 5 in mm. 209–210. The two excerpts in Figure 6.6 resemble each other because they form part of the same pattern. The top cello line is related by free variation, and the bottom cello line is related by transposition— T_{10} maps E onto D and F $\sharp$ onto E. The rhythm in both passages is nearly identical despite their change in meter. Adams terminates this pattern in m. 206 to begin link 5 in m. 207 and restart the same thread in m. 209. In this scenario, it is the *absence* of the cello and bass that marks a new link, as well as the stability of the [0358] tetrachord, now transposed to a B-minor seventh chord. The remaining new patterns maintain their overall flow as they cross formal link 5. Adams's approach to dovetailing in this fourth link connection differs from links 1-3 in that all patterns that belong to link 4 end by m. 206 before formal link 5 begins. In other words, formal link 5 occurs *after* the preceding musical material has been removed.

¹⁶³ I have chosen to label this chord Em7 according to Timothy Johnson's chord preference rules, which establish a hierarchical approach to the music of John Adams. See Timothy A. Johnson, "Harmonic Vocabulary in the Music of John Adams: A Hierarchical Approach," *Journal of Music Theory* 37/1 (Spring 1993) 129–30. His chord preference rule number 1 states that complete triads and seventh chords are preferred sonorities in Adams's music. Chord preference rule number 2 states that "if more than one complete chord is possible, the lowest sounding pitch in that time span identifies the root, if this pitch is the root of an allowable (diatonic) chord." John Roeder's recent analyses of Reich's *New York Counterpoint* and *Six Pianos* also favor lowest pitches as tonics, or at least chord roots. See John Roeder, "Beat-Class Modulation in Steve Reich's Music," *Music Theory Spectrum* 25/2 (Fall 2003) 278–283. The lowest pitch in this passage is E1, heard in the double bass and tuba parts.



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Figure 6.6: Pattern Modification between Two Links

The fifth and final link connection, shown in Figure 6.12, does not exhibit the use of dovetailing; nevertheless, examining this connection proves useful in evaluating the prerequisites for dovetailing. The use of double barlines, which previously signaled two earlier link entrances, is used again to mark a new section visually. The triplet pattern seen in Figure 6.6 is recycled to connect the final two sections of this movement. Unlike subsequent patterns that fade away at the onset of a new section, this pattern continues for a significant period of time. Are overlapping textures between formal sections the only determinant for dovetailing? Earlier, I emphasized the importance of textural and block additive processes as well as increasing dynamic levels at the beginning of new sections, but these aspects of dovetailing are missing in this connection. When the formal beginning arrives in m. 284, all textures and dynamics have already reached the climax of the movement, which occurs soon after the golden section ($284/401 \approx .70$). Thus, additive processes and increasing dynamics are missing in the final link.

An arch map of “Chain to the Rhythm,” shown in Figure 6.7, displays dovetailing beginning and end points, as well as their duration, formal link beginnings, length of each link, and initial sonorities. There are six links; the final and longest of the six may be considered a coda. The first four link connections demonstrate dovetailing, and the last is fused with the triplet pattern from Figure 6.6. The length of dovetailed passages is proportional to the length of a link. Link 3, which is the shortest link, displays the shortest dovetailed passage for a length of 4 measures; while link 5, which is the longest overlapped link, displays dovetailing for a length of 12 measures. Links 2 and 4, as well as their respective dovetailing, are roughly the same length. The arch map reveals links becoming shorter in the first half of the movement and longer in the second

half. The fact that the shortest links are in the middle of the work and longer links are at the boundaries creates a rough symmetry to the overall form.

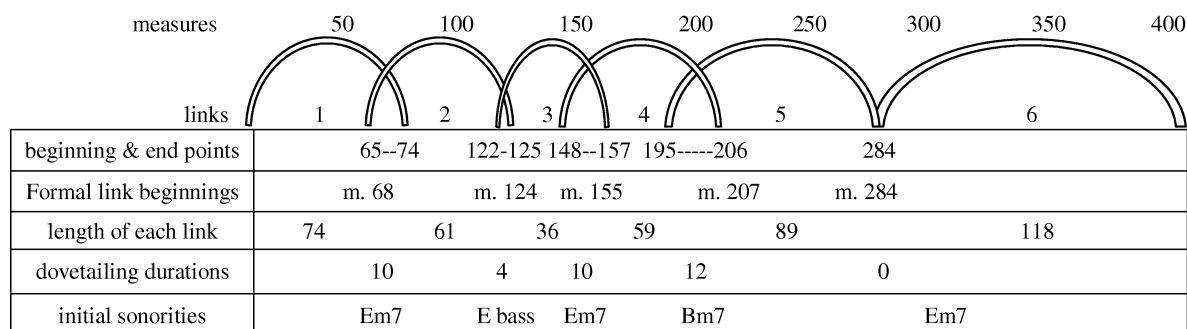


Figure 6.7: Arch Map of Chain to the Rhythm

I have previously alluded to the importance of the minor seventh chord as a form-defining element in this piece. I interpret the seventh chords at the beginning of these links as stable sonorities, perhaps even dissonant tonics. Daniel Harrison refers to such chords (i.e., major or minor triads with major or minor sevenths) as colored triads. “This gives the chord mass greater perceived depth as well as thickness.”¹⁶⁴ Thus, in some cases, dissonant sevenths do not alter tonic function. Paraphrasing Roy Travis, Harrison confirms that “a tonic can sound like anything as long as it plays the appropriate role in the piece, even if it does not have the natural resonance of traditional tonal tonics.”¹⁶⁵ Harrison’s tonic *colored triads* include various chord types such as major-major, major-minor, and minor-minor. Root-position minor seventh chords mark the beginning of links 2, 4, and 5. Links 2 and 4 begin with Em7, and link 5 states a Bm7 chord. In addition, the beginning of link 3 emphasizes E as a crucial tone in the lower instruments. These link beginnings call attention to a quasi-tonic-dominant relationship. A macro-resolution of dominant-to-tonic centers appears towards the end of the work, where lower-pitched instruments play a drawn out E natural-minor scale (mm. 295–306,

¹⁶⁴ Daniel Harrison, “Dissonant Tonics and Post-Tonal Tonality,” presented at the Annual Meeting of the Music Theory Society of New York State. New York City: April 28, 2002, p. 5.

¹⁶⁵ Ibid.

not illustrated in examples). The overpowering presence of E is also apparent throughout the growth of links 2, 3, 4, and 6.

In this chapter, I have shown how block and textural processes, dynamics, and centricity become part of the dovetailing process in “Chain to the Rhythm.” Tonal centricity often plays a form-defining role in Adams’s works; “Chain to the Rhythm” is not exceptional in this regard. In *Nixon in China*, for example, the more stable sonorities correspond with a dramatic break in the opera. Centricity can also be observed in *Lollapalooza* (1995), *Road Movies* (1995), *Hallelujah Junction* (1996), and other works by the Adams.

Each dovetailing occurrence in “Chain to the Rhythm” seems notable and distinct. The first instance is characterized by an early entrance of its formal link, which is marked by the return of the bass. Finding the mean of each dovetailed passage—by adding the first and last measures of the dovetailed passage, and dividing by two—shows that the first formal link is the *only* one to begin before its mean. Given that it is the first transition, Adams may have wanted a longer preparation for the new section. The second dovetailed entry revealed a sudden change of patterns without the need of a block additive process. It is the shortest dovetailed passage since it prepares a way for the shortest and least developed section of the piece, link 3. The third dovetailing connection bears the proportions of the first; but, like the second link connection, its formal link beginning appears near the end of the dovetailing section. The fourth link connection is notable in that formal link 5 begins a measure *after* dovetailing has ended. Yet despite the surface differences that exist between link connections, Adams’s approach shows a proportional sameness that persists at a more structural level of form.

65 66 67 68 69 70

CI 2 in Bb

Bass Chk. in Bb

2

1

Horn in F

2

1

Trombone in C

2

1

Perc. 3

(Bass Drum)

Violin II

A

B

Violin

A

B

Viola

A

B

Violoncello

A

B

Double Bass

A

B

Contrabass

Horns reach their peak and signal dovetailing

Trumpets continue until m. 74

Dovetailing begins

4-26 [0358] Formal link 2

71 72 73 74 75 76

trumpets drop out and dovetailing ends

textural additive process

short, powerful strokes even shorter than violas and cello

short, powerful strokes even shorter than violas and cello

Figure 6.8: Dovetailing Link 1 Connection

121 122 123 124

Pices. 1 2

Fls. 1 2

Obs. 1 2 3

Cls. in B $\flat$ 1 2

Bass Cls. in B $\flat$ 1 2

Bsns. 1 2

Hns. in F 1 2 3 4

Tpts. in C 1 2 3 4

Tbns. 1 2 3

Timpani

Perc. 1

Perc. 2

Perc. 3 (Bass Drum)

Perc. 4 (Chimes)

Perc. 5

Piano

Sampler

Harp 1 (Ak)

Harp 2

Vln. I div. pizz.

Vln. II div. pizz.

Vla. A unis. pesante

Vcl. unis. pesante

Cbs.

Formal link 3

Flutes

(let ring)

Dovetailing begins

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Figure 6.9: Dovetailing Link 2 Connection

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137

146 147 148 149 150 151

Pices. 2

Fls. 1 2

Bass Cls. in Bb 1 2

Bsns. 1 2

Cbsn.

Hns. in F 1 2 4

Perc. 1 (Vibraphone)

Perc. 2 (Glock.)

Perc. 3 (Xylophone)

Piano

Celesta

Harp 1

Harp 2

Vln. II A B

Vcl. front desk off the string

Cbs. A B

dovetailing

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Figure 6.10: Dovetailing Link Connection 3

<----- This passage, through measure 195, should have a light, transparent "chamber-music" effect. Clarinets and bassoons should be in the foreground, but the scherzando quality should never become heavy or aggressive. ----->

152 153 154 155 156 157
 Picc. 1 2
 Fls. 1 2
 Cls. in B $\flat$ 1 2
 Bass Cls. in B $\flat$ 1 2
 Bsns. 1 2
 Obsn. 1 2
 Hns. in F 1 2 3 4
 Tbn. 2 3
 Tubas 1 2
 Perc. 1
 Piano
 Harp 2
 Vcl. (front desk)
 Cbs. A B
 a light, precise bounce; never heavy

4-26 [0358]
 Formal link 4
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Figure 6.10 – continued

188 189 190 191 192

Picc.

Bass Cls. in B $\flat$

Cbsn.

Hns. in F

Tpts. in C

Tbns.

Perc. 1 (Almglocken)

Perc. 2 (Vibraphone)

Perc. 4 (Chimes)

Vln. I

Vln. II

Vla.

Vcl.

Cbs.

gradual diminuendo

mutes out

dim.

193 194 195 196 197

Bass Cls. in B $\flat$

Cbsn.

Hns. in F

Tpts. in C

Tbns. 1-3

Perc. 2

Perc. 4

Vln. I

Vln. II

Vla.

Vcl.

Cbs.

Pattern modification 2: remove a note/group of notes

dovetailing

off the string, brilliant

(short)

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Figure 6.11: Dovetailing Link Connection 4

198 199 200 201

Hns. in F
1 2 3 4

Tpts. in C
1 2 3

Tbns. 1 - 3

Perc. 2

Vln. I

Vln. II

Vla.

Vcl.

A

Cbs.
B

div. a2

détaché, brilliant

détaché, brilliant

202 203 204 205

Tpts. in C
1 2 3

Tbns. 1 - 3

Perc. 2

Vln. I

Vln. II

Vla.

A

Vcl.
B

A

Cbs.
B

div. a2

détaché, brilliant

détaché, brilliant

unis

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Figure 6.11 – continued

$\text{♩} = \text{♩} (\text{♩} = 92)$

206 207 208 209 210

Piccs. 1 2

Fls. 1 2

Tpts. in C 1 2 3 4

Tbns. 1 - 2 - 3

Vln. I f

Vln. II f

Vla. f

Vcl. A f

B f

Cbs. A f

B f

Dovetailing ends 4-26 [0358] formal link 5



211 212 213 214 215 216

Piccs. 1 2

Fls. 1 2

Vln. I *always off the string div.a2* mp

Vln. II *unis.* f *always off the string* f

Vla. f

Vcl. A *sim.* f

B *sim.* f

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Figure 6.11 – continued

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Figure 6.12 – continued

CHAPTER 7

CONCLUSION

This dissertation makes an effort to advance analytical scholarship of Adams's music in several ways. First, it compiles and evaluates current writings relating to counterpoint and polyphony in the music of John Adams, including musicological and theoretical articles and books, as well as interviews with the composer. Second, it provides the first comprehensive study of Adams's recent instrumental works. By necessity, I have focused upon common compositional threads across a wide body of musical literature ranging from 1992 to the present. Since Adams's recent instrumental music seems to be more horizontally derived than music from his earlier stylistic periods, this study calls for analytical tools and approaches that take a linear perspective into account. Furthermore, and in an effort to define Adams's compositional style, this dissertation has uncovered techniques that are unique to Adams's style (e.g., unison displacements), as well as others that are more familiar (e.g., canons), yet which are deployed in Adams's music in a fresh and innovative manner.

In writing a dissertation on counterpoint and polyphony in Adams's instrumental music, I have tried to shed light upon the connection between his linear and vertical musical events. I demonstrate that several contrapuntal and polyphonic processes are interconnected to the formal structure of these musical works. The canonic technique I call *developing imitation* is associated with developing sections, as we saw in the first movement from *Hallelujah Junction*. I also observed that dovetailing has formal ramifications in "Chain to the Rhythm"; namely, the duration of transitional passages and formal sections are directly related to this process. Nevertheless, my study does not attempt to investigate formal structures as a whole.

Another fruitful aspect in Adams's recent works entails the study of rhythm. Rebecca Jemian and Stanley V. Kleppinger have published insightful rhythmic and/or metrical analyses of *Shaker Loops* (1978, 1983), *Short Ride in a Fast Machine* (1986), and the Violin Concerto (1993). Both authors demonstrate that Adams's music is rhythmically and metrically sophisticated. Although it did not fit into the scope of this

dissertation, it would be especially interesting to study a particular temporal phenomenon that seems to be an Adams signature: gradually speeding up the tempo of a work for a sustained period of time, in order to "achieve a shifting of gears in music." In the first movement of *Harmonium* (1980–81), for instance, Adams calls for a gradual *accelerando* for almost ten minutes. Eventually, I would like to investigate what types of musical structures allow for such a process to unfold. In the recent works, these periods of gradual change are not lengthy; nevertheless, they frequently signal significant moments such as section beginnings. Thus, a study of this process found in several earlier works might help elucidate Adams's approach to "changing gears" in the more recent works.

Yet another area uncovered by this study but not pursued independently of counterpoint and polyphony involves Adams's harmonic structures. Concerning harmony, Timothy Johnson's approach is particularly useful for the works that he examines, which come from Adams's second stylistic period (1977–87). His analytical tool, called the common tone index (CTI), favors segmenting pitch collections into tertian structures and ascertaining their chordal roots. While Johnson proposes a top-down approach for the earlier works, I would propose a bottom-up approach for the recent works because they are not necessarily based on tertian structures. Developing a method of chord classification according to salience—rather than tonal schemes based on tertian sonorities—might prove more useful for Adams's more contemporary works. For example, pitches that are not doubled by other instruments and cannot be clearly heard in a performance or recording would be deemed less significant. In this manner, the aural and experience and the analytic eye are equally weighted in the analysis of Adams's works.

With its tremendous energy and depth, Adams's recent orchestral music has been well-received by concert goers and has accordingly been performed and recorded by our country's major orchestras. However, it has not yet received substantial attention in music-theoretical circles. With my dissertation, I have begun an examination of certain distinguishing formal elements of these works. In many ways, they are structured differently from the composer's earlier compositions and I hope to have elucidated some noteworthy aspects of their counterpoint, polyphony, harmony, and form.

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BIOGRAPHICAL SKETCH

Alexander Sanchez-Behar was born on September 16, 1977, in Málaga, Spain. He attended Santa Monica College from 1996 to 1999, and transferred to the University of California, Berkeley, graduating with a Bachelor of Arts in music in 2001. After completing his undergraduate degree, he began his graduate studies in music theory at Northwestern University, where he received his Master in Music degree in 2002. He commenced his doctoral studies in music theory at Florida State University in the fall of 2002. While at Northwestern and FSU, he was a graduate teaching assistant in music theory and aural skills. Alexander Sanchez-Behar has presented music theory papers on several twentieth-century composers at annual conferences of the Society for Music Theory, Music Theory Southeast, and the Florida State University Music Theory Forum, and he served on the program committee for the 2006 Music Theory Southeast Annual Meeting. He currently teaches music theory at Phoenix College.