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Modeling Compositional Grammars in Leonard Bernstein's West Side Story (1957)

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MODELING COMPOSITIONAL GRAMMARS
IN LEONARD BERNSTEIN'S
WEST SIDE STORY (1957)

BY

THOMAS W. POSEN

BACHELOR OF ARTS, PHYSICS & ASTROPHYSICS, 2013
BACHELOR OF MUSIC, PIANO PERFORMANCE, 2013

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

Master of Music

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Dedication

To my father, William Posen, who showed me that anything is possible with persistence and dedication.

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Finally, I must express my profound gratitude to my mother, Joanne, for providing me with unfailing support throughout my undergraduate years as both a physics and music student, and my graduate years as as a piano performance and music theory student. Without her support, these accomplishments would not have been possible.

MODELING COMPOSITIONAL GRAMMARS
IN LEONARD BERNSTEIN'S
WEST SIDE STORY (1957)

by

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ABSTRACT

As a result of Leonard Bernstein's numerous didactic lectures, he is generally recognized as a tonal composer who misrepresented or even misunderstood other compositional grammars. But, while scholars criticize Bernstein for these reasons, close analysis of his own music reveals a different story. Using post-tonal theory and semiotics, I examine Bernstein's music from the perspective of compositional grammars—some not tonal—through analysis of three pieces from *West Side Story* (1957), "The Rumble," the "Tonight" ensemble, and the "Cool Fugue." I demonstrate that although Bernstein passionately defended tonality as the means to unite composers and audiences—especially Broadway audiences—analysis of *West Side Story* reveals varied musical syntaxes, including particular intervallic structures, pitch centric passages, and twelve-tone serialism.

Analysis of *West Side Story* challenges illusory notions of supposed binary oppositions: opera versus Broadway, highbrow versus lowbrow, and tonal versus atonal. By closely interpreting how various compositional grammars in *West Side Story* blur supposed opposing binary musical aesthetics, genres, and styles, this thesis opens new and perhaps unexpected avenues for Bernstein research.

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Abbreviations

PC = Pitch-Class

PCS = Pitch-Classes

SC = Set Class

IC = Interval Class

ICV = Interval Class Vector

TCV = Transposition Class Vector

THCV = Transposition Hyperoperator Class Vector

T-net = Transposition Network

TTO = Twelve-Tone Operator

K-net = Klumpenhouwer Network

UTT = Uniform Triadic Transformation

GMIT = *Generalized Musical Intervals and Transformations*, David Lewin, 1987

Pitch classes are identified with numbers 0, 1, 2 . . . t, e, where 0 represents pitch class 'C' and 't' and 'e' substitute for 10 and 11 respectively.

Pitches are notated according to the American Standard Pitch Notation with middle 'C' notated as C4.

Chapter 1

Introduction

> There are passages here and there from which the connoisseurs alone can derive
> satisfaction; but these passages are written in such a way that the less learned cannot
> fail to be pleased, though without knowing why.[1]

Mozart to his father, July 3rd 1778

1.1 Introduction

As a result of Leonard Bernstein's numerous didactic lectures, he is generally recognized as a

tonal composer who misrepresented or even misunderstood other compositional grammars.

However, although scholars criticize Bernstein for his attempts to prove the validity of tonal

supremacy at the expense of misrepresenting other compositional grammars, close analysis of his

own music reveals a different story.[2] In this thesis I examine Bernstein's music from the perspective

of compositional grammars, some not tonal, through analysis of the music from what might seem

like an unsuspecting piece, *West Side Story* (1957). I demonstrate that although Bernstein passionately

defended tonality as the means to unite composers and audiences—especially laymen audiences, e.g.

Broadway audiences—analysis of *West Side Story* reveals varied pitch-structures, including some that

cannot be understood in a tonal framework.

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[1] Mozart's letter to his father from July 3rd, 1778. See Emily Anderson, ed., *The Letters of Mozart and His Family*, 3rd
Edition. (New York: Norton, 1989), 558. Mozart uses *Liebhaber* for less-learned and *Kenner* for connoisseurs.

[2] For Bernstein on tonality as a natural language, see Leonard Bernstein, *The Unanswered Question: Six Talks at Harvard*
(Cambridge, Mass.: Harvard University Press, 1976), 325–425; Leonard Bernstein, *The Infinite Variety of Music* (Hal
Leonard Corporation, 2007), 9–13; Leonard Bernstein, "Introduction to Modern Music," in *The Joy of Music* (New York:
Simon and Schuster, 1959), 180–224. For a critique of Bernstein's Harvard lectures, see Allan Keiler, "Bernstein's 'the
Unanswered Question' and the Problem of Musical Competence," *The Musical Quarterly* 64, no. 2 (April 1978): 195–222.
See

Using tools from music theory and semiotics, I structure my argument around three analytical case studies: "The Rumble," the "Tonight" ensemble, and the "Cool Fugue." I demonstrate that although Bernstein may have reinforced divisions between so-called "neoclassicists" who aimed to revitalize tonality and the second Viennese school composers who sought to explicitly circumvent it, his own compositional approach was far more integrative. While it is true that Bernstein criticized grammars besides tonality as relying upon learning "artificial languages"[3]—grammars that were not innate like tonality but had to be learned—analysis reveals that Bernstein took a more sophisticated position in his own compositions. Analyzing music from *West Side Story* invites us to reevaluate Bernstein's controversial lectures—to be discussed below—and encourages a new perspective of Bernstein's role in twentieth-century music.

1.2 Scope and Audience

The purpose of this thesis is to better understand how Bernstein used various compositional grammars in *West Side Story* to engender music that blurs opposing binary musical aesthetics, genres, and styles. It is not, therefore, intended to be a comprehensive analysis of the entire musical, nor is it intended to reevaluate issues explored by other authors such as race, ethnicity, nationality, and gender, to name a few. Nonetheless, some of the theoretical frameworks and analytical case studies may shed light on many pieces in *West Side Story* if not the entire musical, and perhaps other pieces in Bernstein's compositional *oeuvre*. While it is not a primary focus of this thesis, some musical aesthetics pertaining to highbrow and lowbrow ideology require some socioeconomic and racial issues to be addressed. I comment briefly on these issues in chapter two.

By comparing my observations with Bernstein's public statements, my analytical observations may offer a glimpse into Bernstein's compositional workshop—one that may be at

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[3] Bernstein, *The Unanswered Question*, 283.

odds with some of his lectures. Although I doubt that many of the analytical frameworks and methodology used in this study were known by Bernstein (most of post-tonal theory used in this thesis, including Klumpenhouwer Networks and Uniform Triadic Transformations, were not yet in existence) I believe that my approach offers a compelling view into the structure of the music with firm theoretical foundations. Furthermore, some of the analytical approaches purposed appear to coincide with Bernstein's compositional methodology as outlined by his personal assistant Jack Gottlieb; I elaborate on this in chapter two.

The reader is expected to have a working knowledge of basic concepts from tonal music theory and post-tonal theory. Additional knowledge in transformational theory and mathematical group theory, especially for the last chapter, will undoubtedly aid the reader but is not absolutely necessary. For some post-tonal concepts, I summarize important ideas in extensive footnotes and provide external references for the interested reader. After a quick overview of the post-tonal theory used in this thesis in chapter two, section 1.1, I introduce the basic elements of transformational theory in section 1.2. I provide worked examples for Transposition Networks, Klumpenhouwer Networks, and Uniform Triadic Transformations. I have provided numerous figures and musical examples, but a score of *West Side Story* and knowledge of the entire show will prove useful for following some analyses.

1.3 Background: Bernstein's Lectures

Writing in 1966 in *The Infinite Variety of Music*, Bernstein cautions readers that they are part of a "*scary* moment" in music history. The problem, he writes, is the rapidly degenerating relationship between composers and audiences spurred by a disconnect between a composer's "personal message, conceived in his own unconscious" with that of the "collective unconscious of the

sacred/secular community."[4] The previously mutually beneficial relationship between composer and audience in the eighteenth- and nineteenth-centuries changed in the twentieth-century to an antagonistic opposition between composer and audience. But in contrast to what Mark Evan Bonds considers the "pragmatic" to "expressive" shift that occurred at the turn of nineteenth-century romanticism,[5] Bernstein's characterization of the mid-twentieth-century was more extreme: the "symbiotic interaction" that fed both composer and audience had degenerated into what Bernstein considered far worse: "composer *versus* audience."[6]

In an attempt to narrow the widening gap between composers and audiences, Bernstein educated audiences through widely broadcast televised lectures. Bernstein's educational lectures were in some ways similar to the rise of published analyses and musical criticism in the nineteenth century that aimed to illuminate an increasingly demanding repertoire; but in contrast to the published analyses that were read primarily by music connoisseurs, Bernstein's lectures reached a new demographic through the new medium of broadcast television.[7] However, although Bernstein's lectures were received by a larger, less musically educated audience, Bernstein believed that education could only fix part of the problem with much of twentieth-century music. According to Bernstein, the problem was deeper: composers were failing to communicate with their audiences because of the compositional grammars composers used. As Bernstein put it, the electronic, chance,

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[4] Bernstein, *The Infinite Variety of Music*, 9.

[5] Mark Evan Bonds, *Wordless Rhetoric Musical Form and the Metaphor of the Oration* (Cambridge, Massachusetts, and London, England: Harvard University Press, 1991), 54–71. Bonds argues that eighteenth-century pragmatic composers were fundamentally concerned with directly communicating with or moving an audience through particular means. This contrasts with the nineteenth-century expressive composer who was more concerned with successfully demonstrating their self-expression and individuality to an audience.

[6] Bernstein, *The Infinite Variety of Music*, 9.

[7] On the rise of musical criticism and analysis in the early nineteenth-century, see Bonds, *Wordless Rhetoric Musical Form and the Metaphor of the Oration*, 56.

and serial music written by the community of "avant-garde" composers had already acquired the "musty odor of academicism" and was not accessible for a lay-public (Mozart's *Lieber*).[8] Therefore, according to Bernstein, it was the composers themselves that caused enthusiasm for new concert music to come to a troublesome halt.

In place of serialism and other twentieth-century approaches such as chance and electronic music, Bernstein passionately defended tonality. As Bernstein argued in several lectures, composers could restore the symbiotic relationship with their audiences and reinvigorate public interest in contemporary composition by reaccepting and reinvigorating tonal composition. Bernstein supported this position by arguing that tonality evolved naturally from the harmonic series and was therefore innately understood by audiences.[9] In contrast, the "rules" of other compositional grammars, like Arnold Schoenberg's "twelve-tone democracy," were "like rules of an artificial language,"[10] a language that had to be learned. Matters were worse if one took Schoenberg's supposed formalistic exaggeration—"it doesn't matter how a piece of serial music sounds so long as the inherent structure of the piece is logical"—too seriously.[11] If audiences were still struggling to

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[8] Bernstein, *The Infinite Variety of Music*, 10.

[9] For Bernstein's introduction tonality through the overtone series, see Leonard Bernstein, *The Joy of Music* (New York: Simon and Schuster, 1959), 180–92 & 210–12; For Bernstein's declaration of tonality as a natural language, see Keiler, "Bernstein's 'the Unanswered Question' and the Problem of Musical Competence," 283, 424.

[10] On the idea of a "twelve-tone democracy," see Bernstein, *The Unanswered Question*, 277. For a discussion of twelve-tone music relying on "artificial language," see Ibid., 283.

[11] Shortly after discussing how Schoenberg was accused of writing "form without content," or "form at the expense of content—structuralism for its own sake," Bernstein defends Schoenberg writing, "We know that Schoenberg never meant anything of the kind. He was just too musical to hold such an attitude, too much of a music-lover. Nor do I believe he really meant the extraordinary claim he is said to have made at a certain point that it doesn't really matter how a piece of serial music *sounds;* it is important only that the inherent structure of the piece be logical. At least he couldn't have meant that for more than a moment of excessive zeal." Bernstein, *The Unanswered Question*, 283.

absorb music of the past, how were they expected to absorb the new artificial languages created by twentieth-century composers?[12]

Nearly a decade later in 1973, Bernstein's gloomy synopsis took a positive turn. By the time of his final lecture at Harvard, "The Poetry of the Earth," Bernstein declared that there was "an ebullient renewed will to survive the apocalyptic, and [to] make musical progress." In place of the vast "oceanic gulf" between composer and audience a decade prior, the "rediscovery and reacceptance of tonality" enabled a newfound period "of fresh air and fun . . . a neo-neoclassicism, so to speak."[13] By re-envisioning tonality, Bernstein assured, composers began to restore the symbiotic relationship with their audiences. For Bernstein, tonality would solve the twentieth-century music crisis.

1.4 Criticism of Bernstein's Lectures

Understandably, Bernstein's unabashed rhetoric was met with significant criticism. At issue was Bernstein's sometimes questionable application of Chomsky's linguistic theories, his seeming distaste for atonality in spite of his proclaimed neutral stance, and his characterization of tonality as a system based on immutable physical laws innate to human perception. Writing for the Harvard Crimson a year before Bernstein's *Infinite Variety of Music* (1975), James Gleick summarizes his critique of Bernstein's Harvard lectures, writing: "In the end, Bernstein's treatment of Schoenberg suffers from the same dogmatism he criticizes in Adorno. His failure is a failure to listen to the music on its own terms. He imposes his tonal expectations on works that have a different internal logic."[14] In contrast to Adorno, who praised Schoenberg over Stravinsky, Bernstein directly

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[12] See Bernstein, *The Infinite Variety of Music*, 9.

[13] Bernstein, *The Unanswered Question*, 423–24.

[14] James Gleick, "Whither Bernstein?," *Harvard Crimson* (Cambridge, Massachusetts, January 8, 1975), accessed April 12, 2016, http://www.thecrimson.com/article/1975/1/8/whither-bernstein-pbabccuse-leonard-bernstein-of/?page=2.

challenged the university musical establishment, and especially the serial composers who he believed occupied the majority of composition positions at major musical universities.[15] Gleick, precipitating future criticism towards Bernstein's lectures, opposed Bernstein's tonal manifesto and oversimplifications of the issues at hand.

Bernstein's numerous lectures—especially his Harvard lectures—stirred up considerable controversy in the academic community. The central "ruckus," as Tommasini writing for *The New York Times* in 1998 put it, was:

> the "great split," as Bernstein called it, the pitched battle (pun intended) between, on one side, intellectually cocksure, cutting-edge composers who advocated Serialism as the inevitable next step in the evolution of music, and, on the other side, composers who clung to tonality—all those fusty, irrelevant conservatives, as the Serialists saw them.[16]

Bernstein's seemingly over-exaggerated split frustrated serial composers and music academics at many leading universities. Tommasini recalls that his composition teachers at Yale in the 1970s "seethed at the thought of [Bernstein's] Nortan Lectures." In short, the academic community reduced Bernstein to a polemical lecturer who lacked a true understanding of the issues at hand. In

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[15] Joseph Straus challenges this assertion directly calling it one of the myths of serialism, noting that "the American academy was dominated, as it had been throughout the 1950s and 1960s, by tonally oriented composers." See Joseph N. Straus, "A Revisionist History of Twelve-Tone Serialism in American Music," *Journal of the Society for American Music* 2, no. 03 (August 2008): 307 & 373–77.

[16] Anthony Tommasini, "When Bernstein Saw the Future," *The New York Times*, July 22, 1998, sec. Arts, accessed March 23, 2016, http://www.nytimes.com/1998/07/22/arts/critic-s-notebook-when-bernstein-saw-the-future.html.

the end, as I aim to demonstrate through analysis, it is problematic to reduce Bernstein to a naïve composer who lacked a more nuanced understanding of different compositional syntaxes.

When we begin to investigate Bernstein's own compositions—including pieces meant for a lay-audience—we realize that his music appears to follow principles that we would not expect from his lectures. Bernstein's lectures, which oversimplify, should not be used as the *primary* evidence for his own compositional approaches. They can, however, be used as proof of his pragmatic approach to composition—an approach fundamentally concerned with moving an audience to emotion through musical means.

1.5 Early Reception History of *West Side Story*, Part 1

Like Mozart, in the letter quoted at the beginning of this chapter, Bernstein proclaimed a desire to write music for both music connoisseurs (*Kenner*) and those less-learned (*Liebhaber*) alike. As Bernstein's *Joy of Music* demonstrates, Bernstein wanted to be modern, but to be so in a way his audience could understand.[17] Although we might not be able to ascertain if Mozart's attempts to please *Kenner* and *Liebhaber* were equally effective, the richly documented reception history of *West Side Story* provides some insight into Bernstein's attempts. How did he fare?

Now recognized as a Broadway classic, it might seem surprising that *West Side Story* (1957) did not open to universally positive reviews. Many negative reviews express concerns about the music's relationship to Broadway aesthetics. In 1957, an anonymous critic condemned the show's lack of comedic moments and absence of show tunes, writing, "there is nothing to sing from it. . . strictly for the arty set";[18] another wrote, "matters of taste obtrude here in a big way," the music is

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[17] Andreas Giger, "Bernstein's the Joy of Music as Aesthetic Credo," *Journal of the Society for American Music* 3, no. 03 (August 2009): 315.

[18] "Untitled Clipping," *New York World-Telegram and Sun*, September 27, 1957.

"repulsive," and "there is no tune in the score that could be whistled by the traditional messenger boy."[19]

Positive reviews express these perceived faults as exemplars of Leonard Bernstein's successes, especially for those attuned to modern sounds. After the shows premier in London, one critic summarized this sentiment: "Many people, I suspect, will recoil from the knuckle-duster impact of this Teddy Boy musical . . . [The piece] was violent. Race hatred and teenage warfare end in tragedy. The music of Leonard Bernstein is modern and magnificent, but it will displease ears attuned only to the old-fashioned charm of *My Fair Lady*."[20] In comparison to the "old-fashioned charm of My Fair Lady," which opened a year before in 1956, Bernstein's music was considered to be too "arty," but for those audiences willing to accept new, "modern" sounds, Bernstein's music, as another critic put it, took American theater "a venturesome step forward."[21] Although the tragic, serious plot of West Side Story may have been a surprise to many mid-twentieth-century musical theater audiences—especially those who were accustomed to the normative comedic plot archetypes on Broadway—the music itself appeared to cause "aesthetic confusion."[22]

More broadly, *West Side Story* caused critics and audiences to question supposed mutually exclusive mid-twentieth-century musical aesthetics between highbrow and lowbrow music (discussed further in chapter two). What distinguished the supposed accessible "lowbrow entertainment" of

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[19] Gerard Fay, "A Musical with a Message: West Side Story Sets a Pattern," *Manchester Guardian*, n.d. Cited in Elizabeth Anne Wells, *West Side Story: Cultural Perspectives on an American Musical* (Lanham, Maryland: Scarecrow Press, 2011), 220.

[20] Adrian Wright, *West End Broadway: The Golden Age of the American Musical in London* (Woodbridge: Boydell Press, 2012), 144.

[21] John Chapman, *Daily News* 1957. See Steven Suskin, ed., *Opening Night on Broadway: A Critical Quotebook of the Golden Era of the Musical Theatre, Oklahoma! (1943) to Fiddler on the Roof (1964)* (New York: Schirmer Books, 1990), 695.

[22] See Wells, *West Side Story: Cultural Perspectives on an American Musical*, 220.

musical theater from the "sophisticated highbrow art" of opera?[23] If opera was too "uppity," how "sophisticated" could a musical be, before it turned into something no longer appropriate for the Broadway stage? Did Broadway aesthetics, "based no doubt on experience at the box office," allow for more supposedly sophisticated art music?[24]

1.6 Reception History, Part 2: Recent Research on West Side Story

Research on Bernstein's music is only beginning to emerge. Most recently, Elizabeth Wells explores the historical and cultural origins of *West Side Story* focusing on issues of race, ethnicity, gender, reception history, and archival research.[25] Wells includes several small snippets of musical analysis—primarily to illustrate potential musical borrowings or inspirations—but avoids detailed investigations of the music in favor of more broad stylistic and cultural comparisons. Several of Wells's observations and archival research—especially the letters Bernstein sent to Stephen Sondheim and a Dutch student that reveal an aspect of Bernstein's motivic thought process for *West Side Story*—have inspired my own approach. My analyses confirm some of the intuitions posited by Wells that were previously only supported by Bernstein's public comments. For example, I confirm Bernstein's musical borrowings and inspiration from Berlioz's *Romeo and Juliet* and suggest that Bernstein did indeed appear to model passages after music by composers like Stravinsky.

In contrast to broader cultural studies, analytical studies on the music of *West Side Story* are more limited. Perhaps the most comprehensive analytical treatment of the music to *West Side Story*

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[23] On the terms "highbrow" and "lowbrow" see chapter two of the present study, section 2.4. For a critique of *West Side Story* faltering between musical theater and opera, see Howard Taubman, "Bernstein's Score of *West Side Story* Falters between Musical and Opera," *The New York Times* (New York, New York, October 13, 1957).

[24] Ibid.

[25] Wells, *West Side Story: Cultural Perspectives on an American Musical.*

can be found in Helen Smith's *There's a Place for Us: The Musical Theatre Works of Leonard Bernstein.*[26] Set within the context of Bernstein's entire musical theater *oeuvre,* Smith provides some excellent insight into Bernstein's music for *West Side Story* detailing some of the motivic tritone connections found throughout the musical. Many of Smith's observations, some of which are compiled from other authors, inform my own analysis. However, although Smith provides many insightful observations, some of her claims do not rest on secure theoretical foundations. For example, Smith notes that the "Cool Fugue" opens with a twelve-tone row, but stops short of considering the work a twelve-tone composition, instead favoring to call the work a tonal fugue. In chapter five, I argue that the serial design of the "Cool Fugue" undermines a tonal reading and propose an alternative non-tonal approach based on post-tonal theory.

Some of the musical claims made by Smith compile observations made by Joseph Swain and Geoffrey Block, both of whom include a chapter on *West Side Story* in their books on Broadway Musicals.[27] Swain's slightly more extensive chapter includes brief analytical interludes with snippets of the "Prologue," "Maria," "Tonight," "Somewhere," "A Boy Like That," and the "Finale." Swain identifies the presence of simultaneous major and minor thirds, bitonality, and recognizes the importance of the tritone interval as a motive. He then provides brief analytical examples to highlight the working out of his initial observations from the "Prologue." Geoffry Block details Bernstein's likely musical borrowings or inspirations from other composers, most notably Wagner. Some insightful examples include musical likeness between Wagner's "Redemption" motive (in *Die Walküre* and *Götterdämmerung*) and Bernstein's "Procession" motive, and motivic parallelisms with

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[26] Helen Smith, *There's a Place for Us: The Musical Theatre Works of Leonard Bernstein* (Burlington, Vermont: Ashgate Publishing, Ltd., 2011).

[27] Geoffrey Block, *Enchanted Evenings: The Broadway Musical from Show Boat to Sondheim* (New York; Oxford: Oxford University Press, 1997), 245–273; Joseph Peter Swain, *The Broadway Musical: A Critical and Musical Survey*, 2nd Edition. (Lanham, Maryland: Scarecrow Press, 2002), 221–265.

Bernstein's three-note tritone-figure— a motive he calls the "hate motive"—and Berg's first Piano Sonata.[28] I examine the "hate motive" in more detail in chapters two and three.

1.7 Organization of Chapters

In the next chapter (chapter two), I establish a perceptual and structural basis for the technical and theoretical methodologies used throughout this study. In particular, I introduce the rationale for using post-tonal theory and semiotics, and comment on mid-twentieth century views of "highbrow" and "lowbrow" to set the stage for analytical and aesthetic comparisons. The remaining analytical chapters, summarized briefly below, use the theoretical methodology developed in chapter two.

In chapter three, I begin analysis *in media res* with "The Rumble." Because "The Rumble" was a late addition to *West Side Story*'s genesis, Bernstein could draw upon and synthesize material from throughout the show while writing it.[29] Accordingly, "The Rumble" functions somewhat like an overture—a montage of material from throughout the musical that is coordinated according to the dramatic goals of the scene. Surprisingly, my analysis reveals that the montage-like structure is coordinated according to specific pitch-based structural principles derived from important local sonorities, such as "The Rumble" chord and Wagner's "Tristan" chord. Additionally, my analysis shows how the music is coordinated with stage action and structured according to seemingly abstract musical principles. As I demonstrate in successive chapters, developing a detailed interpretation of "The Rumble" provides the necessary framework for understanding other pieces in *West Side Story* if not the entire musical.

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[28] See Block, *Enchanted Evenings: The Broadway Musical from Show Boat to Sondheim*, 260–272.

[29] Originally, a piece called "Mix!" functioned as music for the fight scene as early as the second number in the show. When the fight moved to the end of act one, "Mix!" was cut and was replaced by "The Rumble." See Nigel Simeone, *Leonard Bernstein:* West Side Story, Har/Com edition. (Farnham, Surrey; Burlington, Vermont: Ashgate, 2009), 54.

Many critics singled out "The Rumble" as a piece that spoke to its audience "through dissonance,"[30] but despite critical response pointing to this piece, discussions of "The Rumble" are absent in scholarly literature. How does a piece *speak* "through dissonance"? Some of the analytical challenges this piece poses include pitch structures devoid of common-practice triads, harmonic progressions that do not follow tonal paradigms, and frequent sequential patterns lacking traditional triadic material. Using "The Rumble" as a case in point, I diverge significantly from recent studies, such as those by Smith, Swain, and Block, by eschewing tonal concepts in favor of methodology from post-tonal theory. By abandoning ad-hoc solutions that attempt to follow Bernstein's own tonal manifesto, I provide secure theoretical foundations for analysis in place of theoretically strained and ambiguous tonal readings.

In chapter four, "The Patterns of Grand Opera on Broadway," I combine Swain's and Block's analytical observations of the "Tonight" ensemble with observations made by Larry Stempel to discuss the "patterns of grand opera" in a semiotic framework.[31] In Bernstein's invented "West Side Story Log," written after the events it describes and pre-dated, Bernstein describes the genesis of *West Side Story* (1957) in terms of "making a musical that tells a tragic story in musical comedy terms, using only musical comedy techniques, never falling into the 'operatic trap.'"[32] In this chapter, I problematize the "opera trap" and argue that the "Tonight" ensemble closely parallels some ensemble finales found in opera while simultaneously drawing upon popular musical idioms common to Broadway.

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[30] See Richard L. Coe, "Musical at National Is a Triumph," *Washington Post*, September 1, 1957.

[31] Larry Stempel, "Broadway's Mozartean Moment or An Amadeus in Amber," in *Sennets & Tuckets: A Bernstein Celebration*, ed. Steven Ledbetter (Boston: Boston Symphony Orchestra in association with D.R. Godine, 1988), 39–56.

[32] Leonard Bernstein, "Excerpts from a West Side Log," *Playbill*, September 30, 1957; Leonard Bernstein, *Findings* (New York: Simon & Schuster, 1982), 145–146. Several authors have noted the asynchronous nature of the invented log book which was invented after the events it describes. See Simeone, *Leonard Bernstein*, 17; Wells, *West Side Story: Cultural Perspectives on an American Musical*, 243–244.

To show how *West Side Story* was more sophisticated than other musicals, several authors have noted Bernstein's inclusion of a fugue. Nigel Simeone considers the "Cool Fugue" unorthodox for Broadway and suggests that it was "possibly the most complex instrumental music heard on Broadway to date."[33] In chapter five of the present study, I provide a detailed analysis of the "Cool Fugue" by disentangling an unusual combination of serialism with fugue. Using a combination of post-tonal and traditional fugal principles, I posit a serial structure that interacts with—and helps define—the unfolding fugal process. In the course of this analysis, I re-contextualize Bernstein's public lectures on modern music, especially his numerous comments on tonality and serialism. Although some scholars, e.g. Giger and Baber, suggest that Bernstein reinforced pejorative myths of twelve-tone music and other avant-garde musics as compositional fads of the postwar period, he also "fooled with serialism," and his own serial pieces sometimes made it into places we least expect.[34] According to my interpretation, Bernstein placed not only the first fugue into a Broadway musical, but also Broadway's first *serial* fugue.[35]

In a final chapter, I summarize how Bernstein fashioned his musical with multiple compositional grammars in an effort to navigate between aesthetic and cultural divisions. Drawing on the results of the prior three analytical chapters, I reconsider Bernstein's polemical lectures and encourage a more nuanced understanding of Bernstein's views. Afterwards, I revisit some of the semiotic methodology established in chapter two in the context of Bernstein's Norton lectures to discuss how my analytical observations cohere with Bernstein's own views about the future of

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[33] Simeone, *Leonard Bernstein*, 84.

[34] In an article dedicated to Copland's 70th birthday, Bernstein discusses how he also "fooled with serialism." See "An Intimate Sketch - Aaron Copland Collection - Collections," web page, *Library of Congress, Washington, D.C. 20540 USA*, accessed September 20, 2015, http://www.loc.gov/collections/aaron-copland/articles-and-essays/an-intimate-sketch/.

[35] The Tinhorn fugue from Frank Loesser's *Guys and Dolls* (1950) is not a fugue, but a canon.

American musicals. After summarizing this work in its entirety, I suggest future questions, areas of

research, and analysis.

Chapter 2

Methodologies

So you see how, with new sounds, new sonorities, new textures, dissonances, harmonies, rhythms, and that new objective approach, a great modern composer can use the same old-fashioned notes that music has always used, and use them in a fresh way. And I guess that's what people mean by a composer's "having something to say."[36]

Leonard Bernstein, *The Joy of Music*

Figure 2.1 Bernstein's Letter to a Dutch Student

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[36] Bernstein, "Introduction to Modern Music," 221.

2.1 Post-Tonal Theory

A little more than a decade after its premier, a Dutch student wrote Bernstein a letter requesting an analysis of *West Side Story*. Bernstein responded to the student with a letter, replicated in **Figure 2.1** (previous page).[37] In the letter, Bernstein writes that it is "impossible to send analyses by mail," but offers a clue in its place: "In West Side – look for the relation among songs and dance-pieces in terms of these three notes (sort of a *leitmotif*)." He then sketches out the Prologue motif {D, G, C#}, and draws the motives from "Maria" and "Cool" to show that that they are the "same three notes in a different order." The different orderings of the same three notes (pitch classes), Bernstein writes, "holds [*West Side Story*] together, and makes it <u>one</u> piece instead of many different pieces" (emphasis by Bernstein).

In a later talk with Mel Gussow, Bernstein explained that the three notes acted as a type of "kernel of the piece, in the sense that the three notes of 'Maria' pervade the whole piece – inverted, done backward. . . the same three notes."[38] Bernstein's clues emphasize the principle of reordering pitch classes (pcs) forward, backward, and even inverted. Set-theory provides a useful analytical tool to describe the similarity each motive shares. No matter how the three pitch classes are arranged, there will be three unique interval classes: a tritone represented by interval class (ic) 6, a semitone or major seventh represented by ic 1, and a perfect fourth or fifth represented by ic 5. These three unique interval classes can be represented by the interval class vector (ICV) [100011].[39]

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[37] This figure is replicated from Wells, *West Side Story: Cultural Perspectives on an American Musical*, 56–57. Elizabeth Wells uses this letter to support the tritone motive, "one of the most enduring symbols of the musical's unity," as a means for describing the musical's "perceived organic unity."

[38] Cited in Simeone, *Leonard Bernstein*, 81.

[39] An interval class vector contains the intervallic content of a set class. Interval classes describe the shortest semitone distance between two pitch-classes (not pitches). As a result, there are six semitone interval classes instead of twelve. For example, the distance from pitch-class 'C' (0) is one semitone from pitch-class B (pitch-class 11) read counter-clockwise. Informally, interval classes can be understood to represent an interval and its inversion. The vector consists of six digits,

The ICV [100011] uniquely defines set-class 3-5 (016).[40] Alternatively, we can describe the set in terms of the pc content. To do this, first we re-label Bernstein's pcs with numbers where C is mapped to 0, thus D = 2, G = 7, and C#/Db = 1, which results in the pc collection {2, 7, 1}. Afterwards, the set is arranged according to increasing order ({2, 7, 1} becomes {1, 2, 7}), and then transposed so that the first pc is zero (to move the set to start on zero, one is subtracted from each interval). This process results in the pc-set {0, 1, 6}, which happens to be the prime form of set-class (sc) 3-5.[41] Consider **Figure 2.2**. Each motive that Bernstein sketches in the letter, what he calls "Prologue," "Maria," and "Cool," are members of sc 3-5. Note the direction of arrows in the right

Figure 2.2 Set Class 3-5 (016)

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with each digit representing an interval class ordered one through six. See Joseph N. Straus, Introduction to Post-Tonal Theory, 3rd edition. (Upper Saddle River, New Jersey: Pearson, 2004), 14.

[40] Set class labels used in this thesis are adapted from Allen Forte, *The Structure of Atonal Music* (New Haven; London: Yale University Press, 1977). Set classes are defined by the canonical operators transposition (T_n) and inversion (T_nI). Where necessary, I append the letters "a" and "b" to denote the prime form and the inversionally related member respectively. For example, sc 3-11a denotes a minor triad (037, the prime form) and sc 3-11b denotes a major triad (047, an inversion of the prime form).

[41] The prime form of a set is the most tightly compacted version with intervals arranged in increasing order. See Straus, *Introduction to Post-Tonal Theory*, 57.

of the figure, which are drawn to emphasize the transpositions (T_n) that describe the intervals between pitches. For more on the relationship of transpositions and intervals, see section 1.2 "Transformational Theory."

At first, it might seem strange to use post-tonal theory to label motives form a supposedly tonal composer without additional evidence for its usefulness. In chapter three, I therefore show the powerful insight post-tonal theory affords not only for these particular motives, but for a large variety of musical structures in *West Side Story*. Additionally, in chapter five, I use post-tonal theory to describe how a twelve-tone serial structure interacts with an unfolding fugal design. Post-tonal theory can help describe the structural intervallic similarities the motives share and provides a tool for explaining larger passages that combine these motivic building blocks with other material. In some ways, it can even offer a way to model characteristics of Bernstein's compositional approach in general.

Bernstein's personal assistant and composer-theorist friend Jack Gottlieb writes in his 1964 dissertation on Bernstein's music that: "Bernstein composes with intervals as his main source material. The interval is used not only in its natural state as a musical building block, but is treated as an entity unto itself. It has meaning *sui generis*."[42] If we focus on Bernstein's supposed careful attention to intervals and their generative, transformative properties, post-tonal theory begins to make a lot of sense as an analytical tool for understanding his music. Not only does post-tonal theory accurately describe the motives Bernstein details, it shares a structural and perceptual basis with Gottlieb's characterization of Bernstein's compositional strategies.

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[42] Jack Gottlieb, "The Music of Leonard Bernstein: A Study of Melodic Manipulations, with Original Compositions: Sonata for Piano, Pieces of Seven, Overture for Orchestra" (D.M.A., University of Illinois, 1964), 19; For a discussion of Bernstein's intervallic composition technique outside the context of set theory, see Smith, *There's a Place for Us*, 19–20.

An astute reader may still find post-tonal theory troublesome, as it might seem problematic to extend the theoretical framework to a larger scale, especially if one considers Bernstein to be a tonal composer. Certainly, many musical passages in *West Side Story* appear to orbit or be organized around a central pitch. However, as I will show in later chapters, trying to understand certain pieces in *West Side Story* with tools from tonal theory invites a manifold of theoretical problems. To prevent these, but still account for some seemingly pitch-centric passages, I use the term "centric," from Straus (2005) to designate musical material that centers or orbits about a central pitch, but does not necessarily incorporate tonal syntax. As Straus notes, although all tonal music is centric, not all centric music is tonal.[43] The theoretical construct of centricity is frequently more appropriate than Bernstein's concept of tonality or even extended tonality, as it allows a more fine-grained analytical inquiry with secure theoretical foundations, rather than what would be a theoretically strained and deeply ambiguous tonal readings.

It is important to recognize that by foregoing a tonal framework, we also lose the harmonic implications it posits. Whereas tonal theory supposes a harmonic progression of tonic to pre-dominant to dominant and back to tonic, post-tonal theory does not directly suggest any particular harmonic paradigms. Nonetheless, particular harmonic choices and transpositions in a post-tonal framework are hardly arbitrary decisions. Therefore, to describe how particular musical objects interact with one another, I use a relatively new branch of post-tonal theory called transformational theory, as developed by David Lewin, Henry Klumpenhouwer, Julian Hook, and Jack Douthett among others. In particular, I use Transposition Networks (T-Nets), Klumpenhouwer Networks (K-

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[43] Straus, *Introduction to Post-Tonal Theory*, 131.

nets), and Uniform Triadic Transformations (UTTs).[44] In what follows, I provide a brief

introduction to these analytical tools.

2.2 Transformational Theory

Transformational theory describes relationships, or

transforms, between musical objects. Fundamentally, a

transformational approach requires an analyst to shift focus

from that of an outside observer to someone *inside* the

musical system in question. David Lewin, after sketching
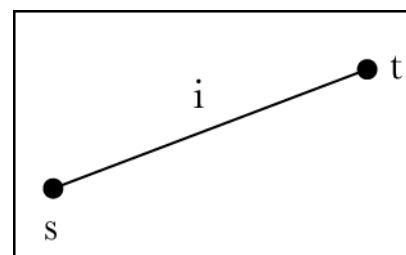
Figure 2.3 Lewin's Figure 1

Figure 1 in Chapter 1 of *Generalized Musical Intervals and Transformations*—two points "s" and "t"

connected by an interval "i" (replicated in **Figure 2.3**)—writes of the transformational reorientation

required in Chapter 7:

> We tend to imagine ourselves in the position of *observers* when we theorize about
> musical space; the space is "out there," away from our dancing bodies or singing
> voices. "The interval s to t" is thereby conceived as modeling a relation of *extension,*
> observed in that space external to ourselves; we "see" it out there . . . In contrast, the
> transformational attitude is much less Cartesian. Given locations s and t in our space
> . . . it asks: "If I am *at* s and wish to get to t, what characteristic gesture should I
> perform in order to arrive there?"[45]

The "characteristic gesture," or transform, that is necessary to move from *s* to *t* can take a variety of

forms. Perhaps the most straightforward transformation is transposition: to move from pitch C up

to E, we need to apply the transform "transpose pitch C by four semitones in the ascending

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[44] For more thorough introductions to these theories, see David Lewin, *Generalized Musical Intervals and Transformations* (New Haven: Yale University Press, 1987); David Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them," *Music Theory Spectrum* 12, no. 1 (April 1990): 83–120; Julian Hook and Jack Douthett, "Uniform Triadic Transformations and the Twelve-Tone Music of Webern," *Perspectives of New Music* 46, no. 1 (2008): 91–151.

[45] Lewin, *Generalized Musical Intervals and Transformations*, 159.

direction to arrive at the pitch E." Alternatively, we could apply the transform in pc space, e.g. "transpose pc C by four semitones clockwise on a pitch-clock face, i.e. transpose C by T_4." Metaphorically, if we wish to go from pc E to pc C, we can imagine ourselves taking four semitone steps away from C clockwise, much like 4:00PM is four hour-ticks away from 12:00 Noon on a clock-face. Pitch-class space operates in a mod(12) system, not unlike an analogue twelve-hour clock. In pitch-space, we can imagine taking four ascending semitone steps from a particular pitch C, for example C4, to arrive on E4. Whereas pitch-class space does not necessarily preserve register, in pitch-space, a positive transposition corresponds to movement to a higher register, for example, to the right on a piano or up the neck on a guitar or cello.

In transformational theory, one of the central concepts is the idea that "intervals-between-things and transpositional-relations-between-Gestalts" are not alternatives, as David Lewin details, but are "the *same* phenomenon manifested in different ways."[46] **Figure 2.4** reproduces Lewin's example 7.1 from *Generalized Musical Intervals and Transformations* (GMIT) to demonstrate the concept of interval and transposition relational equivalence.[47] The left side of the figure (**Figure 2.4a**) shows a harmonic sonority that begins Schoenberg's piano piece, Op. 19 No. 6. The sonority consists of
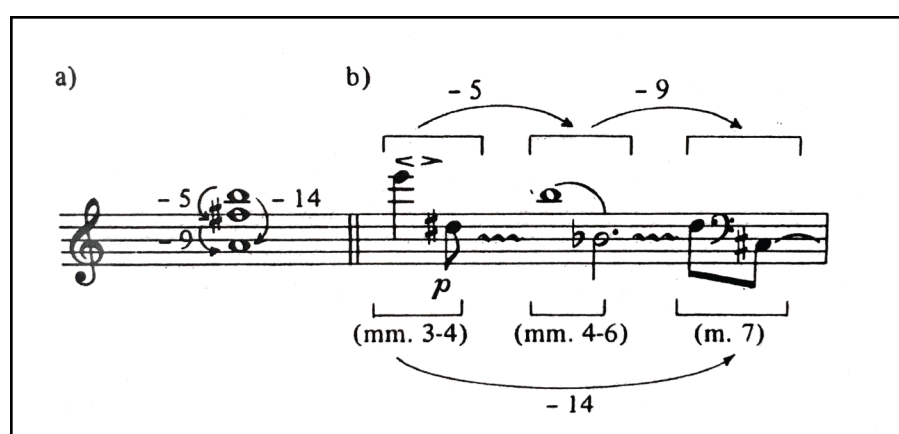
Figure 2.4 Lewin's Transformational Network

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[46] Ibid.

[47] Ibid.

three pitches separated by the intervals represented by –5, –9, and –14 semitones respectively (note the downward pointing arrows representing the minuses). The negative versions are chosen because they show how the vertical harmonic entity becomes reinterpreted as a network structure over the course of the piece. The right side of the figure (**Figure 2.4b**) shows how the vertically expressed intervals embedded in this trichordal pc chord (with doubling thrown out) become unfolded as a network of intervals that govern each falling minor ninth throughout the course of the piece. As **Figure 2.4b** uses transposition operators, it is a T-net. As Lewin notes, the "three transposition-operations T_{-5}, T_{-9}, and T_{-14}, which move the falling-ninth motif *forwards in time . . .* are exactly those members . . . which move the individual pitches of [the right hand] *downwards in space.*"[48]

Analyzed in this manner, the initial sonority (**Figure 2.4a**) acts as what David Lewin refers to as an *Unterklang*, a referential structure, and the T-nets demonstrate how the referential structure gives rise to particular compositional decisions. The numbers –9, –5, and –14 are understood to be two aspects of *one* musical phenomenon that can describe both intervals (objects) and transpositions (transforms) on other objects (in this case, minor ninths). In the absence of a tonal syntax motivating particular harmonic choices or transpositions, the T-net in **Figure 2.4b** strongly suggests how the initial vertical sonority gives rise to the horizontal structure—perhaps as a type of *Fortspinnung* or *Auskomponieren,* i.e. the "spinning out" or "composing out" of musical material.

A transformational network is defined by its *nodes,* which are objects such as pitches, pcs, groups of pcs, scs, etc; and *edges,* which are operations that connect nodes such as transpositions or inversions.[49] In the above example, the pcs of the initial sonority in **Figure 2.4a** act as the nodes, and the intervals described by plus and minus semitones act as the edges. In **Figure 2.4b**, the nodes

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[48] Ibid., 160.

[49] Nodes can also have operations ("transformations") embedded too. However, this consideration is not used in this thesis.

now consist of descending minor ninths, and the edges are the transpositions between each iteration. Because the two networks have the same edges, they are said to be *isographic permutation networks*. Note that two networks can be isographic permutation networks if the nodes are different—only the edges need to be the same. In the absence of a tonal framework, recognizing network isographies allows one to posit meaningful and potentially hierarchical relations between musical objects, e.g. pitch-structures.

2.2.1 Klumpenhouwer Networks
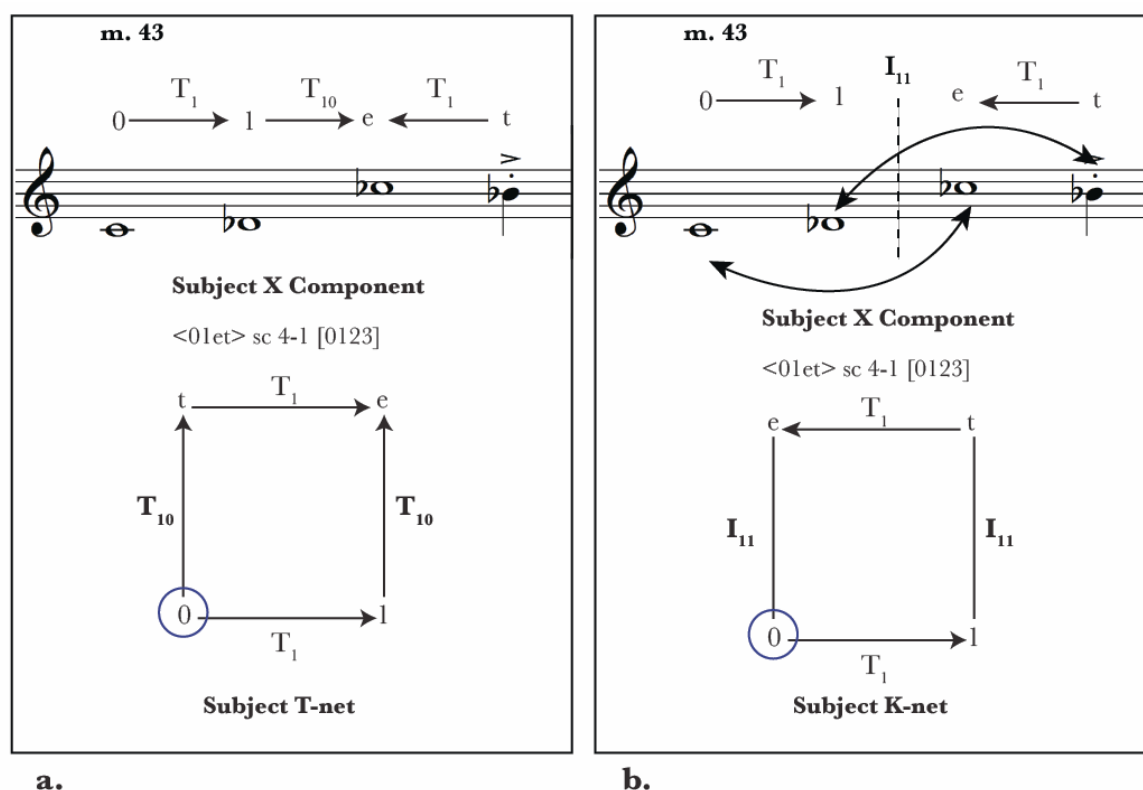
Figure 2.5 Klumpenhouwer Network Example

Klumpenhouwer Networks, or "K-nets," build upon the theoretical framework of T-nets. While a T-net allows only transposition edges, a K-net allows transposition and inversion edges.[50] As

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[50] For a more thorough and formal introduction to Klumpenhouwer Networks, see Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them."

a result, K-nets model perception differently than T-nets. For insight into the difference, consider

Figure 2.5; this figure models the first part of the fugue subject of the "Cool Fugue" (to be

discussed more thoroughly in chapter five) on a T-net (left) and a K-net (right). Note how each

node is a pc, and the arrows represent transposition or inversion edges between each node. Starting

with the circled pc 0 in the bottom left corner and reading counterclockwise, the edges reveal the

transformations (transpositions notated by T_n) required to reach each successive pc.[51] **Figure 2.5**

(right) is a K-net, showing a similar network, but replacing the vertical T_{10} edges with inversion

edges notated as I_{11}.

Inversion transforms act in pc-space, described by

mod(12), such that the inversion transformation does not

necessarily preserve register or contour. In the K-net of

Figure 2.5b, the relationship between the pitches can

productively be understood as a type of reflection about an

axis of inversion.[52] **Figure 2.6** offers one way to visualize

the K-net of **Figure 2.5b**. Note that the axis of inversion
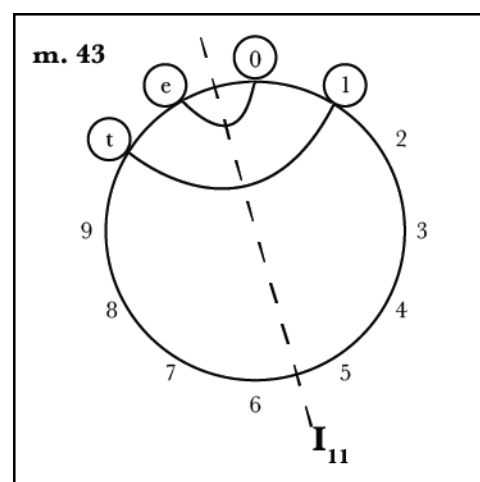
Figure 2.6 Axis of Inversion

numbers represented by the *n* subscript of I_n are the sum of the pcs taken mod(12). The dashed line

between the first two notes (0, 1) and the second two notes (e, t) shows that each two-note pair has

responding notes modeled by a singular axis of inversion (here I_{11}). K-nets can be useful to describe

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[51] Note that the transpositions described by the Twelve Tone Operator (TTO) T_n operate in a modular twelve pitch-class-space, and not the traditional tonal pitch-space which maintains contour, temporal characteristics, etc. However, if the subscript *n* is greater than eleven, we can understand the transposition to emphasize a pitch space relationship in certain contexts. Note that the subscript *n* is a distance in semitones clockwise about the pc-clock face. The transposition is not directly analogous to a tonal transposition which maintins countour, temporal characteristics, etc.

[52] The axis of inversion between two pitch-classes is calculated by summing the two pitch-class integers mod(12). For example, pc 7 and pc 6 create an axis of inversion of 13 mod(12) = 1.

how different set-classes relate, especially when the relationship involves a changing axis of inversion.[53] Perceptual bases for K-nets are further developed in chapter five, "Playing it 'Cool'."

2.2.2 Uniform Triadic Transformations

To bolster network interpretations and further detail how the serial structure of the "Cool Fugue" interacts with the fugal process in chapter five, I use UTTs. Originally formulated for triads, Douthett and Hook have shown that UTTs can be extended to model other musical objects such as asymmetrical pitch-class sets.[54] In the case of triads, for example, UTTs can model neo-Riemannian transformations in
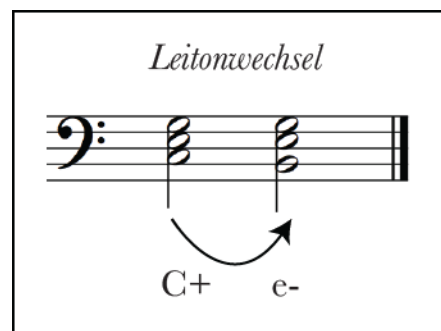
Figure 2.7 *Leitonwechsel* **Transform**

addition to other functions for which neo-Riemannian techniques cannot. Consider **Figure 2.7** which shows two chords: C major (indicated with C+ as is customary in transformational theory) and E minor (E–) in second inversion (to demonstrate smooth voice leading between the chords). Neo-Riemannian theory considers the chords to be related by a *Leitonwechsel* transformation, a transformation in which the tonic of the first (major) chord becomes displaced to its leading-tone, or conversely, when the chordal fifth of a minor triad is displaced to a semitone above—hence the German term *Leitonwechsel*, which translates to "leading-tone switch." At the expense of not considering smooth voice-leading implications in pitch-space—a sacrifice that will prove useful in chapter five—UTTs can describe the relationship between C+ and E– as a mathematical function,

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[53] For a critique of Klumpenhouwer networks, see Michael Buchler, "Reconsidering Klumpenhouwer Networks," *Music Theory Online* 13, no. 2 (June 2007), http://www.mtosmt.org/issues/mto.07.13.2/mto.07.13.2.buchler.html.

[54] Hook and Douthett, "Uniform Triadic Transformations and the Twelve-Tone Music of Webern," 2.

much like the Neo-Riemannian *Leitonwechsel* transform represented by the function *L* (for

Leitonwechsel operation*)*.

By definition, a UTT is a function *U* that acts on a musical object, which is referred to as the

mathematical variable *Delta.* The object *Delta* is defined by two parameters, a mode indication (+ or

–) and the root note of the musical object represented by a pc mod(12). In the case of triads, for

example, *Delta* is either major (+) or minor (–) and the root note describes the root of the triad. For

example, *Delta* = (4, +) indicates an E major triad, and *Delta* = (0, –) indicates a C minor triad. The

function *U* is an ordered triple U<x, y, z>; that is, *U* has three terms that describe how it functions

on the objects described by *Delta.* The first term of the function *U* (x)*,* is written + or – to denote

whether the function preserves the chord quality (+), or whether it flips the mode (–); the second

term (y) is understood to represent t+, the transposition level of positive mode objects (for example,

major triads); the third term (z) is understood to represent t–, the transposition level of minor mode

objects (for example, minor triads). In summary, a UTT is described by U<+ or –, t+, t–>. An

example follows.

To better understand how UTTs can be used, it is useful to understand how Neo-

Riemannian transforms translate. The Neo-Riemannian *Leitonwechsel* transformation is modeled by

the UTT *U* = < –, 4, 8>. Thus, to model the *Leitonwechsel* transformation between C+ and E– we

need simply to apply the function *U* = <–, 4, 8> to C+ (*Delta* = 0, +) to arrive at E– (*Delta* = 4, –).

Expressed mathematically, the operation is written <–, 4, 8> (0, +) = (4, –), and is read "the UTT

U=<–, 4, 8> operates on *Delta* = (0, +) to result in *Delta* = (4, –). The UTT that translates the

Parallel transformation, the transformation that describes the movement of a chord switching to its

parallel mode, for example C+ to C–, is <–, 0, 0>. Note how the transposition terms are zero so the

chord is not transposed, and the mode indicator is minus in order to flip the mode from major to

minor or vice versa. *Relativ,* when a chord switches to its relative mode such as C+ to A–, is modeled

by the UTT $U = <–, 9, 3>$. In each transform, note how the second and third terms of the functions U (the terms t+ and t–) are complementary so that the function can reverse a transform if applied successively, and the first term is always a minus so the mode flips.[55] These conditions insure that the Neo-Riemanian UTTs reverse the results when applied a second time in a manner similar to how Neo-Riemannian transformations reverse the results when done a second time (both are mathematical involutions).[56] For example, if we apply the *Leitonwechsel* transformation L to C+, written L(C+), we arrive at E–; if we apply L to E–, we arrive back at C+.

Figure 2.8 offers one way to visualize the function U operating on triads. The left circle represents the roots of every major triad (+ mode objects) and the right circle represents the roots of every minor triad (– mode). The *Leitonwechsel* transformation is done in two steps with UTTs. As shown in the bottom left example, with U = $<–, 4, 8>$ acting on *Delta* = (0, +), we first add 4 to 0, i.e. transposing C major to E major (because we are dealing with a + mode *Delta),* and then switch the mode from plus to minus (E major to E minor).[57] Visualizing two separate mod(12) circles linked by a switching function (+ or –) offers a simple way to understand how UTTs operate.

In chapter five, I use UTTs to model the alternating entries of fugue subject and answer components. UTTs help show how the underlying serial structure interacts with and helps define the unfolding fugal process. To do so, I change the objects defined by *Delta* to represent asymmetric pc-sets in place of triads as shown in previous examples. With this configuration, only the objects defined by *Delta* change—the functions represented by U remain equivalent.

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[55] This is true only with the canonical Neo-Riemannian operations L, P, and R.

[56] Involutions describe any operations that reverse the results when applied twice. For example, transposition by six semitones mod(12) or a retrograde transformation applied twice.

[57] For more examples, see Hook and Douthett, "Uniform Triadic Transformations and the Twelve-Tone Music of Webern," 2–6.

UTT Triad Example

+/-
Mode Switch

Major Triads sc 3-11b [047]   Minor Triads sc 3-11a [037]

Numbers on each clock face correspond to transposition levels. For example, 3 on the +mode indicates T3 operating on pcs, node 3 on the + mode represents [37t].

UTT is an ordered triple function:
<+ or -, t^+, t^->; Given a +, the mode remains. Given a -, the mode switches. t^+ shifts + modes, t^- shifts - modes. See examples.

The function operates on Delta:
Delta = (r, *sigma*), where r represents the root of a triad mod 12, and sigma represents the + or - mode.

Examples:

1. C+ to E- is represented by L(C+) = (E-)	2. C+ to C- is represented by R(C+) = (C–)
C- = (0, +) UTT = <-, 4, 7>	C+ = (0, +) UTT = <-, 0, 0>
Thus: <-, 4, 7> (0, +) = (4, -) = e minor Read: Add 4 to plus mode object, then flip mode	Thus: <-, 0, 0> (0, +) = (0, –) = C minor Read: Add 0 to major mode object, then flip mode

Figure 2.8 Uniform Triadic Transformations
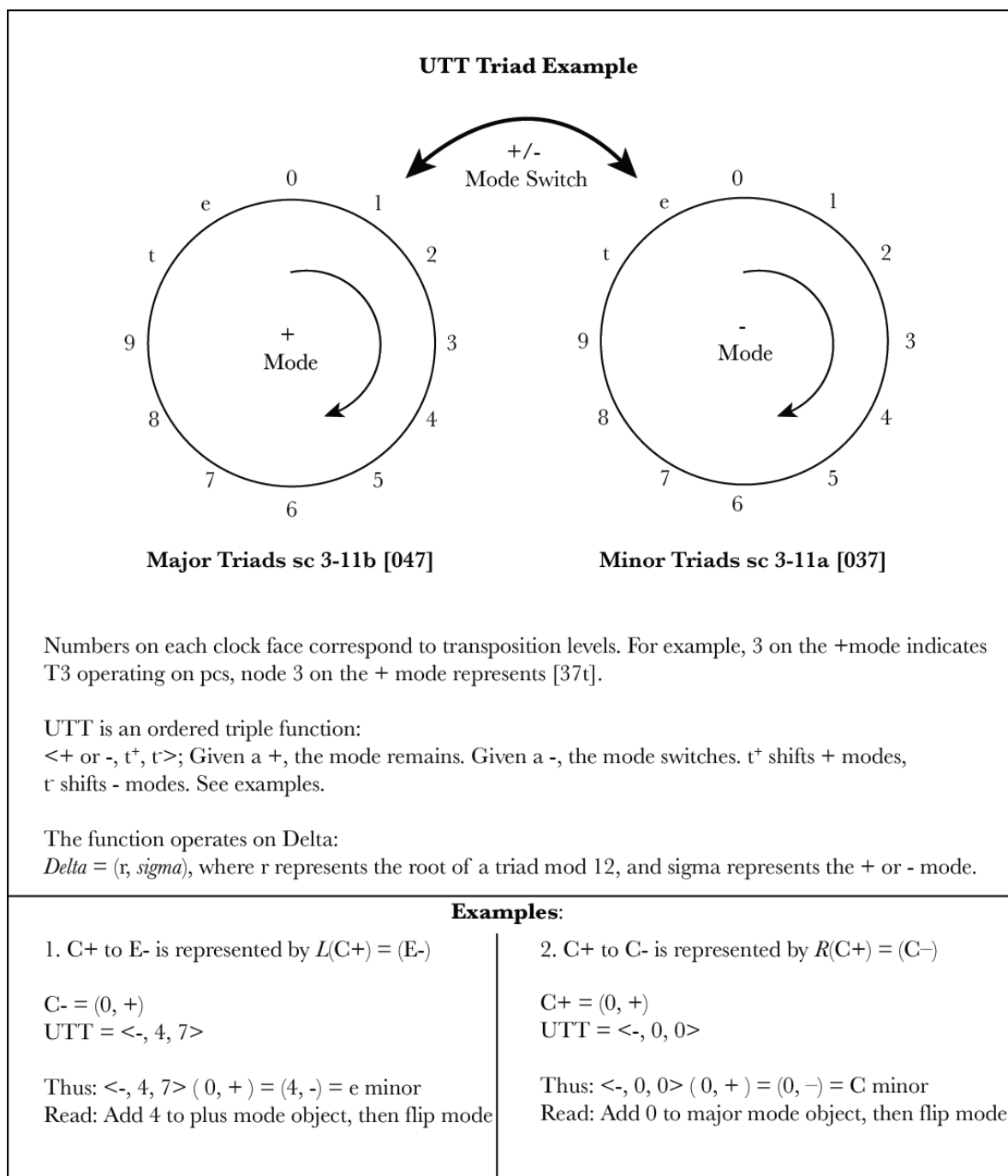
Post-tonal tools can provide a powerful analytical framework for understanding much of the music in *West Side Story*. In the absence of a tonal framework, transformational networks can offer insight into how local musical entities manifest into large-scale *Auskomponierungen* (composed out material). In addition, transformational networks can help describe how certain transforms

correspond to extramusical concepts, for example on-stage dance or other stage action as discussed in chapter three. Although post-tonal theory can help decipher much of the music in *West Side Story*, one problem still remains: if we adopt a post-tonal framework, might we also miss out on musical syntax that appears to reference or interact with tonal idioms?

2.3 Semiotics

Semiotics, the study of sign designation and interpretation, can help describe and also discover the interaction of post-tonal and tonal theories in particular pieces. As a discipline, semiotics formalizes meaning-making through the study of sign processes.[58] When we speak of one thing referencing another, we are colloquially referring to a concept encapsulated in the *Sign*. According to Charles Sanders Peirce (1839-1914), one of the founding fathers of semiotics, a Sign:

> stands for something for the idea which it produces, or modifies. Or, it is a vehicle conveying into the mind something from without. That for which it stands is called its [Referent]; that which it conveys, its meaning; and the idea to which it gives rise, its interpretant (1.339).[59]

I use Peircean semiotics primarily because it posits a triadic Sign in contrast to a dyadic Sign, as is typically attributed to Ferdinand de Saussure (1857-1913). The triadic nature of the Sign allows an analyst to more easily discuss the role of the interpreter, which is an especially useful component when discussing music aesthetics.

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[58] For an overview of Peircean semiotics as used in this thesis, see Winfried Nöth, *Handbook of Semiotics*, Advances in semiotics (Bloomington, Indiana: Indiana University Press, 1998), 39–47.

[59] In place of Referent, Peirce uses "object." See Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce, Volume I: Principles of Philosophy*, 1931, http://www.textlog.de/4317.html. The first number in parenthesis refers to the volume number, here Volume 1, and the second number the paragraph number as is standard with Peircean scholarship.

Once we recognize tonal and post-tonal syntax as sign systems, an analyst can begin to more

carefully describe how the two sign systems interact and the potential emergent meaning that results.

Much as a portrait of a person is not the person it is a likeness of, it is not necessary to force

allusions to tonal grammar into a tonal theoretical framework, especially when such references

would require us to posit a highly distorted or even structurally incoherent tonal syntax. Semiotics

allows an analyst to discuss how musical passages reference tonal idioms, without forcing a severely

strained tonal syntax. Additionally, tools from semiotics show us *how* musical passages reference

particular styles and extra- and intra-musical topics. I develop this approach in chapter four through

an analysis of the "Tonight" ensemble.
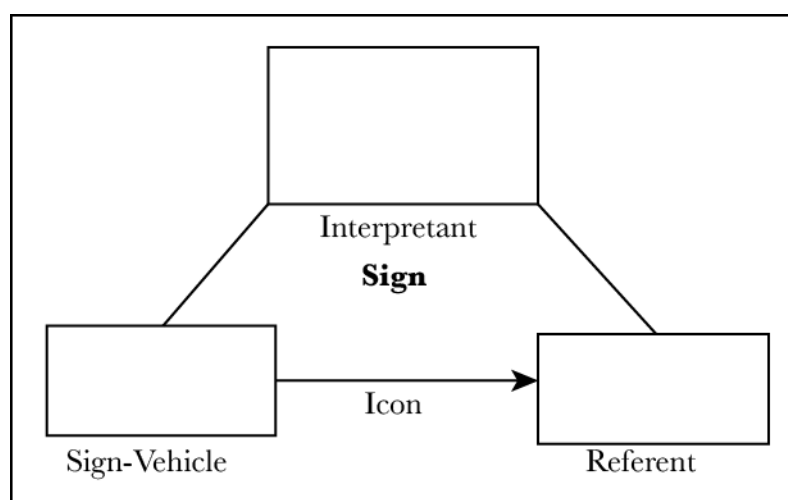
Figure 2.9 Semiotic Triangle

In Peirceian semiotics, the Sign is composed of three correlates: The *Sign-Vehicle*, for

example, the word "bird"; the Referent, for example the bird that is "out there" (perhaps it is a real

biological bird in the sky, or a picture of a bird on a wall) that the Sign-Vehicle references; and the

Interpretant, what someone interprets, translates, or develops from, the relationship(s) between the

Referent and Sign-Vehicle, for example the notion of flight or what the bird represents to the

interpreter.[60] **Figure 2.9** provides a schematic example of the three correlates on a Semiotic triangle: an arrow at the bottom of the figure indicates that the Interpretant mediates the relationship between the Sign-Vehicle and Referent which are forming an iconic sign (discussed below).[61] Splitting the Sign into three correlates allows one to clearly discuss how a reference gives rise to meaning and imparts emphasis on the act of interpretation.

The nature or kind of reference between the Sign-Vehicle and the Referent informs how a particular reference can give rise to meaning(s). This relationship can be described with Peirce's second trichotomy of the Sign—*icon, index,* and *symbol.* An iconic reference is one where the connection between Referent and Sign-Vehicle can be described in terms of some shared quality or likeness perceived by the interpreter; for example, a painted portrait of someone looks like the person it references and is therefore considered to be an Iconic Sign. Index describes a reference that is a type of factual, existential contiguity, a type of causal connection (temporal or spatial contact); for example, cross-modal temporal alignments of music with stage action, or the bullet that a bullet-hole references are said to be Indexical Signs. Symbol refers to a reference that results from some arbitrary conventional or general connection between the Sign-Vehicle and the Referent that depends on a shared convention or code. The word "bird," acts as a Symbolic sign because it depends on the arbitrary conventions of the English language.

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[60] Throughout this essay, I capitalize certain semiotic terminology—Sign, Sign-Vehicle, Referent, and Interpretant—in order to elevate their specific semiotic meanings and eliminate their colloquial meanings. Peirce uses Representamen, Object, and Interpretant. I have chosen Sign-Vehicle in place of Representamen following several other semioticians such as Charles William Morris (1901-1979) and Referent in place of Object to avoid undue emphasis on the physical nature of the second correlate that the word "Object" suggests. For some other terms used to describe the three correlates, see Nöth, *Handbook of Semiotics*, 89–91; see also Albert Atkin, "Peirce's Theory of Signs," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Summer 2013., 2013, accessed October 19, 2015, http://plato.stanford.edu/archives/sum2013/entries/peirce-semiotics/.

[61] See Nöth, *Handbook of Semiotics*, 89.

Peirce organizes icon, index, and symbol according to a progressively more demanding awareness required for meaning to emerge. For example, after seeing a bullet-hole in a pain of glass, we must be able to imagine the bullet that caused the hole, even though the bullet itself is no longer present. Similarly, the situation is more complex with symbolic Signs such as words: outside the context of the English language the word "bird" is an arbitrary set of abstract symbols—the word requires a larger shared system in order to function. Painted portraits reference the person they share a likeness with and appear to function without an underlying code or system; presumably, semiosis between a portrait of a person (the Sign-Vehicle) and the person the portrait represents (the Referent) is a more straightforward interpretive process than that required by indexical and symbolic Signs. Peirce formalizes these intuitions of iconic, indexical, and symbolic signs in terms of three perceptual categories that he labels *firstness, secondness,* and *thirdness* respectively. Although Pierce's three universal categories, *firstness*, *secondness*, and *thirdness*, are used sparingly in subsequent chapters in this thesis, it is helpful to think through them in order to understand the philosophical and perceptual underpinnings of Peircean semiotics.

Emphasizing the role of the interpreter is especially pertinent when discussing musical aesthetics and differences between so-called less or more compositionally sophisticated musics.[62] Among the three categories, *firstness* is frequently considered to be the most difficult to define. *Firstness* is the category of feeling, to which Pierce adds that it is:

> an instance of that kind of consciousness which involves no analysis, comparison or any process whatsoever, nor consists in whole or in part of any act by which one stretch of consciousness is distinguished from another, which has its own positive quality which consists in nothing else, and which is of itself all that it is, however it may have been brought about; so that if this feeling is present during a lapse of time, it is wholly and equally present at every moment of that time . . . A feeling, then, is

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[62] See ibid., 42.

> not an event, a happening, a coming to pass, . . . a feeling is a *state,* which is in its entirety in every moment of time as long as it endures.[63]

To summarize but risk oversimplifying, *firstness* is a type of state that happens before reflection occurs. An *iconic* Sign adheres to the category of *firstness* as the connection between the Sign-Vehicle and Referent is immediately apparent. The concept of *firstness* is a fleeting state because it must occur before more complex comparisons begin.

In contrast to *firstness,* the categories of *secondness* and *thirdness* are perhaps easier to define. *Secondness* occurs when reflection begins; it is the category of "comparison, facticity, action, reality, and experience in time and space."[64] *Thirdness* occurs when a particular reflection is compared or conjoined with other reflections, it is the category of "mediation, habit, memory, continuity, synthesis, communication (semiosis), representation, and signs." [65] *Thirdness* describes the norms, expressions, and everything else that is consciously thought about. By "habit," Peirce refers to anything featuring regularity and generality, such as the laws of physics. Whereas *Secondness* describes our interaction with objects, *thirdness* deals with representations of things (that need not be objects), but not the objects themselves.

To illustrate the difference between *secondness* and *thirdness,* Peirce provides an example of baking an apple pie that can be summarized as follows: When one wishes to make an apple pie, he knows that he needs to choose high quality apples, but "high quality apples" is a general concept and not an actual real thing; when it comes time to actually acquire apples, he must choose physical apples that are judged to coincide with the mental concept of a "high quality apple," whatever such a concept might entail.[66] Said another way, a singular "high quality apple" does not actually exist, but

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[63] Peirce, *Collected Papers of Charles Sanders Peirce, Volume I: Principles of Philosophy*, 1.306.

[64] Nöth, *Handbook of Semiotics*, 41.

[65] Ibid.

[66] Peirce, *Collected Papers of Charles Sanders Peirce, Volume I: Principles of Philosophy*, 341.

physical apples can fit the conceptual idea that the "high quality apple" concept represents.

Choosing actual physical apples involves *secondess*, living in reality, whereas the concept of a "high

quality apple" is represented by *thirdness*—a conscious thought that is not actually in the world.

When we speak of musical references, it is worthwhile to recognize the general requirements

a Sign implies. As a general principle, the progression from *firstness* to *thirdness* describes a decrease in

the number of persons capable of semiosis—the act of extracting meaning from a Sign. To see why

this is so, consider the symbolic sign "bird." As a Sign-Vehicle, the word "bird" requires that the

interpreter know the English language. If the interpreter does not know English, the word appears

as an arbitrary set of abstract symbols. In a similar way, musical references demand differing degrees

of musical knowledge. An iconic musical Sign, perhaps a direct quote or reprise of an earlier melody

(an *intraopus* reference), can conceivably give rise to meaning for a greater number of audiences than

a more abstract symbolic reference, such as large-scale reference to the "Tristan" chord (an *extraopus*

reference, see chapter three), that would require a particular context for a Referent to emerge. This

observation alone helps pinpoint why critical reception for *West Side Story* varied so greatly. For

those attuned to a variety of repertoire outside Broadway, some of the symbolic musical references

in *West Side Story* could create a rich web of meaning. However, for those audiences who are

unaware of these symbolic references, it is more likely they would identify with the iconic or

indexical Referents the Sign-Vehicle posits, which may be different from an interpretation arising

from a symbolic relationship.

2.4 Analytical Focus: Modeling and Perception

The analytical observations constructed in this thesis model musical structure, may have

correlates in Bernstein's compositional process, and appear to be aurally perceptible by listeners

according to preliminary music perception research. Ultimately, however, the situation is more

complex. The primary problem associated with conflating music perception studies with specific analytical observations hinges upon the differences between general, classes of observations suggested by cognitive studies, and particular instantiations associated with specific analyses.

Music perception studies make general, class based inquiries, whereas the analyses in this thesis shed light on highly specific musical observations. Therefore, while some preliminary music cognition studies support the aural discernibility of recognizing similarities between classes of objects—for example between different members of set class 3-5—the aural and cognitive reality of specific musical objects depends on a number of specific musical factors that are not accounted for in class based music perception studies. Thus, the general class based results of music perception studies only partially influence an analysis that focuses on highly particular musical gestures. As a result, my analyses are directed at understanding aspects of specific musical structures; while a proper discussion of perception as it relates to the analytical models developed in subsequent chapters is outside the scope of this thesis, I provide a few comments here, with more to follow in chapter five (on K-nets).

It is not difficult to imagine Bernstein playing with the original "Maria" motive to produce the other two ("Prologue" and "Cool")—reordering the pitch classes, inverting intervals, experimenting with different rhythms, and so forth. Fundamentally, moving three pcs to create different formations explores the geometry of a limited group structure, which a set class describes. As an abstract object, set class 3-5 (016) can be metaphorically understood as a type of well from which actual pitch realizations can be drawn. Although Bernstein did not use the term "set class 3-5" itself, the idea of exploring all combinations of three particular fixed pitch-classes shares a structural basis with set theory—they are isomorphic. Therefore, whether or not Bernstein was aware of set theory nomenclature, set class 3-5 models the structural similarities each trichordal motive shares.

Because set theory models intervallic characteristics of musical objects, it is not a stretch to see a

parallel with Bernstein's own intervallic compositional process as characterized by Jack Gottlieb.

But what of the listener? If the three motives are members of the same set class, but each

motive sounds different from one another—after all, if they were the same, we would not recognize

them as different motives—what is gained by observing set class 3-5? Certainly, the "shofar," or

"hate" motive (see the first motive Bernstein outlines in **Figure 2.2a**) and the "Maria" motive

(**Figure 2.2b**) have different audible effects due to the particular ordering of the notes, their context,

orchestration, register, rhythm, etc. Similarly, not all major and minor chords (members of set class

3-11) sound exactly alike. Nevertheless, each trichordal motive Bernstein outlines also shares a

certain audible likeness, which is represented by the characteristics set class 3-5 models. While it is

impossible to ascertain whether every listener can detect the audible likeness these trichordal

motives share, initial research by others suggests that features that set classes model—particular

intervallic geometries—are especially important when discriminating trichordal (and lower

cardinality) classes.[67] This suggests that in general, listeners *can* perceive the similarities shared

between members of set class 3-5. The situation is further solidified when we consider the particular

intervallic characteristics that set class 3-5 represents. Recent cognitive research suggests that the

tritone is highly discernable, as are the minor second and major seventh, and perfect fifth or fourth,

which are the defining features of set class 3-5.[68] Put simply, members of set class 3-5 have the

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[67] Experiments show that the perception of set classes differs among musicians, non-musicians, and music theorists and composers. Nevertheless, the properities that set classes describe play a role in discriminating trichords. See Tuire Kuusi, "Discrimination and Evaluation of Trichords," *Music Theory Online* 15, no. 5 (October 1, 2009), http://www.mtosmt.org/issues/mto.09.15.5/mto.09.15.5.kuusi.html.

[68] For a cognitive study of the psychological representation of musical intervals in a twelve-tone context, see Jenine L. Brown, "The Psychological Representation of Musical Intervals in a Twelve-Tone Context," *Music Perception* 33, no. 3 (2016): 274–86. In an earlier experiment, Tuire Kuusi revealed that interval class 1 was least confused with other interval

potential to aurally "stick out" in a musical texture. Furthermore, given the strongly distinguishable intervallic qualities that members of set class 3-5 share, supersets that contain set class 3-5 (such as set classes 4-18 and 4-z29 explored in chapter three), are also likely to be aurally discernable.[69]

It is difficult to know whether more abstract modeling such as the long-range pitch structures, for example the "Rumble" or "Tristan" chord suggested in chapter three, or the interlocking structural tritones of "Cool Fugue" shown in chapter five, have aural realities. [70] It is possible, however, that Bernstein structured these piece with these ideas in mind. Thus, some of the analytical models in this thesis may suggest aspects of the compositional process that may or may not have perceptual realities.

Ultimately, the aural perceptibility of a particular model is complex and can be influenced multiple factors such as a listener's musical education and experience, number of exposures to a piece, degree of attention or conscious point of focus, correlation to other components such as dance, staging, and so forth. As a result, I follow a music theoretic approach in favor of a cognitive music perception approach. Nevertheless, in most instances, I aim to make musical observations

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classes. See Tuire Kuusi, "Interval-Class and Order of Presentation Affect Interval Discrimination," *Journal of New Music Research* 36, no. 2 (June 2007): 95–104.

[69] Set classes 4-18 and 4-z29 contain set class 3-5 and 3-11, the triad, as subsets, which further leads to their aural recognition. This is discussed further in chapter three. On the importance of subset-class relations for aural similarity, see Tuire Kuusi, "Subset-Class Relation, Common Pitches, and Common Interval Structure Guiding Estimations of Similarity," *Music Perception: An Interdisciplinary Journal* 25, no. 1 (September 2007): 1–11. On discerning tetrachords and pentachords, see Tuire Kuusi, "Comparing Nontraditional Tetrachords and Pentachords: Both Set-Class and Chord Voicing Guide Evaluations," *Journal of New Music Research* 39, no. 3 (September 2010): 215–225.

[70] The aural perceptibility of long-range hierarchies is complex and can be influenced by a number of factors. For a recent study that suggests the processing of hierarchical syntactic structure in music, see Stefan Koelsch et al., "Processing of Hierarchical Syntactic Structure in Music," *Proceedings of the National Academy of Sciences* 110, no. 38 (September 17, 2013): 15443–15448. For a music theoretic stance challenging the aural reality of large-scale tonal structure, see Nicholas Cook, "The Perception of Large-Scale Tonal Closure," *Music Perception: An Interdisciplinary Journal* 5, no. 2 (December 1987): 197–205.

that have aural realities and could be verified through cognitive perception research. Nevertheless, some observations, especially large-scale structures, may have their origins in generative processes and therefore may or may not be perceptible for the average listener.

2.5 "Highbrow" and "Lowbrow" Aesthetics

When discussing *West Side Story*, it is important to recognize the varying aesthetics associated with mid-twentieth-century music. Bernstein was careful to point out the differences between Broadway versus opera, and modernist twelve-tone composers versus neo-classicists. Although the terms "highbrow" and "lowbrow" did not take shape until the beginning of the twentieth-century, the idea of linking the concept of "brow" to taste began in the eighteenth century with the pseudo-science of phrenology, which mistakenly conflated the physical shape of an individual's brow with one's intellectual capacities and taste.[71] At the turn of the twentieth century, highbrows were considered to be wealthy individuals who were thought to have superior intellect and a more sophisticated palate for art. Lowbrows, in contrast, were supposedly wanting in intellectual curiosity and were believed to interact with art emotionally and sensuously, devoid of more abstract and conceivably cognitive interaction. In the context of Pierceian semiotics, one could say that lowbrows supposedly experienced art through the categories of *firstness* and *secondness,* whereas highbrows went regularly beyond *firstness* and *secondness* to more complex acts of semiosis characterized by the category of *thirdness.*

In the United States, the concept of "lowbrow" and "highbrow" extended beyond intellect and taste into race and socioeconomic status. Immigrants, dark-skinned ethnic groups, and the

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[71] Alicia Kopfstein-Penk, *Leonard Bernstein and His Young People's Concerts* (Lanham, Maryland: Rowman & Littlefield, 2015), 36.

poorly working educated class were considered to be lowbrow.[72] The division of "high" and "low" art, therefore, helped reinforce social divisions based on racial and socioeconomic status. As highbrow music was thought to require a higher education to appreciate it, and only wealthier Anglo-Americans could afford the necessary education required with their supplementary income, highbrow music was believed to be designed for the richer white class. Music designed for the masses—for those not educated in the fine arts—was thought to be watered down, so as not to require a more cultivated aesthetic awareness. Not only was the music "watered down," it was—at least from the perspective of the highbrows—designed to be consumed predominately by cultural minorities and people of color.[73]

Mid-twentieth century cultural critics echoed many of the ideas from the early twentieth-century with preconceived notions of superior intellect. Cultural critic Winthrop Sargeant writing for *LIFE* in 1949, went so far as to suggest that while middlebrows and lowbrows could be "good providers or otherwise decent citizens" they were, at least culturally speaking, members of the "oafish class"— stupid, uncultured, and clumsy.[74] For Sargeant, the so-called "oafish class," with its pejorative tones towards non-Anglo-Americans, threatened to damage highbrow culture as it began to control popular art. Were it not for the highbrows that fostered a more sophisticated culture, lowbrows, being "overwhelmingly numerous" in number, would "dominate taste in nearly all our big industries where taste is a factor."[75] Sargeant was not alone in his concerns. As Alicia Kopfstein-Penk summarizes, for some highbrow writers, lowbrow and even middlebrow music threatened the "special province of the privileged classes (the 'elites')" either because it favored money above aesthetics, or "demeaned high culture by making it too available to the masses, who were

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[72] Ibid.

[73] Many of the issues discussed here are largely still in play in the U.S.

[74] Winthrop Sargeant, "In Defense of the High-Brow," *LIFE*, April 11, 1949.

[75] Sargeant considered lowbrow "cultural oafs" to make up 90% of the population. Ibid.

constitutionally unable to appreciate high culture despite their best attempts."[76] At issue, then, was not merely a difference of aesthetic taste, but also socioeconomic division propagated by racial and socioeconomic hierarchy.

West Side Story offers a fertile ground for exploring false binaries between lowbrow and highbrow aesthetics. By the time of *West Side Story*'s premier, differences between highbrow opera and lowbrow musical theater continued to resonate, but from slightly different perspectives. With the rise of new technology that enabled the mass distribution of "lowbrow" art, highbrow and lowbrow were set into further binary opposition with one another.

Shortly after *West Side* Story's premier, numerous authors criticized *West Side Story* for its inability to be categorized as either highbrow or lowbrow. One critic with the *New York World-Telegram and Sun* compared Bernstein's music to a cheapened version of opera composer Gian Carlo Menotti (1911-2007), writing, "Leonard Bernstein's undistinguished score sounded like a blue-plate special of [Gian-]Carlo Menotti warmed over."[77] Howard Taubman, music critic for *The New York Times,* began his review of *West Side Story* with the negatively connoted title, "Bernstein's Score of *West Side* Story Falters Between Musical and Opera." Taubman summarized the divide between Broadway and opera, writing: "The semantics of Broadway based no doubt on experience at the box office, require that ambitious musical intentions should be played down or preferably not mentioned at all. Opera is a dreaded word, and lyric theatre sounds uppity."[78] Although more positive in tone than Sargeant's truculent take on lowbrows dominating mass culture, Taubman believed Broadway shows had to appeal to a general lay-audience, the supposedly lowbrow masses, to insure sustained

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[76] Kopfstein-Penk, *Leonard Bernstein and His Young People's Concerts*, 43.

[77] "Untitled Clipping."

[78] Taubman, "Bernstein's Score of *West Side Story* Falters between Musical and Opera."

ticket sales and therefore a successful show. Taubman, perhaps less bellicose than Sargeant,

supported his claims by writing:

> One cannot blame Broadway for being frightened of opera. It has the reputation of
> being high-brow. It often requires concentrated attention. At its best it seeks to
> probe into the secret places of man's deepest emotions. But who wants that kind of
> thing on Broadway?. . . *West Side Story*, despite the seriousness of its intentions has
> been afflicted by the problem of how to mediate the claims of the lyric theatre with
> those of sound commercial procedure.[79]

Interestingly, however, the "problem" of mediating lyric theater with commercial procedure

was not Taubman's own invention, but rather Bernstein's. Published as a quote from a Bernstein's

logbook to *West Side Story* in the Broadway *Playbill*, Bernstein discusses the genesis of the show

writing: "Chief problem: to tread the fine line between opera and Broadway, between realism and

poetry, ballet and 'just dancing,' abstract and representational. Avoid being 'messagy.' [sic] The line is

there, but it's very fine, and sometimes takes a lot of peering around to discern it."[80] Curiously, the

supposed logbook was actually written after the events it described and falsely dated.[81] Nevertheless,

Taubman was unaware when the logbook was written and used Bernstein's quote as evidence for his

own argument that characterized *West Side Story* as a Broadway failure.

Considering the fake logbook, it appears as though Bernstein himself wanted critics to

evaluate the show in terms of how well it mediated complexity with accessibility, opera with musical

theater, lowbrow with highbrow. Unlike the George Gershwin's operetta *Porgy and Bess* or Fredrick

Loewe's supposedly lowbrow musical *My Fair Lady,* Bernstein aimed to write music that cut through

aesthetic boundaries, appease both lowbrows and highbrows, and perhaps therefore, even navigate

between racial and socioeconomic divisions. According to Bernstein, others had not yet succeeded

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[79] Ibid.

[80] Bernstein, *Findings*, 145–146.

[81] See Simeone, *Leonard Bernstein*, 17; Wells, *West Side Story: Cultural Perspectives on an American Musical*, 243–244.

in this endeavor because they catered too far to one side, either their shows were too operatic, such as *Porgy and Bess,* or they weren't sophisticated enough, such as *My Fair Lady.*

Given the popularity today of hit songs that are often indicators of the "musical-quality" of *West Side Story,* such as "Maria," "Tonight," and "America," it appears as though many have overlooked the compositional complexity found in several other pieces. As my subsequent analyses in the following chapters reveal, Bernstein went to great lengths to achieve something of a merging between complexity and accessibility.

Chapter 3
More Than a Tritone

3.1 Introduction: The Great Modern Composer

In a 1957 telecast, Leonard Bernstein claimed that a "great modern composer" could use "the same old-fashioned notes that music has always used, and use them in a fresh way."[82] Bernstein's manifesto—a compositional direction he would later passionately develop in his 1973 lectures at Harvard—was part of what he called a "neo-classical call to arms . . . issued by Stravinsky" that opposed the atonal techniques of Schoenberg and his pupils.[83] According to Bernstein, although Schoenberg's method could guarantee a modern sound by avoiding anything resembling a key, it best depicted a "nightmare world" in line with the Vienna of Schoenberg's time. Alternatively, Bernstein aligned with composers who "had not given up" on tonality; for Bernstein, a modern sound was best accomplished by preserving "old-fashioned tonality" while at the same time "giving it a fresh new look."[84]

However, as I argue through an analysis of "The Rumble," Bernstein's polar tonal and atonal divide is a vast oversimplification that benefits from a more nuanced interpretation. In "The Rumble," Bernstein's music does not follow tonal syntax, even though he used what he considered "pure tonal" compositional building blocks. These findings are surprising in the context of Bernstein's lectures, and also of Broadway aesthetics in general. As previously discussed in chapters one and two, Bernstein considered tonal music to be more "natural"; he considered tonal music to

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[82] Bernstein, "Introduction to Modern Music," 221–222.

[83] In perhaps his most passionate defense of tonality in his 1973 Norton lectures, Bernstein summarizes the neo-classical goal: "On the one hand, there were tonal composers, guided by Igor Stravinsky, who were seeking to extend musical ambiguities as far as possible by constant new kinds of transformations, but always somehow remaining within the confines of the tonal system." See Bernstein, *Findings*, 270.

[84] Bernstein, *The Joy of Music*, 203–210.

be essential to rekindle the relationship between composer and audience, a relationship that had become "composer *versus* public."[85] Accordingly, we would expect Bernstein to follow his own imperative, especially in the context of musical theatre. After all, the Broadway musical was recognized for its star performers, memorable tunes, dancing, and drama, not for notions of "compositional sophistication."[86]

A closer look at "The Rumble" offers a glimpse into Bernstein's seemingly romanticized compositional workshop—although Bernstein claimed the motivic relationships in *West Side Story* to be "happy accidents," grounded in tonality and recognized only in retrospect, close analysis of the "The Rumble" suggests a different story.[87] In "The Rumble," motivic threads scattered throughout the musical return in new guises and contexts. This chapter reveals that some of Bernstein's music does not "preserve old-fashioned-tonality," and it does depart from Broadway compositional dialect in a "modern" way.

For Bernstein, the path to become a "great modern composer" involves using the "same old-fashioned notes"—but not Schoenberg's twelve-tone method—in "fresh ways." This raises two questions: 1. What are the "old-fashioned notes" and "fresh ways"? 2. How do the "fresh" methods or transformations of the "old-fashioned notes" differ substantially from atonal or serial methods? In the context of Bernstein's lectures, the "old-fashioned notes" refer to the triad, an entity he derived from the overtone series, and the "good old scales," which were extensions of the same

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[85] Emphasis written by Bernstein. Bernstein, *The Infinite Variety of Music*, 9.

[86] See Geoffrey Block, "The Melody (and the Words) Linger On: American Musical Comedies of the 1920s and 1930s"," in The Cambridge Companion to the Musical, ed. Walter A. Everett and Paul R. Laird, 2nd Edition. (Cambridge: Cambridge University Press, 2008), 112–116.

[87] Nigel Simeone quotes Sid Ramin, Kostal, and Stephen Sondheim who all recall Bernstein's retrospective awareness of the tritone motive. Simeone, *Leonard Bernstein*, 80–82.

principle.[88] Because the triad and scale were derived from the overtone series, Bernstein considered

them rooted in tonality and fundamental to human nature. With these relationships established,

Bernstein would argue that although Schoenberg's dodecaphonic democracy was in vogue, it would

eventually be subsumed as a component in the "reacceptance of tonality, that universal earth out of

which such diversity can spring."[89]

There is of course, a problem here. By design, Bernstein's criteria for the "great modern

composer" included not only Stravinsky, but also composers like Mozart, Haydn, and Beethoven

who sculpted compositions with what he considered to be the same tonal "clay." Schoenberg,

because he drew upon twelve-tone rows instead of scales, was not included.[90] However, analysis of

Bernstein's compositional techniques, like those of Stravinsky and others, reveals musical grammar

that goes beyond common-practice tonal idioms and is sometimes not tonal at all. In chapter five, I

show that despite Bernstein's criticism of twelve-tone music, he too worked with twelve-tone

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[88] See Bernstein, *The Joy of Music*, 184–192. Bernstein's Whig history of the overtone series starts with a primitive man, vocal chanting, and the eventual discovery of the overtones series as the primitive man's ears evolve. See Ibid., 187.

[89] On twelve-tone democracy, see Leonard Bernstein, "Thursday Evening Previews Scripts: Three Pioneers [typescripts with Pasteovers of Musical Examples in Ink, & Emendations in Red, Blue & Black Pencil]," October 16, 1958, http://hdl.loc.gov/loc.music/lbtep.0172. See also Bernstein, *The Joy of Music*, 204–205. On the relationship of the harmonic series to tonal music see Bernstein, "Introduction to Modern Music"; Bernstein, *Findings*, 424.

[90] In his "Introduction to Modern Music" lecture, Bernstein equated the twelve tone-row with a scale: "The tone-row is now used, instead of a scale, as the basis of any given movement or piece. You have to know how to manipulate these tone rows contrapuntally back and forth, inside out, upside down. It can become very complex. There's not even a tonic home plate to slide into." Bernstein, *The Joy of Music*, 205. Bernstein's use of the overtone series to define "naturalness" is ironic. For example, Schoenberg uses the overtone series for precisely the opposite means in his *Harmonielehre* to suggest the emancipation of dissonance. For Schoenberg, consonance and dissonance is rather a matter of degree between notes closer to the fundamental or further from the fundamental. See Arnold Schoenberg, *Theory of Harmony* (University of California Press, 1978), 220–221. At hand, therefore, is not a matter of how natural either system is, but the fundamental components that define it. According to Bernstein, it was in many ways a difference of "old-fashioned scales" versus twelve tone-rows.

compositional methods.[91] Therefore, although Bernstein may have believed "great modern composers" shared the same building blocks with canonic tonal composers like Beethoven, Haydn, and Mozart, I find that Bernstein's music differs in several marked ways.

The difference and similarities between Bernstein and Mozart, or even Beethoven and Haydn, cannot be measured entirely by observing their use of the same components (triads and scales), but rather by the differing procedures to which the components are subjected and transformed. As I show, an approach that identifies how the fundamental building blocks are transformed offers considerable insight into Bernstein's music. Because tonal relationships do not necessarily result after particular transformations, the analytical tools and nomenclature used to describe them must be carefully chosen; in many instances the transformations to the "old-fashioned notes" exhaust the explanatory power of more traditional analytical tools.

Approaching *West Side Story* with analytical music theory "technology" that works well for tonal common-practice repertoire can be greatly problematic. Tools like Schenkerian analysis based on functional harmony and counterpoint could grant insight into some pieces in *West Side Story;*[92] but in "The Rumble," these tools obfuscate rather than illuminate. Bernstein's tonal manifesto, and the "old-fashioned" scales and triads, may have served as pedagogical tools to provide scaffolding for lay audiences, or perhaps even functioned as mnemonic, generative components in his own compositional process. However, transformations of these musical objects result in music that does not follow tonal idioms but does sound—to use Bernstein's own word—"modern." In what follows, I identify and interpret important intervals and Bernstein's fundamental "building blocks" drawing on material from chapter two. With these established, I show how Bernstein's fundamental

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[91] In his "Introduction to Modern Music" lecture, Bernstein notes that Stravinsky had also turned to twelve-tone composition, and some twelve-tone composers were beginning to write more tonal works. See Bernstein, "Introduction to Modern Music," 222–23.

[92] See Nicol Viljoen, "The Raised Fourth in Leonard Bernstein's West Side Story," *Acta Academica* 42, no. 2 (2010): 1–26.

blocks combine into larger components (supersets) that structure individual passages. Finally, I interpret how the buildings blocks are unfolded to structure the large-scale design of "The Rumble." What results is a new perspective on Bernstein's "modern" approach—one that is, sometimes, at odds with his own compositional manifesto.

1.1 Post-Tonal Theory and Transformations

Analyses of *West Side Story* focus on the tritone in four typical applications: 1. A melodic or harmonic statement with or without resolution, 2. As part of a melodic circling motion around the fifth scale degree, 3. As a modulatory or tonicizing device, and 4. As a tonal structural device with "tonal symbolic significance."[93] Although these observations are frequently apt, they all overlook an essential additional note: it is not the tritone alone that structures *West Side Story*.

Consider again the letter Bernstein sent to a Dutch student, (**Figure 2.1** in chapter two), categorized and labeled in **Figure 3.1**. Recall that each iteration of the same three notes in different orders are members of the same sc 3-5. Particular realizations of sc 3-5 invite a rich web of interrelated motives and musical topics. The first motive Bernstein outlines in his aerogram (see **Figure 3.1a**, Prologue) is a variation of what Jack Gottlieb identified as the *shofar* topic. The *shofar* topic references a traditional Jewish ram's horn call; the call announces holidays, accompanies processions, and also announces the beginning of a battle.[94] This topic is useful in the context of *West Side Story* both in celebratory and combative scenes. In addition, sc 3-5 is sometimes called the "Viennese Trichord," as particular realizations are frequently found in music by composers of the

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[93] In his Example 6 and 7, Nicol Viljoen suggests a middleground structured on the tritone in "Tonight" and "Gee Officer Krumpke." See Ibid., 14,17. See also Wells, *West Side Story: Cultural Perspectives on an American Musical*, 56–97.

[94] See Simeone, *Leonard Bernstein*, 82. See also Jeremy Montagu, "Shofar," *Grove Music Online* (n.d.).

Figure 3.1 Post-Tonal Analysis of Motives

second Viennese school.[95] Furthermore, the trichord is common in jazz where it is often realized as

the third, seventh, and added sixth (thirteenth) of a dominant chord with an elided root (played by

the bass), for example, an Emm7 add 6.[96] Considering these numerous musical and extra-musical

references, Bernstein's three notes helped him signify a large variety of musics and extra-musical

references.

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[95] In part due to the traditionally dissonant qualities of interval class 1 and 6 in set class 3-5, set class 3-5 can be
frequently found in European avant-garde music from the early 20th century, particularly in the music of Arnold
Schoenberg, Anton Webern, and Alban Berg. Due to its frequent use by Schoenberg in particular, Allen Forte considers
the trichord a "hallmark" of the Second Viennese School and calls it the "Viennese Trichord." See Allen Forte,
"Harmonic Relations: American Popular Harmonies (1925–1950) and Their European Kin," *Contemporary Music Review*
19, no. 1 (January 1, 2000): 3. Henry Martin notes Webern's affinity for the trichord due to its "more dissonant"
inclusion of ics 1 and 6. See Henry Martin, "Seven Steps to Heaven: A Species Approach to Twentieth-Century Analysis
and Composition," *Perspectives of New Music* 38, no. 1 (2000): 149. For some analyses (among many) that show set class 3-
5 (016) functioning locally and globally in the music of Schoenberg, see Lewin, "Klumpenhouwer Networks and Some
Isographies That Involve Them." Geoffry Block suggests that Bernstein may have borrowed the motive from Alban
Berg's Piano Sonata, op. 1 (1907-1908) which was "well known in Bernstein's circles." See Block, *Enchanted Evenings: The
Broadway Musical from Show Boat to Sondheim*, 266.

[96] For an example, see Frank Mantooth, *Voicings for Jazz Keyboard* (Winona, Minnesota: Hal Leonard, 1997), 15–16.

The second primary component in *West Side Story* is the triad, a building block Bernstein calls "the bread and butter of our musical culture."[97] Although post-tonal theory nomenclature succinctly describes features of Bernstein's three note motives, it may at first seem inappropriate to use post-tonal theory to label major and minor triads. However, by abandoning major and minor triads in favor of sc 3-11 (037), analytical focus shifts from triadic function, to particular intervals and the transformations between them. Additionally, it is possible to predict supersets from combinations of sc 3-5 and sc 3-11 and the unique intervallic features contained therein. Along with these two building blocks, the final task is to describe Bernstein's "good old scales" with post-tonal theory terminology and show how these scales create or result from particular transposition networks of smaller musical objects.

Bernstein's "good-old scales" can be interpreted as members of sc 7-35, a set that includes all major, natural minor, and modal variants. However, these scales cannot be found in isolation within "The Rumble." Instead, multiple members of sc 7-35 appear simultaneously, a compositional technique Bernstein called "Bitonality."[98] In "The Rumble," the most frequently found pc collection is the octatonic, a member of sc 8-28. Although Bernstein does not mention the octatonic in his earlier lectures on modern music, he appears to have learned it from his study of Stravinsky, Bartok, or a multitude of other sources.[99] The two collections (scs 7-35 and 8-28) can be interpreted as

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[97] Bernstein, *The Joy of Music*, 188.

[98] Ibid., 215–216.

[99] There are multiple avenues in which Bernstein may have learned about the octatonic scale through the music of Debussy, Scriabin, Bartok and Stravinsky to name a few. He may have also encountered it in jazz. Consider Nicolas Slonimsky, *Thesaurus of Scales and Melodic Patterns* (New York: Coleman-Ross Company, Inc., 1947). Later in life, Bernstein wrote a piece for recorder called "Variations on an Octatonic Scale" (1988). The *Dybbuk* ballet, another collaboration with Jerome Robbins (choreographer of *West Side Story*) that uses the octatonic scale, and Bernstein himself discusses the octatonic scale used in *Mixed Doubles*. See Jack Gottlieb, *Working with Bernstein: A Memoir* (Hal Leonard Corporation, 2010), 237.

compositional spaces that are formed by particular transpositions of the fundamental units, the intervals and "building blocks," or as spaces that govern the various transpositions available to particular subsets. Equipped with these resources, it is now possible to interpret how Bernstein "modernized" the "old tonal boy," or more accurately, how Bernstein created music that involved triads and particular intervals in pitch- or pitch-class-centric compositional spaces.

In the following section, I take a closer look at how the building blocks, scs 3-5 and 3-11, interact and function outside a tonal framework. I begin by looking at manifestations of sc 3-5, and show how particular transpositions result in octatonic collections. Afterwards, I draw upon the tools of transformational theory and show that although triads can be found, they too operate outside the bounds of tonality. Finally, I interpret how the two trichords are combined into two tetrachordal supersets that operate locally and unfold globally to structure the entire piece. As I show, not only do the "fresh" new tetrachords allow new sounds, they offer a clue into large-scale construction and point to potential musical references outside the musical, specifically the *Tristan* chord—a sonority that symbolically represents lovers that cannot be.

3.2 Modernizing the "Old-Fashioned Notes"

The octatonic collection affords numerous triads reminiscent of "tonal building blocks," but it does not afford traditional tonal relationships (for example, it does not contain a tonally functioning dominant triad, V). The cyclic operator subgroup $\{T_0, T_3, T_6, T_9\}$ describes all possible cyclic operators (transpositions) that can operate on *any* subset of a particular octatonic collection and preserve the pitch class content of the octatonic collection. In some ways, the permutation group $\{T_0, T_3, T_6, T_9\}$ describes a set of available "moves" that are akin to the traditional harmonic progressions in a diatonic system. Two examples from "The Rumble" illustrate these principles.

Figure 3.2 provides a piano reduction of a passage that underlies the climatic tragedy of the

drama where Bernardo, leader of the Sharks, stabs and kills Riff, leader of the Jets.[100] As the figure

illustrates, the sequence is created by successively transposing members of sc 3-5 by T_9 or T_3.

Because these transpositions are members of the cyclic operator subgroup, $\{T_0, T_3, T_6, T_9\}$, the

successive transpositions of the trichord result in an aggregate that is a member of sc 7-31, the only

septachord sc subset of the octatonic collection.[101] As the figure indicates, the Eb's that mark each

downbeat, and the final Eb with the longest duration, encourage interpreting the passage as a

prolongation of the centric pitch class Eb. The first member of sc 3-5—Bb, Eb, A—directly parallels

a transposition of the pitch content of the "shofar" call Bernstein outlined in his aerogram (see

"prologue" in **Figure 2.1** and **Figure 3.1**). The final A that ends the passage creates a piercing

tritone with Eb: a symbolic association to the knife that pierces and kills Jets leader, Riff, at the same

Figure 3.2 Octatonic Sequence

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[100] Piano reductions are copied by this author from Leonard Bernstein, *West Side Story (Vocal Score)* (Leonard Bernstein Music Publishing Company LLC, 2000).

[101] Note that sc 7-31 can be a subset of other octachord sets such as 8-12. The full octatonic collection appears throughout "The Rumble," and as a result it is best to recognize sc 7-31 in this instance to be a subset of the larger eight-note octatonic collection.

moment on the stage. Brackets below the musical example describe what could be models and copies in the sequence. Although the passage is centric, it is not tonal.

In the "Jet's Theme" depicted in **Figure 3.3**, a different situation occurs. As shown in the figure, I interpret this passage in terms of a transposition network that moves the tritones and major seventh dyads in separate registers in response to one another. Both intervals are characteristic features of sc 3-5, interval classes 1 and 6, and the transformations of T_3 and T_9 preserve the octatonic. However, contrary to the previous example, there is one transposition foreign to the cyclic subgroup, T_7. Why is there a foreign transposition in what would otherwise be a straightforward octatonic collection?

One way to think about the foreign transposition is as a byproduct of an *iconic* reference to structural scale degrees tonic and dominant, but in two separate keys, here E^b (B^b to E^b) and C (G to C). As the term *icon* implies, the likeness to tonic and dominant scale degrees (1 and 5) is mapped by

Figure 3.3 Jet's Theme

similarity, but is not completely parallel. The transposition of the major seventh and tritone dyads by T$_7$ *iconically* references a tonal half cadence; this interpretation is further bolstered by the regular four bar phrase, and by comparing the passage to the full cadence that ends on scale degree one found in the "Jet's Theme" in the second number of the show.[102]

As my semiotic interpretation implies, a tonal *reference,* but not tonal *syntax,* helps punctuate and frame the octatonic collection. Bernstein's notation confirms this reading. Visually, the foreign pc to the octatonic, Cb^5, written in place of its enharmonic equivalent B^4, reinforces two competing sign systems, the transpositions network of important intervals, and an *iconic* reference to a tonal cadence. As this example suggests, Bernstein's idea of "refreshed" techniques can sometimes be interpreted as referencing tonal idioms within a semiotic framework, though they do not function in the context of a tonal syntax itself.

Triads can be found in "The Rumble," but in ways foreign to common-practice tonal music. The skittish arpeggiations that open the work are one telling example. As **Figure 3.4** shows, the

Figure 3.4 Opening to "The Rumble"

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[102] The "Jet's Theme" can be found in numerous numbers, though it is established most clearly in the second song after the "Prologue," in a piece titled "Jet's Song."

passage involves an expanding asymmetrical temporal span of three arpeggiated triads, each successively beginning with an accented tritone chord that is played in the lowest register.[103] A tonal interpretation of this passage misses shared elements each iteration shares: the C, F# dyads in the bass, the common tone C#, the successive transformations between one another, and what might be initially interpreted as structural mixture, an "opposite-mode arpeggiation." Given that the passage predominately features triadic material, a neo-Riemannian transformational approach is fruitful, though not entirely revealing.

In **Figure 3.5**, I have placed the triads on a neo-Riemannian pitch class Tonnetz. Beginning with f#-, a PLRP cycle interprets the movement from f#- to C#+ through the shared common-tone C# (articulated in prominent metrical positions). By focusing on the roots of the three primary triads, F#+, A+, C#+, (see 1, 2, and 3) it is possible—at least visually—to note a large-scale f#- triad, that results from three subsidiary major triads.
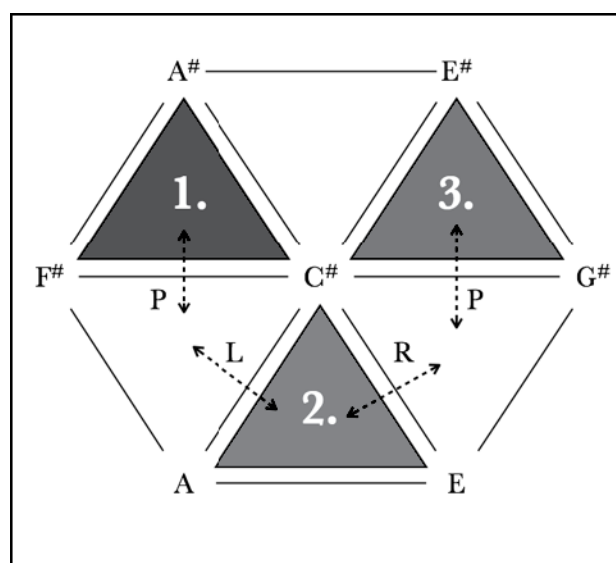
Figure 3.5 Neo-Riemannian Analysis to Opening of "The Rumble"

Structural mixture of this type, a "opposite-mode arpeggiations," is common to PLR cycles in general.[104]

However, the passage is more complex due to the C, F# dyad that begins each iteration and the asymmetric temporal unfolding; hearing structural mixture is less likely because features of both

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[103] Bernstein thought of asymmetrical rhythmical aberrations as one potential way to sound "modern." See Bernstein, *The Joy of Music*, 217–224.

[104] For a similar discussion of "opposite-mode arpeggiations" in the music of Franz Schubert, see Michael Siciliano, "Two Neo-Riemannian Analyses," *College Music Symposium* 45 (2005): 101.

scs 3-11 and 3-5 are operative. A transposition network offers one better analytical solution because it draws on the intervallic properties of scs 3-11 *and* 3-5. As I elaborate in subsequent examples, the two trichords combine to create tetrachordal supersets that complicate a neo-Riemannian transformational interpretation, much less a tonal one.[105] Although these observations do not exhaust the musical examples of scs 3-5 and 3-11, it is now useful to interpret larger sonorities that can be found throughout "The Rumble" and *West Side Story* in general. As will become apparent, the combination and transformation of both scs 3-5 *and* 3-11 are essential to understanding the compositional grammar of *West Side Story*.

3.3 More than Triads and Tritones

One way to explore larger sonorities is to observe how sc 3-5 is combined with sc 3-11 to create larger sonorities. In "The Rumble," these tetrachords result when each trichord shares two common tones. At first, it might seem appealing to avoid post-tonal theory jargon and simply refer to these combinations as a tritone welded onto a triad (major or minor). But this nomenclature misses a crucial distinction between the resultant and its subsidiary components. Much like a person is not the direct reflection of the parents that birthed them, so too should the tetrachordal sonorities, "birthed" from combinations of a triad and tritone, be recognized for their own unique intervallic properties. Whereas stacking additional thirds on top of a triad preserve the original triad, stacking an embedded tritone complicates the intervallic structure of the resulting sonorities.

By using post-tonal theory, attention focuses to the intervallic properties important to the tetrachords. Furthermore, post-tonal theory offers a method to account for combinations of scs 3-5 and 3-11. Instead of trying to understand these tetrachordal sonorities as types of misshapen triads

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[105] In the absence of triadic structures, Hook's *UTTs* can be used to model analogous neo-Riemannian transformations of other objects, though without parsimonious voice leading. See Hook and Douthett, "Uniform Triadic Transformations and the Twelve-Tone Music of Webern."

with irregular tritone appendages, post-tonal theory terminology elevates the unique intervallic

properties of each new sonority. By including the entire sc 3-5 motive rather than the tritone alone,

it becomes possible to reconcile the three note motive Bernstein outlined with the "bread and

butter" triad.

It is straightforward to predict the tetrachordal sonorities resulting in combinations between

sc 3-5 and 3-11 that share two common tones through abstract inclusion relationships—

relationships that describe how subsets relate to particular supersets. Scs 3-5 and 3-11 are only

included in two tetrachordal scs, sc 4-z29 (0137) and sc 4-18 (0147). The opening gesture

represented in **Figure 3.4** is a member of sc 4-z29 as shown in **Figure 3.6a.** As **Figures 3.6** and **3.7**

show, these two tetrachords can be found found in numerous passages throughout "The Rumble."

Although these examples are by no means exhaustive, they help detail the wide varieties of melodic

Figure 3.6 Examples of Set Class 4-z29

Figure 3.7 Examples of Set Class 4-18

and harmonic pitch set realizations for both scs 4-z29 and 4-18. Nonetheless, although identifying

these two tetrachords is useful, it is not enough to show they are simply present.

3.4 Transformer Tetrachords

Figure 3.8 Oscillating Set Classes 3-5 and 3-7

Consider **Figure 3.8**, a passage from the moment before Riff's death in measures 67-78. As

shown, both tetrachords scs 4-z29 and 4-18 label all of the notes in the passage, but this does not

fully explain the unique properties of this passage. It is possible to create a more compelling interpretation by correlating the local musical design with the larger poetic function—especially Jerome Robbins's choreography—with a transformational approach.

When these measures begin, the two main characters, Riff and Bernardo, circle each other, vying for an advantageous position in a knife fight. Similarly, the bass notes B^b and A oscillate between one another, both competing for prominence, while another oscillation can be found in the upper voice between A and G. Closer inspection reveals one more type of oscillation: between horizontal and vertical tetrachords scs 4-z29 and 4-18. As a result of these musical oscillations, a listener cannot settle on either the triad (E^b, G, B^b), sc 3-11, or the tritone "shofar" motive (E^b, B^b, A), sc 3-5, and is instead forced to hear the inner oscillations of scs 4-z29 and 4-18.

When it occurs, the vertically realized member of sc 4-18 (0147)—a chordal "stab" reinforced with percussion, electric guitar, and piano played fortississimo—*symbolically* mirrors the knife jabs by both characters, a property Robbins exploits in his choreography.[106] The alternating tetrachords directly mirror the competing characters. Considering these musical representations of the stage drama depicted in dance, a transformational approach closely correlates the musical manifestations of both tetrachords to the choreography, and best captures how these two tetrachords, and their subsidiary trichords, interact.

Fundamentally, a transformational approach requires the analytical focus to shift from that of an outside observer to someone *inside* the system. It is easy to consider the primary characters Riff and Bernardo as "inside" the system, a system that involves the fusion between music and dancing bodies. In many ways, the characters on stage physically embody the "characteristic gestures" that

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[106] The vertically realized member of sc 4-18 (0147) occurs at precisely the same moment as the knife jabs. This repeated coincidence allows a viewer to indexically correlate the chordal "stab" with the physical knife stab. Once a link is formed between the quick chordal "stab" and the knife jab, future substantiations of sc 4-18 (0147) (Pierce's *tokens*) can function *indexically*, referencing a past or future knife stab.

Lewin describes. To visualize these embodied relationships further, Lewin's T-nets are useful to show the intervallic interactions specific to this passage.

Figure 3.9 provides a T-net that details how the melodic realization of sc 4-z29 operates. The T-net is constructed by holding Bb and Eb invariant (as replicated in the music in the upper voices), and drawing transposition arrows to the other pitches A, G, and Bb that oscillate. By replicating the pitches that both sc 3-5 and sc 3-11 share, and drawing a T_0 arrow between them, we can clearly see how they combine to create something greater. In some ways, the T-net depicts a musical analogue to the choreographed dance, a visual representation of circulating footwork. For
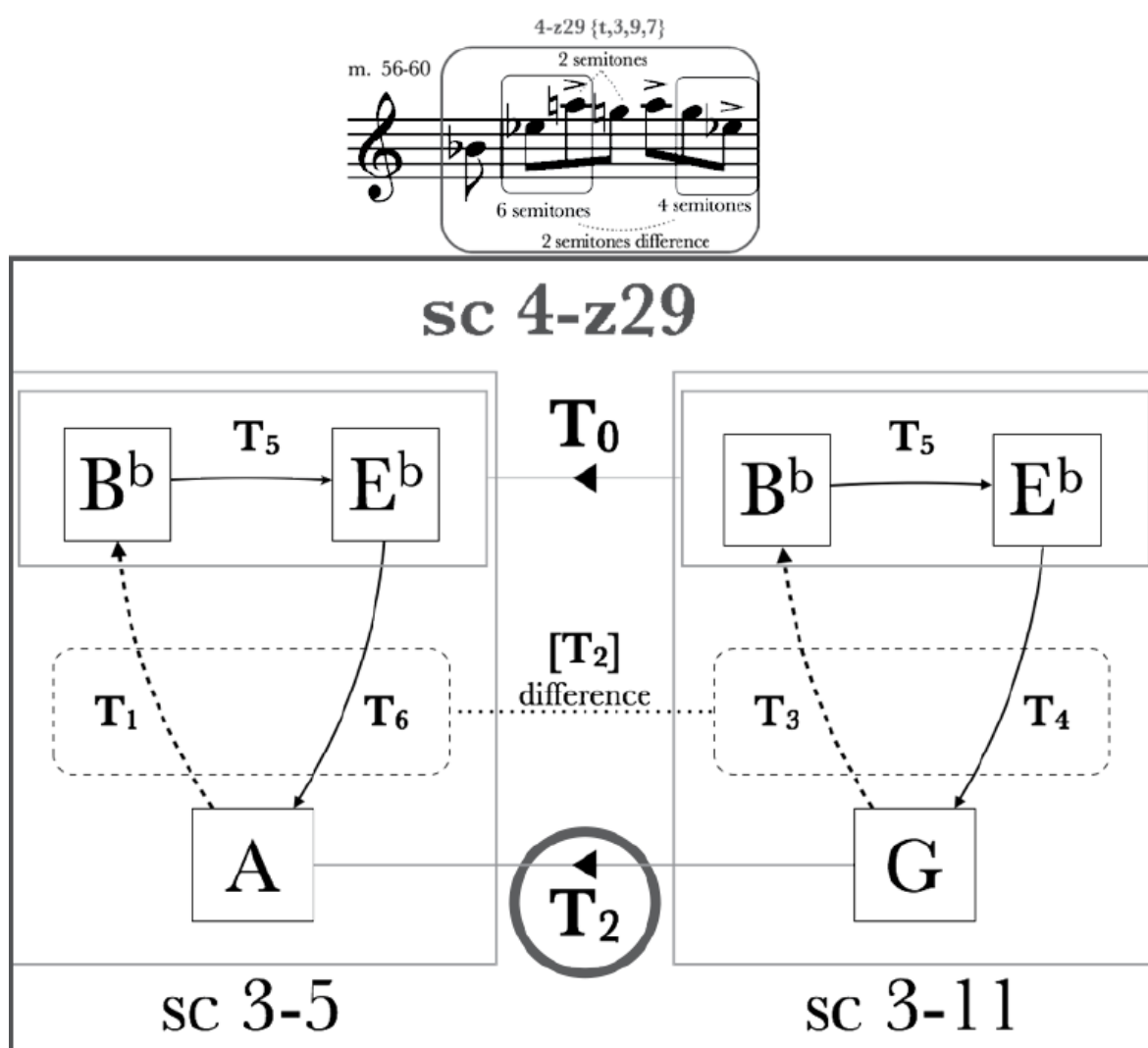
Figure 3.9 T-net of Set Class 4-z29

example, it is straightforward to depict the bass circulations between Bb and A with a transposition arrow T_1 that represents the oscillating steps between the two characters. The middle transformations, here T_2 between A and G, and T_2 between the transpositions, asks us, or perhaps the dancers on stage, to experience the oscillating whole-steps not only between adjacent notes, but within the tetrachord itself.

A similar approach applies to the second measure depicted (see **Figure 3.10**), a member of sc 4-18. Although the sonority is articulated as a vertical chord, we can look at a similar linear realization found earlier in "The Rumble" for ease of analysis (m. 26-27). Similar to the T-net of the first tetrachord, the T-net for the second tetrachord highlights the difference of a semitone represented by the transformational label T_3. As before, the T_3 transformation not only captures the

Figure 3.10 T-net of sc 4-z29

larger step between A and Gb, but also the difference between the shared dyads (Bb and Eb) and their third members, A and Gb. The T-nets drawn highlight a cru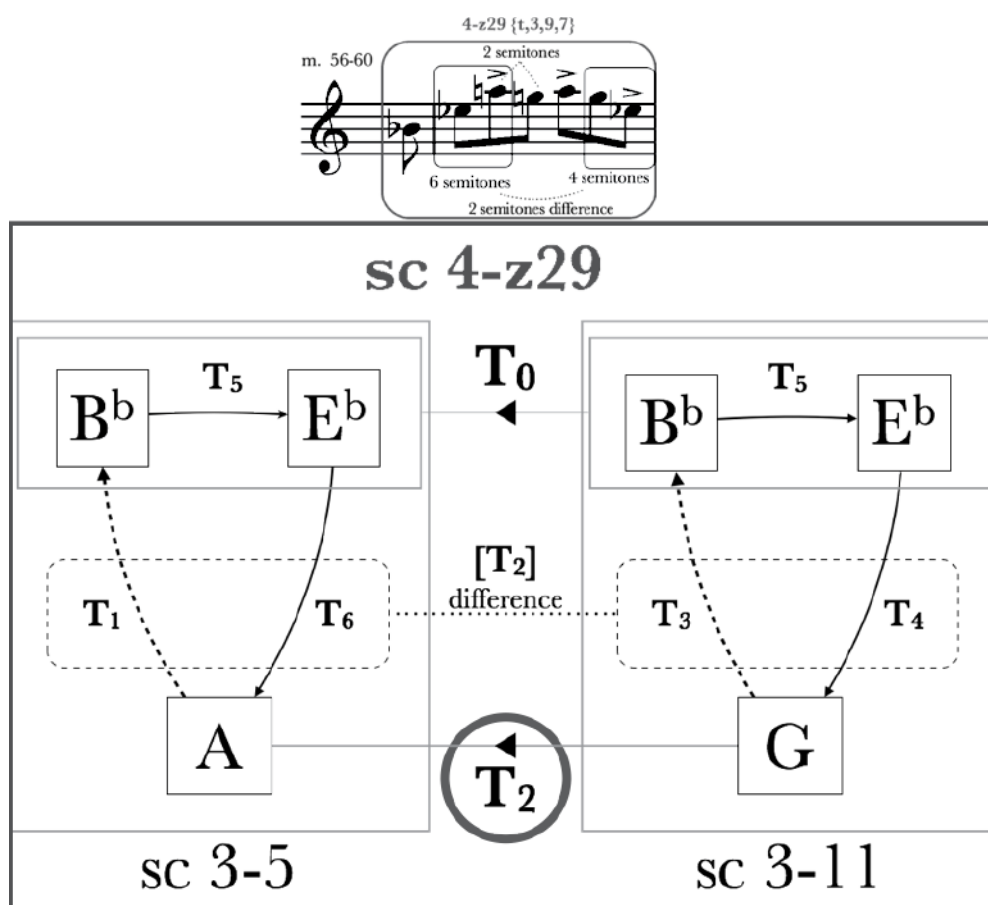cial feature of this passage: although it is true that triads and tritones are present, it is the oscillation scs 3-5 and 3-11 and members of scs 4-z29 and 4-18 that represent the circulatory choreographed fight on the stage. **Figure 3.11** (next page) summarizes these T-nets and graphs the relationship between the two tetrachords.

As shown to the bottom of the diagram, because the two tetrachords occur in close proximity, it is possible to experience their semitone difference modeled by T_1. As these T-nets demonstrate, the two building blocks, scs 3-5 and 3-11, are meaningfully represented in the context of the tetrachord as a whole. Much like the surface oscillation between A and Bb in the bass, the oscillation between scs 4-z29 and 4-18 match the circular positioning of the fighters on stage, while preserving the building blocks important to the grammar of *West Side Story*.

To summarize, Bernstein appears to have combined and morphed the three note tritone motive with triads to suit particular stage action. This interpretation is solidified with Bernstein's own comments regarding Jerome Robbin's influence on his compositional process. Although Stephen Sondheim is frequently recognized as Bernstein's compositional assistant for *West Side Story*, Bernstein often referred to Jerome Robbins as his compositional advisor:

> We worked closely together. I remember all my collaborations with Jerry in terms of one tactile bodily feeling: his hands on my shoulders—composing with his hands on my shoulders. This may be metaphorical, but it's the way I remember it. I can feel him standing behind me saying, 'Four more beats there,' or 'No, that's too many,' or 'Yeah-that's it![107]

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[107] See Wells, *West Side Story: Cultural Perspectives on an American Musical*, 34.
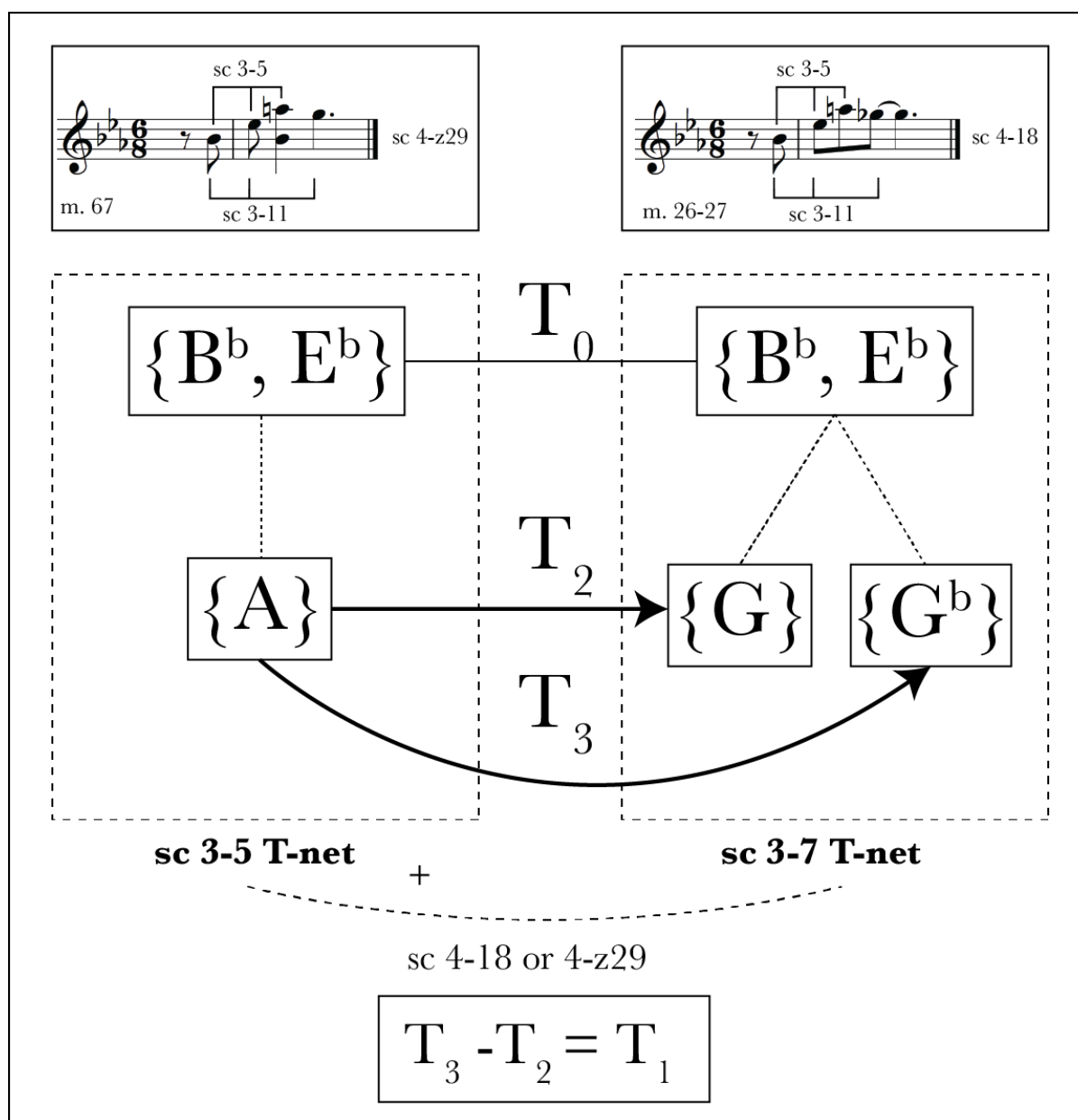
Figure 3.11 Combined T-net of Set Classes 4-18 and 4-z29

As I have shown, post-tonal theory with transformational interpretations allows a new reading of this music that corresponds in part to Bernstein's public statements, and at the same time, it symbolically represents the dramatic action on the stage. In what remains, I detail how the local building blocks expand to dictate the form of the "The Rumble."

Having established the important intervallic relationships and Bernstein's constituent "fresh" tetrachordal sonorities, I now interpret these inclusions, unions, and operations as integral to

discussion of larger scale questions of form and pitch structure in "The Rumble." Bernstein's new building blocks function both locally and globally.

3.5 From Building Blocks to Large Scale Structures

"The Rumble" ends the first act in an unusual fashion. Typically, an ensemble finale involving most of the musical's characters signals the curtain to end the act. Bernstein follows this formula in the "Tonight Ensemble." But instead of ending Act one, the impending curtain fall is thwarted and "The Rumble" begins. For Broadway audiences used to ensemble finales signaling the end of Acts, "The Rumble" must have been surprising. The immense impact of this scene, therefore, is in part a result of its placement. Furthermore, because it is placed after what is normally a show stopper, the compositional stakes for the "The Rumble" are heightened. It seems plausible that much time was spent crafting this important scene.

Considering that "The Rumble" accompanies the most dramatic moment of the musical, it is perhaps no surprise that it starts on $F^{\#}$, a tritone away from the musical's opening in C. Furthermore, the ensemble finale "Tonight" that precedes it ends in the key of C major, a key that assures that F# does not function as a linking key, but rather as a carefully chosen signal to mirror the impending conflict. But the relationship between the tritone and the "old fashioned notes" goes even further.

In what follows, I examine the narrative and musical structure of the scene and interpret how Bernstein may have translated the narrative plan Jerome Robbins gave to him into a musical structure. Bernstein's music is not only ideal for the scene itself, but also references what he considered the operatic *locus classicus* of lovers that cannot be, Wagner's *Tristan und Isolde* (1859).

3.6 Dramatic Narrative to Abstract Musical Structure

In earlier drafts of *West Side Story*, a piece called "Mix!" was planned in place of "The Rumble."

When replacing "Mix!" with, "The Rumble," Jerome Robbins laid out the scene for Bernstein into

five parts.[108] I have replicated Robbins's instructions below, and correlated measure numbers to the

right:

1.	Entrance of groups	(before "The Rumble" music)
2.	Dialogue	(before "The Rumble" music)
3.	a. Drums lead to	(before "The Rumble" music)
	b. explosion of fight between Bernardo & Riff	Beginning to "The Rumble" music
	c. The killings	Measures 82-92
4.	The Free for All	Measures 93-108
5.	[Police] Whistle. *Exit* of kids	108-133
	MARIA	133-End

Although much of Robbins's plan outlines moments before the music to "The Rumble"

starts, it offers a starting point for many significant moments: the death of two main characters, the

turning point of the drama*,* and Tony's impending projection of his soon to be doomed marriage,

the recognition.[109] Each of Robbins's suggestions from 3b through 5 correspond to specific musical

moments that are demarcated by contrasts in textures and pitch structures. The underlined

"MARIA" corresponds to Tony yelling "Maria!" after everybody but Tony and the bodies of Riff

and Bernardo have left the stage.

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[108] "'On The Rumble' and 'Somewhere' - West Side Story: Birth of a Classic | Exhibitions - Library of Congress,"
accessed May 16, 2015, http://www.loc.gov/exhibits/westsidestory/westsidestory-rumble.html.

[109] In *Poetics*, Aristotle identifies these moments, the turning point or *peripeteia*, and the recognition or *anagnorisi* as
essential to a complex tragedy. For more information on Aristotle's *peripeteia* and *anagnorisis* see Chapter 11 of Aristotle's
Poetics in Aristotle, *Aristotle's Poetics*, trans. James Hutton (New York: W. W. Norton & Company, 1982). See also
Aristotle, *Poetics*, trans. Anthony Kenny, Oxford world's classics (Oxford: Oxford University Press, 2013), xii. For
parallels in opera, Patrick McCreless uses a similar approach to discuss the tragic structure of Wagner's *Ring*. See Patrick
McCreless, *Wagner's Siegfried: Its Drama, History, and Music* (Ann Arbor, Michigan: UMI Research Press, 1982), 1–20.

The music to "The Rumble" is organized into two major sections with a pause between them; the dramatic separation of "The Rumble" heightens the effect of the subsequent brawl, and the pause allows dialogue. Part one ends after the "Jet's Theme" and the Jet's yell, "Keep out of this!" **Figure 3.12** (next page) provides a sketch of both parts of "The Rumble." The figure is organized into three main sections: 1. A sketch of the first part of "The Rumble" on the top left; 2. A sketch of the second part below it (larger); and 3. Examples of the important pitches, in the top right box.

Part 1 (top left) consists of the skittish arpeggios and C, F# chords that open the work, analyzed in **Figure 3.4** and **3.5**, to the "shofar" battle signal or "hate motive" and the Jet's Theme, analyzed in **Figure 3.3** (see **Appendix A.1**). As prior examples demonstrate, important pitches are extracted through correlation with the stage drama and pitch centricity. Multiple additional examples that explain pitch selections in the analytical sketch of **Figure 3.12** can be found in **Appendices A.1-3**.

Figure 3.12 Analysis of "The Rumble"

As a whole, the piece opens centric to pitch class F# with dense figuration and ends with an

pianisissimo Eb[6], a potential symbolic reference to Tony's isolation after the death of his friend Riff

and his lover's brother Bernardo. On the way, "The Rumble" is organized about several pitch

centers: F#, Eb, C, Bb, and A. As the third box of **Figure 3.12** depicts, the piece may have been

organized around a large-scale unfolding of "The Rumble Chord," Bb, Eb, A, and F#/Gb, a

member of sc 4-18 (see **Figure 3.7d**). Metaphorically, the architectural design expresses the

relationship of its constituent components. In this context, recall Lewin's (1990) correlation of K-net

hierarchy to that of Rameaunean tonal theory in discussing Schoenberg's *Pierrot Lunaire* No 4:

> The opening chord generates from its own internal structure a progression of chords
> that includes and follows the incipit chord. This is very like the situation in
> Rameauean tonal theory, where an opening tonic triad generates a rising-fifth
> progression in the fundamental bass through an aspect of the triad's own internal
> harmonic structure.[110]

According to this model, when scs 3-5 and 3-11 are combined, they generate a new tetrachord that

becomes expressed in the constituent form. Furthermore, the global tetrachord involves the same

pitch classes that form the local "Rumble Chord" as shown in **Figure 3.7d**, and in the top right box

of **Figure 3.12**. Much like the ability of a triad to project a large-scale design, so too does the

relationship between Bernstein's fundamental building blocks "modernize" the "old fashioned notes

music has always used" both locally and globally.

Another interpretation emerges if pitch class C is accounted for. Roughly, part one moves

from F# to C; part two hints at C, quickly moves to Bb, and ends with an isolated Eb (see

Appendixes A.1-3 as desired). Combined, these form a transposition of the "Tristan Chord," (see

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[110] Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them," 94.

the top right box of **Figure 3.12**). Considering Bernstein's detailed explanations of the Tristan chord in multiple lectures, a deep level parallel is not out of the question.[111] In his later Harvard lectures, Bernstein himself summarizes this sentiment: "We might say—in the semantic terms of our last lecture—that *Tristan and Isolde* is a giant metaphor of *Romeo and Juliet*.[112] Considering Bernstein's detailed knowledge of Berlioz's *Romeo and Juliet* and Wagner's *Tristan und Isolde*, it is highly likely he drew inspiration from both when it was time to set the most pivotal scene, the moment lovers can no longer be, in his own version of *Romeo and Juliet*.[113]

As these interpretations suggest, the local and large scale pitch choices go beyond the narrative plan Jerome Robbins gave to Bernstein. The particular pitch classes, set-classes, and transposition networks describe how the fundamental building blocks are transformed to become symbolic of the drama on the stage. Large-scale coherence results from symbolic references to a combination of the fundamental building blocks, scs 3-5 and 3-11, and to the "Tristan Chord"—a sonority that, for Bernstein, defined the edge between the tonal and atonal divide.[114] Local sonorities do not follow tonal syntax, but are morphed and altered to correspond to the drama and choreography on stage.

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[111] Bernstein, *The Joy of Music*, 199–202.

[112] In a later lecture, Bernstein carefully details how Berlioz's *Romeo and Juliet* predates Wagner's "Tristan" chord and summarizes the metaphor of tonal ambiguity with lovers that cannot be. See Bernstein, *Findings*, 226–237.

[113] The relationships espoused here may have references beyond *Tristan und Isolde*. In an unpublished conference paper, Robert Gauldin explores a C – F# complex that plays out over the course of Wagner's *Ring Cycle*. Knowing Bernstein's affinity for beginning many talks with Wagner's operas, perhaps Bernstein used Wagner as a model for his own musicals and operettas more than previously thought. Robert Gauldin, "The C-F# Complex in Der Ring Des Nibelungen" (presented at the joint meeting of the Society for Music Theory and the American Musicological Society, Philadelphia, Pennsylvania, October 27, 1984). Dr. Gauldin was kind enough to send me an updated version of this paper that was intended for a book.

[114] See Bernstein, *The Joy of Music*, 199–201.

3.7 Conclusion

A closer look at "The Rumble" reveals Bernstein's many accomplishments. As I have shown in several examples, particular transformations and combinations of scs 3-5 and 3-11 *iconically* and *symbolically* reference stage action. In **Figures 3.8-11**, the oscillating pitches create a musical analogue for the on-stage choreography; like the knife fight between Riff and Bernardo, so too do members of scs 3-5 and 3-11 vie for prominence. Iconic references to tonal syntax (refer to **Figure 3.3**), symbolic references to topics such as the "shofar" call (see **Figure 3.1a.**), the Viennese Trichord (sc 3-5), and the deeply imbedded reference to the "Tristan Chord," (see **Figure 3.12**, top right) all "take a lot of peering around to discern" and help Bernstein tread the fine line between "realism and poetry" and "opera and Broadway."

It can be misleading to jump to tonal conclusions if a piece has triads and scales; as I have shown in a variety of contexts, these terms themselves should be used sparingly, or perhaps not at all. Although some passages benefit from identifying tonal allusions, tonal syntax itself, especially in "The Rumble," is not operative. Although it can seem appealing to avoid technical jargon in favor of conceivably more accessible language such as tritones grafted onto triads, a problem results. The addition of a tritone complicates the intervallic structure of the resulting sonority. Furthermore, focusing on the tritone alone misses the elegant interaction between members of scs 3-5 and 3-11. Carefully constructed T-nets explore combinations of both building blocks and simultaneously emphasize features in the tetrachordal sonorities that result.

Although Bernstein sought to situate himself apart from Schoenberg and his adepts by "revitalizing the old tonal boy," analysis of his own music strongly problematizes the artificially manufactured divide implicit in Bernstein's modern manifesto. In "The Rumble," post-tonal theory captures precisely these differences, and offers new perspectives on the music and its relationship to dance. Although the approaches outlined in this study do not explain every passage, they provide

sturdy scaffolding for a more informed view of the music in *West Side Story*, and perhaps other music in Bernstein's *oeuvre.*

As evidenced by analysis of "The Rumble," some of Bernstein's tonal claims in his lectures are misleading. Were he equipped with today's modern theoretical tools, perhaps Bernstein himself would have avoided creating what is now a popular misconception of a compositional schism between the poles of tonal and atonal music. Perhaps modern theoretical terminology would have allowed Bernstein to express a more nuanced view of how composers used "old fashioned" notes to fashion modern music. After all, Bernstein appears to use materials in ways that sometimes reference or allude to tonal syntax, but in other passages subvert it in order to better symbolically represent the stage action.

To conclude, although Bernstein reinforced and affiliated himself with the tonal side of the twentieth century aesthetic divide, analysis reveals a different reality. As I have shown, post-tonal theory helps describe more precisely what Bernstein meant when he spoke of composers extending "musical ambiguities as far as possible by constant new kinds of transformations."[115] Many of Bernstein's transformations of traditional materials do not follow tonal syntax, but they do, to use Bernstein's own words, use "the same old-fashioned notes music has always used . . . in a fresh new way."

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[115] Bernstein, *Findings*, 270.

Chapter 4

The Patterns of Grand Opera On Broadway

The glittering world of musical theater is an enormous field that includes everything from your nephew's high-school pageant to *Götterdämmerung*. And somehow in that great mass of song and dance and drama lies something called the American musical comedy—a magical phrase.[116]

Leonard Bernstein, "American Musical Comedy" Telecast, October 7th, 1956

4.1 Introduction: Broadway and Opera

Certainly, not all of the pieces in *West Side Story* invoke operatic comparisons, but the "Tonight" ensemble finale at the end of Act 1 is almost ubiquitously associated with drawing upon the "patterns of grand opera."[117] However, perhaps influenced by supposed differing aesthetics for opera and Broadway, many critics and contemporary scholars carefully hedge their operatic comparisons. For example, after noting that the "Tonight" ensemble seems to recall Verdi, Nigel Simeone suggests that, nevertheless, "there is no sense whatsoever of Bernstein falling into an 'opera trap.'"[118] This statement raises two questions. How does "Tonight" recall operatic tendencies, while simultaneously avoiding them? And perhaps more pressing, what *is* the "opera trap"?

In this essay, I argue that the "Tonight" ensemble closely parallels—and even goes beyond—the musical and theatrical complexity found in some ensemble finales of opera while simultaneously drawing upon popular musical idioms common to Broadway vernacular. To

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[116] Bernstein, *The Joy of Music*, 152.

[117] See Coe, "Musical at National Is a Triumph" and next footnote.

[118] Simeone, *Leonard Bernstein*, 106. Helen Smith (2011) expresses a similar position noting that "the music is driven by the drama here, moving imperceptibly towards the tragedy which will follow shortly, taking it almost into the realms of opera, but Bernstein manages to hold back." Smith subsequently quotes Simeone. See Smith, *There's a Place for Us*, 168.

illustrate, I offer a brief background on ensemble finales in opera and on Broadway and use theatrical semiosis to provide a comparative analysis of the dramatic structure of "Tonight" with Verdi's quartet, "Bella Figlia Dell'amore" from *Rigoletto* (1851). Afterwards, I analyze Bernstein's "Tonight" ensemble in a semiotic framework that involves the second Peircean trichotomy of the sign—*icon, index,* and *symbol*—and two terms from William Bright (1963)—*endosemantic* and *exosemantic* references. Using this semiotic framework, I detail how moments in the "Tonight" ensemble reference earlier moments in the musical, musical topics and syntax both from the "serious" or learned sophistication of ensemble finales found in opera, and topics that reference popular American musical vernacular.

4.2 Ensemble Finales and Broadway Aesthetics

Ensemble finales begin to emerge in 18th-century *opera buffa* with composers such as Nicola Logroscino (1698-c. 1765), Florian Leopold Gassmann (1729-74) and ultimately, Mozart where they reach a new level of sophistication.[119] In the words of John Platoff (1989), the mature ensemble finale in Mozart and his contemporaries was a product of combining "the musical idea of several voices in one movement" with the "purely dramatic idea of ending an act with an emotional 'stretto,' a quickening-up of the interaction of various characters."[120] Accordingly, the operatic ensemble finales of Mozart and his contemporaries function both as a means to further aspects of the plot, while simultaneously allowing the characters to express their emotions—all within the context of a coalescing climax that aims to convince an audience to return for the next act or exit the show with enthusiasm.

Although ensemble finales were not ubiquitous before Mozart, they were even more rare on Broadway in the mid-twentieth century. In contrast to songs or arias that could thrive as popular "hits"

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[119] Donald Jay Grout and Hermine Weigel Williams, *A Short History of Opera* (Columbia University Press, 2003), 279.

[120] Edward J. Dent, "Ensembles and Finales in 18th Century Italian Opera," *Sammelbände der Internationalen Musikgesellschaft, 11. Jarhg. H. 4.* 11, no. H. 4. (September 1910): 553.

outside the theater, dramatically integrated ensemble finales were not easily adaptable outside the context

of the show itself.[121] Furthermore, the compositional demands of an ensemble final, in Bernstein's view,

required compositional techniques beyond those of the typical Broadway composer. According to

Bernstein, Broadway music was not written by composers, but by thirty-two bar songwriters. Broadway

evolved, in part, from songwriters collaborating with "serious" composers—composers trained in the

music academy. Initially, songwriters collaborated with so-called "subcomposers," composers whose

principal job was to integrate a variety of songs into a single "work" by composing "all the in-betweenies

[sic], the connective tissue, the ballets, musical links for scene changes, overtures, interludes—in other

words, everything but the tunes themselves."[122] Broadway's next evolution began with composers such as

George Gerswhin (1898-1937) and Marc Blitzstein (1905-1964), who had the ability to write Broadway

tunes and also the "serious" integrative compositional work without the aid of subcomposers. But these

composers did not complete the evolution of the American Broadway musical because they wrote *operettas*,

a genre outside the "American musical comedy," a distinction Bernstein was careful to point out.

In addition to the technical demands required by ensemble finales, for some Broadway critics,

"serious" music was in opposition to Broadway aesthetics and was better left out—and certainly not

mentioned in the public sphere (see chapter two, section 2.5 on highbrow versus lowbrow aesthetics). For

some audiences, the highbrow seriousness of opera, as best exemplified by ensemble finales, did not have

a place in Broadway theater. Bernstein's manufactured logbook, with its suggestions of "treading the fine

line between Broadway and opera," provided enough evidence to some critics that the show was more of

an "experimental think piece," a show not aimed at general popularity."[123] Because Broadway was for the

lay-public, and the show was not aimed at general popularity, it would ultimately be a failure on

Broadway. Why then, would Bernstein manufacture criteria that would lead some to condemn the show?

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[121] Stempel, "Broadway's Mozartean Moment or An Amadeus in Amber," 46–47.

[122] Bernstein, *The Joy of Music*, 185.

[123] See John McClain, "Griffith and Prince Steal Early Lead," *New York Journal-American*, July 14, 1957; See also "Untitled Clipping."

For Bernstein, the ability of a composer to navigate the edge between highbrow sophistication and accessible Broadway directly paralleled Mozart enhancing the *Singspiel*. Just as opera benefitted from Mozart, so too would Broadway benefit from a future American version of "Mozart."[124] In many ways, Bernstein's forecast can be interpreted as a declaration of his own aesthetic goals for *West Side Story*.[125] Considering the economic and aesthetic concerns for Broadway shows, then, it seems all the more impressive that Bernstein included the epitome of operatic "sophistication," the ensemble finale. But to succeed on Broadway, serious compositional idioms could make their way into the American musical only if they obeyed the vernacular of "an art that arises out of American roots, out of our speech, our tempo, our moral attitudes, our way of moving."[126]

To interpret how Bernstein may have accomplished his aesthetic goals, the task is twofold: 1. Compare the "Tonight" ensemble with one of operas most celebrated ensemble pieces in terms of the "patterns of grand opera," and 2. Verify whether the "Tonight" ensemble ventures into the realm of "serious" composition characterized by operatic ensemble finales, and describe how it also adheres to Bernstein's manifesto of "using only musical comedy techniques." Ultimately, these questions can be resolved by examining the nature and kind of the references found within the "Tonight" ensemble with the tools of semiotics and music theory to assist.

4.3 Form in Ensemble Finales

Because an ensemble finale sums up previous material from a show, its form depends greatly on the prior dramatic trajectory, number of characters, and intended effect and affect, rather than adherence to particular formal principles such as rondo or sonata. In many ensemble finales of Mozart, for example, Platoff identifies what he calls "cycles," alterations between plot developing "dialogue" and emotional or

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[124] See Stempel, "Broadway's Mozartean Moment or An Amadeus in Amber."

[125] See Giger, "Bernstein's the Joy of Music as Aesthetic Credo."

[126] Bernstein, *The Joy of Music*, 190.

expressive text as is typically found in arias.[127] Thus, the structure of ensemble finales—resulting from the arrangement of cycles—is intrinsically tied to the text and the narrative trajectory.

To extend the analytical power of "cycles" further, it is useful to adopt two terms from theatrical semiosis: inner- and outer-frames of communication.[128] An inner-frame of communication describes a bidirectional exchange between two or more actors on-stage; an outer-frame refers to messages from actors to the audience. In contrast to the bidirectional exchange between actors on stage, an outer-frame of communication is superficially unidirectional, unless feedback from the audience is taken into account (refer to **Appendix B.1** for a glossary of all the semiotic terms introduced in this study). Roughly, many arias can be understood as depicting outer-frames of communication—a singer's emotional outpouring to an audience. In contrast, recitative typically advances the plot through dialogue spoken between characters—through an inner-frame of communication.

Inner- and outer-frames of communication can be further developed in relation to differing concepts of time. In the words of Ulrich Weisstein, opera consists of "horizontally progressing dramatic time," often through recitative, and a type of vertical, "timeless moment of reflection and introspection" typically found in arias.[129] Ensemble finales, therefore, can be characterized by combinations of vertical and horizontal time with inner- and outer-frames of communication. This unique combination of time and differing forms of communication contributes to the peculiarities of opera. If the "opera trap" is anything, perhaps it can be described as the complex fabric that emerges from the unique interaction of differing frames of communication and time continua that sometimes contradict dramatic poetic functions. A brief analysis of Verdi's famous quartet from *Rigoletto* brings this to the fore.

"Bella figlia dell'amore," involves four characters: the heroine Gilda, her father Rigoletto, the duke of Mantua, and Maddalena. Earlier in the opera, Gilda falls in love with the duke—to Rigoletto's

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[127] John Platoff, "Musical and Dramatic Structure in the Opera Buffa Finale," *The Journal of Musicology* 7, no. 2 (April 1989): 194–195.

[128] Nöth, *Handbook of Semiotics*, 363.

[129] Ulrich Weisstein, "The Libretto as Literature," *Books Abroad* 35, no. 1 (1961): 18.

chagrin. To disabuse Gilda of her love for the duke, Rigoletto brings her to overhear the duke who is making advances on another woman, Maddalena, in a nearby dilapidated shack. While the duke attempts to seduce Maddelena in the shack, Gilda and *Rigoletto* stand outside to listen and observe. In essence, the duke and Maddelena form an inner-frame of communication that Rigoletto and Gilda, also in an inner-frame, overhear.

In the play that served as the model for *Rigoletto*—Victor Hugo's *Le Roi s'amuse* (1832)—the scene involves alterations between two inner-frames of communication in alternating episodes. For example, when Gilda peers through a hole in the wall to witness the duke's advances on Maddelena, she turns to address her father.[130] At this moment, the audience sees and hears the interaction between Gilda and *Rigoletto*, while the duke and Maddalena—still on stage—are effectively silenced. In the spoken drama, coherence arises from an audience observing alternating inner-frames; when one inner-frame has the stage, the other is suspended in time, to be resumed after the other completes. In the opera, the episodic interplay occurs simultaneously, which is made possible with four-part counterpoint. As a result, the scene features vertical, timeless moments of reflection from Gilda, with horizontal, progressive time essential to the developing drama of the duke, Maddalena, and Rigoletto. Rather than episodic alternations of inner-frames of communication, the audience absorbs two separate inner-frames simultaneously. Fundamentally, what was two inner-frames becomes an outer-frame and two inner-frames simultaneously: four characters communicating with each other and with the audience through four-part voice-leading structures.

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[130] In the play version by Victor Hugo, the characters have different names. I have kept the names from Verdi's *Rigoletto* for ease of discussion.
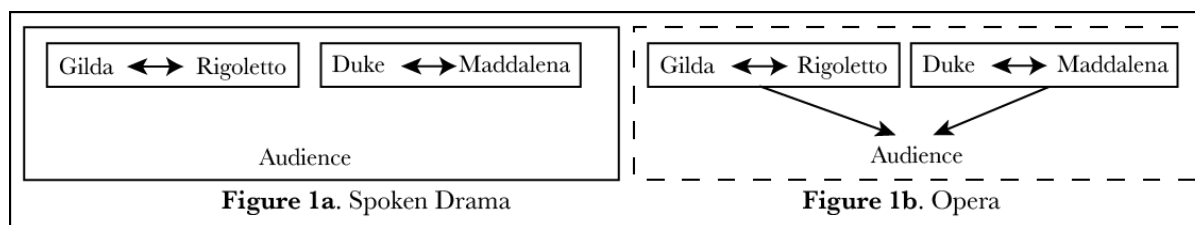
Figure 1a. Spoken Drama   Figure 1b. Opera

Figure 4.1 Inner Versus Outer Frames of Communication

Figure 4.1 depicts the differences in inner- and outer-frames of communication between the spoken drama and the operatic version schematically. In this figure (and following figure), the audience is depicted at the bottom and characters on top. Arrows pointing towards the audience represent outer-frames of communication; boxes represent inner-frames of communication, and dashed boxes represent outer-frames of communication. In the play version, represented by **Figure 4.1a** on the left, the two inner-frames of communication are *observed* by an audience—a feature standard to inner-frames of communication; in **Figure 4.1b**, the two inner-frames of communication combine—through features in the music—to create an outer-frame with the audience.

The simultaneous presentation of both groups in the opera version have led some authors to describe the challenges associated with combining different art-forms in opera, and the peculiarities that result. Weisstein notes this contrast between opera and spoken drama clearly:

> The convention most likely to shock the naïve observer derives from the principle of simultaneity which, negatively applied in the spoken drama, forbids the use of several individualized speakers at the same time—the chorus consisting of persons expressing themselves collectively. In opera, contrasting moods may be rendered simultaneously with an entirely pleasurable effect upon the listener.[131]

As Calvin S. Brown notes, the idiosyncratic characteristics of opera, in contrast to the spoken drama, are revealed in the *Rigoletto* quartet: two persons are inside a shack thinking they are alone, two are outside spying on them (not detected), and all four are "singing away full blast in slickly contrived harmony."[132]

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[131] Weisstein, "The Libretto as Literature," 17.

[132] Calvin S. Brown, *Music and Literature - A Comparison of the Arts* (Thompson Press, 2013), 89.

The harmonic fusion of all four characters requires an audience to further suspend poetic disbelief: if the two groups are separated and not in contact with one another, why are they singing together in "slickly contrived harmony"? In essence, what was two separate groups communicating in inner-frames becomes a single group of four people communicating with the audience (see **Appendix B.2** for the text of "*Bella figlia dell'amore*").

In the context of theatrical semiosis, Bernstein's "Tonight" ensemble shares many features with Verdi's quartet from *Rigoletto,* but in terms of inner- and outer-frames of communication is decidedly more complex (refer to **Appendix B.3** for the full text to Bernstein's "Tonight"). "Tonight" features five "characters": Riff and the Jets, Bernardo and the Sharks, Anita, Tony, and Maria. **Figure 4.2** schematically depicts the modes of communication in eight stages as the piece becomes more

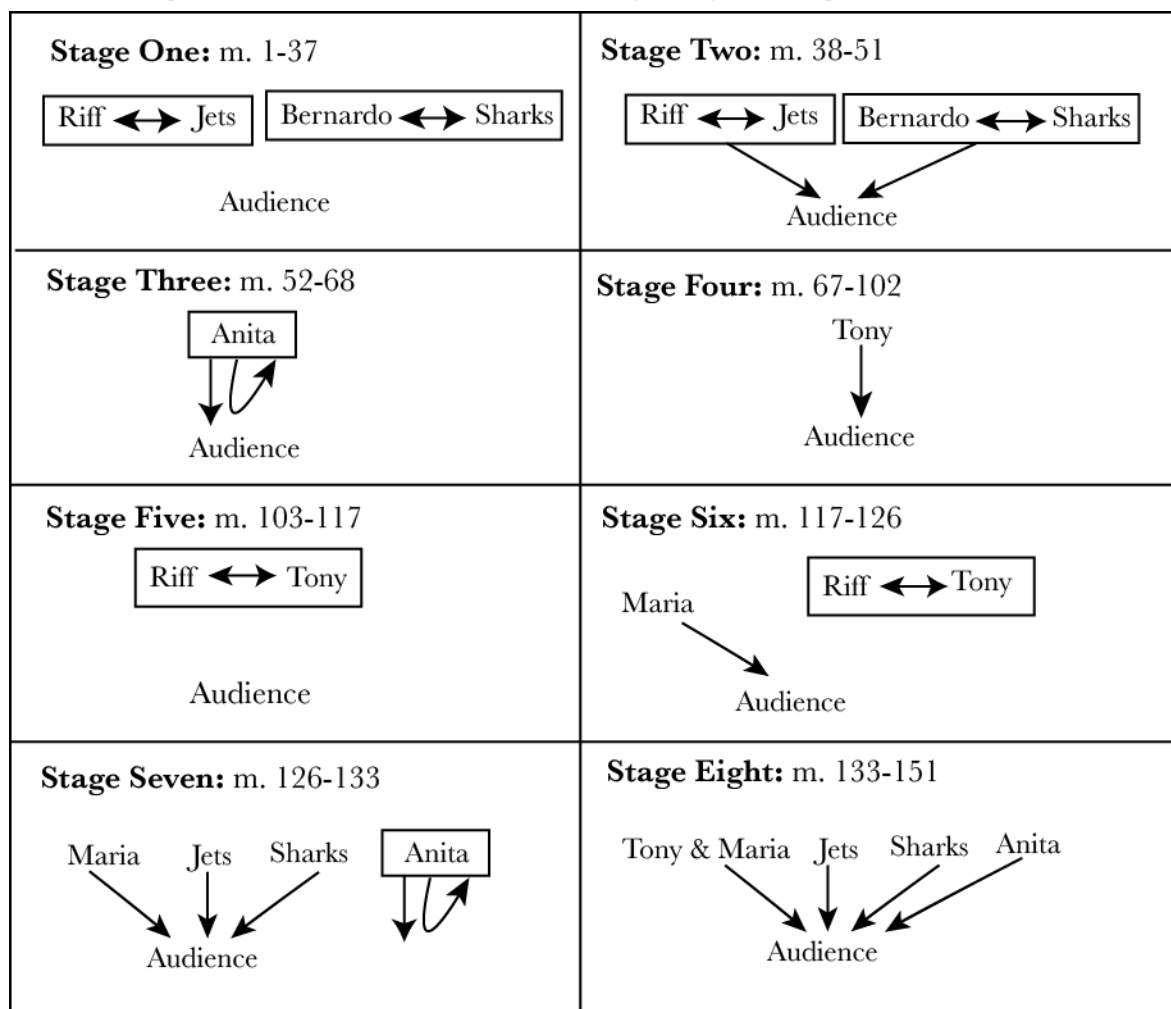| Stage One: m. 1-37	Stage Two: m. 38-51
Riff ⟷ Jets Bernardo ⟷ Sharks	Riff ⟷ Jets Bernardo ⟷ Sharks
Audience	Audience
Stage Three: m. 52-68	**Stage Four:** m. 67-102
Anita	Tony
Audience	Audience
Stage Five: m. 103-117	**Stage Six:** m. 117-126
Riff ⟷ Tony	Maria Riff ⟷ Tony
Audience	Audience
Stage Seven: m. 126-133	**Stage Eight:** m. 133-151
Maria Jets Sharks Anita	Tony & Maria Jets Sharks Anita
Audience	Audience

Figure 4.2 **"Tonight" Ensemble Inner and Outer Frames Schematic**

contrapuntally complex and more characters are introduced (as before, solid boxes represent inner-frames of communication).

As **Figure 4.2** shows in Stage one, the piece begins with Riff and Bernardo directing their text to their respective gangs, represented by two inner-frames. However, as soon as both gangs begin to sing together in unison, as shown in stage two, communication becomes directed towards the audience in a similar manner to the outer-frame depicted in the *Rigoletto* quartet in **Figure 4.1b**. Afterwards, Anita enters the dialogue, appearing to think aloud—stage three. Her text can be interpreted either as thoughts to herself, a type of inner-frame of communication represented by a self-referencing arrow, or directed towards the audience similar to the function of a miniature aria. Soon after Anita finishes, Tony enters in stage four, expressing his emotions about Maria—an outer-frame of communication in vertical "stop-time" reminiscent of an aria. But when Riff says, "I'm counting on you to be there Tonight," it is directed at Tony who responds with "All right" (see stage five). In stages four and five, Tony's mode of communication changes from an outer- to inner-frame. After brief dialogue between Riff and Tony, Maria enters the scene singing towards the audience in stage six. In stage seven, Maria, the Jets, and the Sharks begin singing together, and in stage eight, Tony joins in with the same material as Maria thereby creating a full outer-frame of communication with most of the cast members directed to the audience.

If the "opera trap" can be quantified by the complexity of inner- and outer-frames of communication in tandem with complex vertical and horizontal time simultaneities, the "Tonight" ensemble falls head first into the "trap." And in the context of theatrical semiosis, Bernstein's "Tonight" ensemble invokes the operatic idiom to an even greater degree—by simultaneously invoking multiple frames of communication and differing time continua—than Verdi's *Rigoletto* quartet. But contemporary scholars disagree: Helen Smith summarizes this scene noting that, "the music is driven by the drama here, moving imperceptibly towards the tragedy which will follow shortly, taking it almost into the realms of opera, but Bernstein manages to hold back."[133] What about Bernstein's version gets close to the realms of

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[133] Smith, *There's a Place for Us*, 168.

opera, but still manages to avoid it? In the context of theatrical semiosis, the "Tonight" ensemble does not hold anything back. To answer this question, then, it is necessary to analyze the "Tonight" ensemble in more detail in terms of how the characters are coordinated with a single event, the manifold musical references, and the ways they are coordinated.

Although the "Tonight" ensemble clearly parallels operatic ensemble finales in terms of inner- and outer-frames of communication, and vertical and horizontal time considerations, the "Tonight" ensemble features particular musical references that many operas do not. Conceivably, the "Tonight" ensemble invokes the framework of operatic ensemble finales, but does not fall into the "trap" because of the kinds of references it invokes, and the ways they are contrapuntally coordinated towards a singular dramatic goal. Therefore, our next task is to identify what these references are and to model how they operate.

4.4 Semiotic Framework

As established in chapter two, the Sign is composed of three correlates: the *Sign-Vehicle*, e.g., the melodic line Tony sings in the "Tonight" Ensemble; the *Referent,* e.g. the prior version of the "tonight" melody heard earlier in the show that the version in the "Tonight" ensemble references; and the *Interpretant,* what an audience interprets, translates, or develops from the relationship(s) between the Referent and Sign-Vehicle. In other words, the Interpretant can be thought of as a development of the original Sign—for example, the new meaning of Tony's melodic line in the "Tonight" ensemble.[134]

In addition to the Sign, it is advantageous to describe whether a reference occurs within the system in question or outside it, and whether the reference is related to musical structure or extra-musical

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[134] Peirce uses *representamen* in place of Sign-Vehicle and *object* in place of the *referent*. I have chosen the alternatives for their accessibility and widespread use in other semiotic studies. See Nöth, *Handbook of Semiotics*, 42–43. On differing terminology for the three correlates of the triad, see Ibid., 79–91. One could think of the interpretant as the interpretation. The word "interpretant" is used in order to emphasize the semiotic association of the term. Semiotic terms such as Sign, Sign-Vehicle, Referent, and Interpretant are capitalized in order to limit their meanings as outlined in chapter two.

concepts. To discuss whether a reference points to other music or an extra-musical event, the terms

exosemantic and *endosemantic*—coined by William Bright—are appropriate.[135] Exosemantic structures

reference extramusical events: for example, references to Latin dance music, or references to the abstract

concept of "highbrow" art associated with a particular social class.[136] Correspondingly, endosemantic

content structures involve musical references to *sound* structures such as motifs or themes that only

(presumably) exist in the structure of the music itself. Endosemantic structures can be further delineated in

terms of whether the reference is to another moment in the piece, an *intraopus* reference, or a reference to

music outside the piece, an *interopus* reference.[137]

Some references can be both endosemantic and exosemantic. Consider, for example, references

or quotes of the melodic patterns associated with *Dies Irae* in musical works besides the *Dies Irae* chant.

Because the reference quotes a musical structure—a particular rhythmic and pitch arrangement—it acts

as an endosemantic, interopus reference. Additionally, because *Dies Irae* symbolically references death, a

quote of *Dies Irae* also acts as an exosemantic reference to the extramusical concept of death. Thus, for a

quote of *Dies Irae* to invoke the concept of death, it requires an interpreter to combine both endo- and

exosemantic references.

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[135] William Bright, "Language and Music: Areas for Cooperation," *Ethnomusicology* 7, no. 1 (January 1963): 26–32. The terms inner and outer forms roughly correspond to endosemantic and exosemantic respectively. I have chosen the semiotic variants to be consistent with semiotic literature.

[136] Bright argues that exosemantic structures are to be found only in language, not music. However, it is useful to re-appropriate the term in music semantics with the addition of topics. For this interpretation of the word exosemantic, see Nöth, *Handbook of Semiotics*, 431. Kofi Agawu uses two terms from Roman Jakobson—introversive and extroversive semiosis—for similar purposes. See Roman Jakobson, "Language in Relation to Other Communication Systems," in *Roman Jakobson Selected Writings: World and Language*, vol. 2 (Paris: The Hague, 1971), 704–705; V. Kofi Agawu, *Playing with Signs: A Semiotic Interpretation of Classic Music*, Princeton Legacy Library (Princeton University Press, 1991); See also Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, trans. Carolyn Abbate, 3rd ed. (Princeton University Press, 1990); Leonard Gilbert Ratner, *Classic Music: Expression, Form, and Style* (New York: Shirmer Books, 1980); Raymond Monelle, *The Sense of Music: Semiotic Essays* (Princeton, New Jersey: Princeton University Press, 2010).

[137] See Wilson Coker, *Music & Meaning: A Theoretical Introduction to Musical Aesthetics* (New York: Free Press, 1972), 61; Cited in Nöth, *Handbook of Semiotics*, 431.

With this semiotic framework, it is now possible to interpret and deconstruct the references throughout the "Tonight" Ensemble that may have led critics and contemporary authors to hedge their operatic comparisons. It helps to observe elements of both endo- and exosemantic references to show how the "Tonight" ensemble walks the edge between the "sophistication" of operatic ensemble finales and Broadway vernacular. In the following analysis, refer to **Appendix B.1** for a glossary of the semiotic terms used in this study as desired.

4.5 Analysis Part 1: A Semiotic Approach to the "Tonight" Ensemble

Discussing how a Sign functions can help describe potential emergent meanings. As the following examples demonstrate, a triadic Sign that includes the Interpretant is especially important. Consider **Figure 4.3**, Tony's melodic "Tonight" theme imitated in canon by the violins, approximately halfway through the "Tonight" ensemble. In the larger context of the musical, Tony's melodic line functions as a reprise of "Tonight" from the earlier "Balcony Scene." When the "Tonight" ensemble is heard in the context of the show, the reprise acts as an endosemantic, intraopus Sign—one that references an earlier moment in the show. **Figure 4.4a** schematically represents this endosemantic, intraopus Sign on a semiotic triangle.[138] In a triadic Sign system, the utterance of the "Tonight" melody in the "Tonight" Ensemble acts as the Sign-Vehicle that iconically references—by way of similarity differing only by transposition—the original "Tonight" melody in the balcony scene, here acting as the Referent. The emergent Interpretant (formed by an audience) can be understood as the product of an audience translating, interpreting, or developing the meaning created by the iconic relation between Sign-Vehicle and Referent. Said another way, the Interpretant can be understood to be a more complex understanding

Figure 4.3 Analysis of "Tonight" Canon

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[138] On the terms Sign-Vehicle, Referent, and Interpretant, see Nöth, *Handbook of Semiotics*, 89.

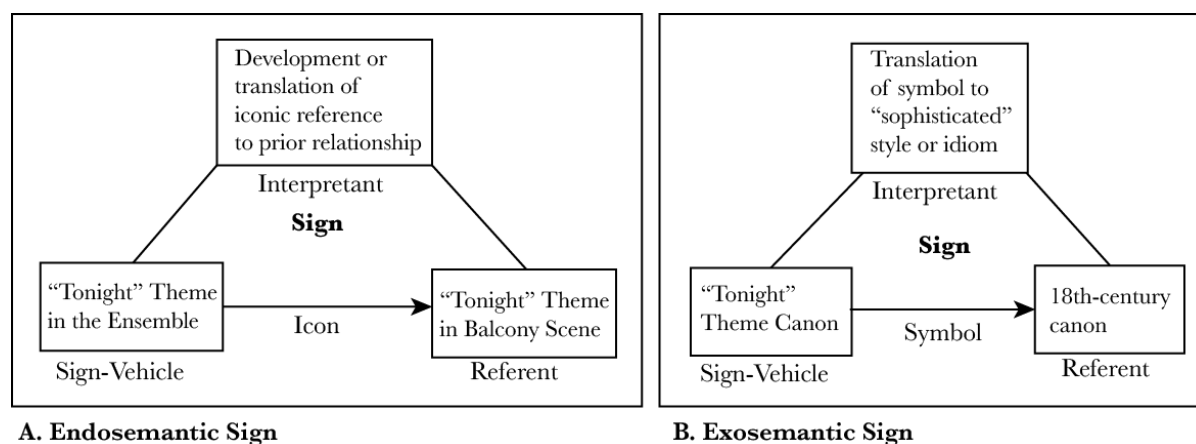A. Endosemantic Sign   B. Exosemantic Sign

Figure 4.4 Endosemantic and Exosemantic Semiotic Triangles

of the sign's Referent—for example the Symbolic association of Tony and Maria's love established in the prior balcony scene the reprise references.[139] As should be apparent, the endosemantic, intraopus Sign does not go beyond the bounds of Broadway expectations. Furthermore, for semiosis to occur—emergent meaning resulting from connections between the Sign-Vehicle and Referent—the demands on an audience are minimal: the ensemble need only be performed in the larger context of the entire musical for the sign to function.

Alternative or complementary acts of semiosis can exist for a smaller subset of audiences. If we consider audiences that are familiar with a wider repertoire, it is advantageous to interpret the exosemantic Sign formed by the canonic imitation of the violins. Refer again to **Figure 4.3**. As the dashed line indicates, the violins imitate Tony's line with a semibreve delay at the unison and octave (the violins play in octaves above the notated example). At first glance, one might be inclined to suggest a reference to the Renaissance concept of *fuga sciolta*—exact canonic imitation for a *part of the piece*, thus "loose fugue"—until it breaks in the last measure of the example.[140] However, the dissonant intervals formed by the voices, as indicated below the bottom stave in Arabic numerals, are more typical of 18th- and 19th-century counterpoint. Indeed, the surface structure involves a complex fabric of interchanging

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[139] On the relation of the Interpretant to translation, see Atkin, "Peirce's Theory of Signs."

[140] On the origin of fugue from its imitative forbearers, see Paul Mark Walker, *Theories of Fugue from the Age of Josquin to the Age of Bach* (Rochester, NY: University of Rochester Press, 2004), 10.

dissonances: dotted circles around notes indicate dissonances of some type—e.g. passing tones, neighboring tones—and slanted lines between staves indicate theoretical consonant alignments. For those attuned to contrapuntal repertoires, the canonic imitation of the violins can symbolically represent the learned or "sophisticated" style as placed on a semiotic triangle in **Figure 4.4b**. In contrast to the reprise reference, the symbolic association here acts as a reference to other musics that represent the learned "topic."

In addition to the exosemantic signs, we can also find some more subtle endosemantic, intraopus Signs. In addition to the canonic imitation in the violins, the entire phrase is coordinated according to several "sophisticated" harmonic paradigms emblematic of a musical sign system. **Figure 4.5** provides a sketch of Tony's melodic line with the canonic imitation, the actual bass voice with traditional figured bass symbols, and the root motion of each harmony extrapolated in the lowest stave. Numbers with a plus or minus sign indicate semitone motion between tones as is frequently denoted in transformational theory.[141] As the root motion indicates in measures 85-87, several important tritones (-6) are embedded into the root motion and are each bisected by minor thirds (-3). One way to interpret the root motion is as a fully

Figure 4.5 Analysis of "Tonight" Canon

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[141] See Lewin, *Generalized Musical Intervals and Transformations*, 157–192.

diminished G# seventh chord unfolded downwards. After G# is reached, the motion resets by a major third up (+4), steps down a minor third (-3), and steps up a whole step (+2) to end on B natural, a tritone away from the phrases root beginning on F in measure 85. Note too how both the root motion and the actual bass lines outline a tritone (-6). For those familiar with the importance of the tritone interval as a structural interval in *West Side Story*, the multiple tritones built into the harmonic and linear movement reference the motivic threads that influence the architectural musical structure.

Tony's melodic line, with its iconic reference to an earlier moment in the show, and the symbolic endosemantic references—created by the canonic imitation in the violins and particular structural features—contains further exosemantic references to extramusical topics. Components of the "Tonight" melody can also be interpreted as invoking the technique of polyphonic melody with several "sigh" or "*pianto*" topics. See **Figure 4.6**. The leaping intervals, stressed notes, and continuous flow of Maria's "Tonight" theme reference the "singing style" polyphonic line topic (see the top stave)—a topic that involves several leaping intervals, many stressed notes, and an overall flowing melodic direction.[142] In addition to the sentimental lyrics, the melodic line consists of several appoggiaturas (as analyzed in the bottom stave) that structure the melodic line—a property characteristic of the *pianto* topic. In addition, the appoggiaturas that define the *pianto* topic are typical of the *Empfindsamkeit* (sentimental) style and help reinforce Tony and Maria's affectionate lyrics.[143]

Figure 4.6 Analysis of the "Tonight" Melody

Observing both the endo- and exosemantic references lends credibility to Bernstein's manifesto— as expressed in the manufactured logbook—to tread the line between "sophisticated serious" music and

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[142] On the singing style topic, especially according to Heinrich Koch, see Monelle, *The Sense of Music*, 26.

[143] On the *pianto* topic, see Ibid., 31.

Broadway vernacular. Indeed, the use of "sophisticated" contrapuntal combinations and resultant

references to earlier events in the musical in the "Tonight" Ensemble were carefully manufactured in

Bernstein's compositional process. Joseph Swain (2002) remarks of Tony's "Tonight" reprise and the

canon played by the violins, that that the contrapuntal intensification was "so breathtakingly simple that it

is hard to believe the original tune was not designed for it."[144] Swain's hunch is more than a suspicion: the

original tune *was* designed for it. Although the balcony scene duet "Tonight" precedes the "Tonight"

Ensemble, it was written afterwards and derived from the ensemble version.[145]

4.6 Analysis Part 2: Contrapuntal Combinations

Clearly describing how the reprise of the "Tonight" melody functions in a Sign system helps

explain the rhetorical power of the reprise and the particular mechanisms responsible for the complex

emergent meaning for particular audiences. As the triadic Sign implies, the emergent meaning of the

"Tonight" melody reprise depends greatly on the interpreter and what they infer from the relationship of

Sign-Vehicle to Referent, here defined as the Interpretant. For some critics and audiences, the

endosemantic, intraopus reference may hold back the operatic tendencies of the scene, but for others,

perhaps the exo- and endosemantic references to contrapuntal learned styles took it into the realms of

opera. Nonetheless, a semiotic approach does not end here.

As noted earlier, one of the main differences between opera and spoken drama is the emergence

of simultaneous communication.[146] Through contrapuntal coordination, music makes simultaneous

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[144] Swain, *The Broadway Musical*, 246.

[145] Using evidence from the manuscripts, Nigel Simeone notes that that the balcony scene duet "Tonight" was "reverse-engineered from the Quintet," and was written during rehearsals in July 1957. See Simeone, *Leonard Bernstein*, 64.

[146] Bernstein describes this phenomenon in his lecture, "What Makes Opera Grand?" He writes, "Now we come to a new function of music in opera, another expansion of reality, and that is simultaneous singing. This is one of the great delights of opera: just think of ensemble numbers like the Quartet from *Rigoletto*. . . And why are these always the high points of opera? Because they provide a thrill that no other art form can provide: the thrill of being able to hear several emotional statements at once. You could never do it in a play . . . But music accomplishes the miracle, because notes are born to sound together, as words are not." Bernstein, *The Joy of Music*, 292.

communication coherent, or at least coordinated according to a greater principle of musical coherence. In the case of Verdi's *Rigoletto* quartet, each voice contains particular features that help it stand out in the contrapuntal framework. But as some have noted, the seemingly "slickly contrived harmony" that results encourage an audience to suspend poetic disbelief. In some ways, the "Tonight" ensemble subverts the operatic peculiarities found, for example, in Verdi's quartet through greater contrapuntal contrasts between the characters and the cohesion of a singular upcoming plot development.

The "Tonight" ensemble features more extreme textural and melodic contrasts than those found in Verdi's quartet, and a great variety of references—both "sophisticated" and popular—that are all coordinated to a singular event. In the *Rigoletto* quartet, the "slickly contrived harmony" may, for some audiences, diminish the poetic separation of the two inner-frames of communication: although Gilda and Rigoletto are physically separated from the duke and Maddelena, their coordinated lyrical lines counter the supposed secretive separation. In the "Tonight" ensemble, a different situation arises: the simultaneous presentation of all five characters in the "Tonight" ensemble reinforce one another because they are singing about what will happen "tonight." Simultaneously, each character is delineated by highly specific contrasting musical textures and particular exosemantic references that help maintain their independence and unique musical characterizations in the dense contrapuntal texture.

If we understand the "Tonight" ensemble as Bernstein communicating with an audience—an endeavor he was passionate about accomplishing—it is useful to know what type of references are present, and for what audiences they might have meaning.[147] As the varied critical response demonstrates, the emergent meaning, here derived through semiotic tools, differs depending on the interpreter. As we have seen, there are references to the "serious" idiom of opera ensemble finales *and* popular musical vernacular common to Broadway, and sometimes these are present at the same time. The simultaneous presentation

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[147] Bernstein felt as though the relationship between modern composers and audiences had become something of "composer *versus* public"—a problem he sought to remedy in his own music. See Bernstein, *The Infinite Variety of Music*, 9.

of popular and "sophisticated" styles could have the ability to temper so-called "operatic tendencies" of ensemble finales.

When all five "characters" sing in three-part counterpoint in the "Tonight" ensemble, a large number of exo-and endosemantic references creates powerfully rich web of meaning—a web that Bernstein considered to be unique to opera.[148] **Figure 4.7** provides a snapshot from the score when all five characters sing in three-part counterpoint towards the end of the piece.[149] Note the sequential "singing style" phrase sung in octaves by Tony and Maria, Anita's oscillating motions, and the quasi imitation between the Sharks and Jets singing "They began it." The "singing style" topic articulated by Tony and Maria and the "learned style" invoked by the quasi-canonic imitation is tempered by the

Figure 4.7 "Tonight" Score Snapshot

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[148] Bernstein discusses ensemble finales as creating "a network of emotions that is in itself a new kind of emotional experience" and argues that "that's something only opera can give you." Bernstein, *The Joy of Music*, 295.

[149] If we consider the Sharks and Jets to sing in quasi-imitation, which merges to a unison, we might consider the passage as using four-part counterpoint.

accompaniment: a beguine rhythmic pattern (see **Figure 4.8**) provides a rhythmic drive and iconically references, through similarity, the beguine rhythmic found originally in dances from Martinique. For many people in Bernstein's audiences, the beguine rhythmic pattern may have been recognized from Cole Porter's 1935 "Begin the Beguine" as recorded by the band leader and clarinet virtuoso, Artie Shaw and arranged by Jerry Gray. Likely known to many Broadway attendees, "Begin the Beguine" was a popular swing era hit and was featured in movies and other mediums. Therefore, the reference to the beguine rhythm acts as symbolic reference to Latin dances and the popular idiom of Latin rhythms found in American

Figure 4.8 Beguine Rhythm

popular musics in general.[150] Because the beguine pattern references Latin dances and American popular music, its presence in the ensemble acts as an exosemantic referent.

In some ways, the beguine rhythmic pattern tempers the operatic tendencies of the contrapuntal texture. However, had Bernstein not been influenced by his co-orchestrators, it likely would not have made an appearance in the "Tonight" ensemble. According to an interview with Irwin Kostal, one of the two orchestrators for *West Side Story*, Bernstein initially disapproved of the beguine rhythm, but eventually agreed with Kostal after insisting that they disguise the pattern.[151] Considering the collision of the two gangs, the Jets, a white urban gang, against the Puerto Rican Sharks, the beguine accompaniment figure can metaphorically or symbolically represent Tony's desire to be accepted into Maria's family and ultimately "Latin" culture. Furthermore, the popular Latin rhythm offsets the sophisticated contrapuntal fabric and offers a rhythmic drive that may have been familiar to many Broadway audiences.

The singing style topic of Maria and Tony contrasts greatly with the narrowly restricted, highly repetitive, ostinato like gestures that underline material sung by the Jets and the Sharks earlier in the ensemble (see **Figure 4.10**, a snapshot from measures 7-13). As Larry Stempl (1988) notes, the meter-

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[150] See Smith, *There's a Place for Us*, 156–157.

[151] See Simeone, *Leonard Bernstein*, 91.

Figure 4.9 "Tonight" Ostinato

defying ostinato that underlines the vocal lines of the Jets, Sharks, and Anita earlier in the ensemble

closely parallels a similar ostinato in Stravinsky's third movement of *Symphony of Psalms* (1930) (compare

Figure 4.9 and **Figure 4.10**).[152] In more detail, the iconic reference between the ostinato in the

"Tonight" ensemble and Stravinsky's *Symphony of Psalms* act as an endosemantic, interopus reference, a

reference to a musical structure outside the show. Because Stravinsky's work is typically associated with

the "high-brow" art music of the concert hall, the ostinato pattern can also function as an exosemantic,

iconic reference to the "serious" topic of symphonic art music. For this reference to have an Interpretant,

an audience would have to be cognizant of Stravinsky's work. But this reference can have meaning

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[152] See Stempel, "Broadway's Mozartean Moment or An Amadeus in Amber," 47–48.

Figure 4.10 Snapshot of Stravinsky, *Symphony of Psalms*

outside its exosemantic reference too: the repetitive ostinato and tightly strained registral properties of the Sharks, Jets, and Anita exosemantically reference a tightly constricted march-like military topic that opposes the "singing style" topic. Considering the brawl that will ensue "tonight" (in "The Rumble"), an iconic reference to a distorted military march topic foreshadows the ensuing warfare between the two gangs.[153]

When all five characters are present, the emergent meaning is both unified according to the overall musical design, and at the same time each character is distinctly marked. What might have been "slickly contrived harmony" in the *Rigoletto* quartet is perhaps perceived to be less "slickly contrived" in the "Tonight" ensemble, at least for some critics. In short, exosemantic references reinforce the competing individuality of the characters, and the endosemantic references combine both "serious" and popular musical topics.

4.7 Conclusion

In summary, the large variety of exosemantic and endosemantic references reinforce the concept of an emotional "stretto,"—as Platoff suggests—a quickening-up of the interaction of various characters.

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[153] On the "March" topic, see Monelle, *The Sense of Music*, 26.

Although the learned or "sophisticated" contrapuntal style refers directly to the patterns of grand opera found in ensemble finales, the sophisticated combinations are tempered with exosemantic references to popular topics such as the beguine rhythmic pattern, and particular endosemantic, intraopus references to prior moments in the show. As a result of this eclectic mix of references, Bernstein's achievements should be interpreted as beyond the technique of quodlibet, and a serious attempt at combining multiple sign systems—a genuine combination of learned counterpoint with vernacular music, popular in the U.S.[154] Observing the eclectic mix of exo- and endosemantic references offers one explanation for the differing critical views and the tendency of many critics, authors, and essayists to hedge their operatic comparisons.

The concept of Bernstein avoiding the "opera trap" should be displaced in favor of an interpretation that describes how Bernstein meaningfully fused popular compositional topics *with* musical dialect from opera. Arguing that Bernstein takes "Tonight" "almost into the realms of opera," but "manages to hold back" involves a false dichotomy between opera and musical theatre—a dichotomy that portrays opera negatively—and is contrary to the evidence provided in this study.[155] The successes of the "Tonight" ensemble should not be judged with respect to how well Bernstein may or may not have avoided operatic tendencies, but rather how he managed to combine popular idioms with classical "sophistication" such as canon, asymmetric ostinatos, and dense counterpoint. A semiotic approach helps untangle and challenge supposed aesthetic binaries, and offers one avenue for deciphering how Bernstein treaded the line "between opera and Broadway, between realism and poetry . . . abstract and representational."

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[154] On the topic of quodlibet, see William Marvin, "Simulating Counterpoint in Broadway Musicals: The Quodlibet as Compositional Procedure" (presented at the joint meeting of the Society for Music Theory and the American Musicological Society, Columbus, Ohio, October 31, 2002).

[155] For these arguments, see Simeone, *Leonard Bernstein*, 106; Smith, *There's a Place for Us*, 168.

Chapter 5

Playing it "Cool": Serialism on Broadway

Serial like a cliff-hanger, not cereal like Grape-Nuts

Leonard Bernstein, October 16th, 1958[156]

In the context of the Broadway musical, it is surprising that Bernstein included a fugue in *West Side Story*, much less a serial piece.[157] Considering Bernstein's argument that the reacceptance of tonality would help reunite composers and audiences, serialism and *West Side Story* couldn't seem further apart.[158] Although Bernstein may have reinforced pejorative myths of twelve-tone serialism and other avant-garde musics as a fad of the postwar period in his lectures, he too "fooled with serialism," and his own serial pieces sometimes made it into places we might least expect.[159] To illustrate, I analyze "Cool Fugue" using post-tonal theory to show how twelve-tone serial procedures interact with—and help define—an unfolding fugal process. In the process of analysis, I re-

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[156] Bernstein, "Thursday Evening Previews Scripts: Three Pioneers [typescripts with Pasteovers of Musical Examples in Ink, & Emendations in Red, Blue & Black Pencil]."

[157] The fugue from Bernstein's "Prelude, Fugue, and Riffs" is sometimes referred to as the least improvisational, and the most "intellectual" of styles. See Paul Myers, "Prelude, Fugue and Riffs," *Carnegie Hall: New York Philharmonic*, accessed April 18, 2015, https://www.carnegiehall.org/bernstein/leonardbernstein/notes/preludefugueandriffs.html.

[158] On the reacceptance of tonality, see Bernstein, *The Unanswered Question*, 421–425.

[159] On "fooling with serialism," see "An Intimate Sketch - Aaron Copland Collection - Collections." On twelve-tone myths, see Joseph N. Straus, "The Myth of Serial 'Tyranny' in the 1950s and 1960s," *The Musical Quarterly* 83, no. 3 (Autumn 1999): 301–343; Straus, "A Revisionist History of Twelve-Tone Serialism in American Music."

contextualize Bernstein's public lectures on serialism, modern music, and Broadway, and interpret

how he modernized "old fashioned structures," such as fugue, with twelve-tone techniques.[160]

5.1 Bernstein and Serialism

As a result of Bernstein's sometimes polemical lectures (see chapter two), scholars have

tended to over simplify Bernstein's opposition to composers from the Second Viennese School.

Andreas Giger, recognizing Bernstein's *Joy of Music* as an "Aesthetic Credo" for *West Side Story*,

suggests that although Bernstein admitted the twelve-tone method emerged with a certain historical

logic, he rejected it as contrary to nature.[161] In the words of Giger—extracted from Bernstein's

"Introduction to Modern Music" lecture—Bernstein thought of the twelve-tone system as arranging

the twelve notes of the chromatic scale "in any arbitrary order, at will," even characterizing the

method as a means to create "nightmarish" music.[162] Joseph Straus's technical history of American

serialism does not list Bernstein as a practitioner.[163] However, while it is true that Bernstein was

frequently negative about twelve-tone music in many of his lectures, he appears to have spent some

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[160] In his "Introduction to Modern Music" lecture, Bernstein discussed the importance of composers writing "modern" music by reinvigorating the "same old notes music has always used." See Bernstein, "Introduction to Modern Music," 221–222.

[161] Giger points out Bernstein's usage of the rhetoric associated with the overtone series. Giger, "Bernstein's the Joy of Music as Aesthetic Credo," 318. In "Introduction to Modern Music," Bernstein invokes the idea of a primitive man vocalizing a signal note, and over time discovering the overtone series eventually creating the major triad and the major scale. Bernstein, *The Joy of Music*, 184–192.

[162] Giger quotes Bernstein from *The Joy of Music,* "In essence, it's simple. You take the twelve notes of the chromatic scale: and arrange them in any arbitrary order, at will. This is called a tone-row…" The word "nightmare" refers to Bernstein's conception of Vienna around Schoenberg's time "that same middle-European factory of the unconscious that produced Freud and expressionistic painting and nightmare poetry." Bernstein, *The Joy of Music*, 203, 204–205.

[163] Joseph N. Straus, *Twelve-Tone Music in America* (Cambridge, United Kingdom; New York: Cambridge University Press, 2009).

effort learning and composing with twelve-tone methods and he even included some serial music in

his New York Philharmonic concert programming.[164]

If Bernstein included a twelve-tone work in a concert, he often tried to guide audiences

through the piece or explain some elementary principles associated with serialism. In a 1958 New

York Philharmonic program preview, Bernstein describes the twelve-tone system of Schoenberg as a

procedure that creates "a sort of democracy of the 12 tones, whereby each one is equally important,

so there is no chief tone."[165] After briefly introducing the concept of a row, he goes on to describe

how the row is used in a composition:

> The row is then manipulated in every which way, turned upside down, backwards, and inside out, but always maintaining the order of that series of tones. This is what makes what is called serial music – (that's serial like a cliff-hanger, not cereal like Grape-Nuts). Of course, serial music gets much more complicated than this, but I'd need a blackboard and a month of lectures to go into it any further. But at least you know the basic principle.[166]

If only Bernstein *did* have a blackboard and a month of lectures on twelve-tone music, we would

know a great deal more about Bernstein's familiarity. Nonetheless, the "rules" that Bernstein

describes (backwards, inside out, etc.) should be taken less as descriptors of his working methods,

and more as a means to demonstrate the vast possibilities of twelve-tone music in a language that

was appropriate for a lay-audience. The "rules," as Bernstein described them, were fluid entities: in

the same pre-concert preview, Bernstein was careful to point out that composers who stemmed

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[164] See "Chichester Psalms," *Leonard Bernstein*, accessed April 16, 2016,

http://www.leonardbernstein.com/works_chichesterpsalms.htm.

[165] Bernstein, "Thursday Evening Previews Scripts: Three Pioneers [typescripts with Pasteovers of Musical Examples in Ink, & Emendations in Red, Blue & Black Pencil]." See also Bernstein's discussion of Schoenberg's method in his Harvard Lectures, Bernstein, *The Unanswered Question*, 277.

[166] Bernstein, "Thursday Evening Previews Scripts: Three Pioneers [typescripts with Pasteovers of Musical Examples in Ink, & Emendations in Red, Blue & Black Pencil]."

from Schoenberg, such Wallingford Riegger (1885-1961), nevertheless "found their own ways of breaking his rules."[167] Bernstein's typical aphorism of composers "breaking the rules" was a convenient way to promote the independent artistry of a composer and may have been used to combat the wide-held belief (a myth) of the algorithmic and academic rigidity associated with twelve-tone music.[168]

Some of Bernstein's more widely known twelve-tone pieces have served as evidence for Bernstein's distaste and naivety of twelve-tone music. For example, Bernstein parodied twelve-tone techniques in the piece "Quiet" in *Candide,* a show that was a box office disaster a year before *West Side Story* running only 73 performances in 1956. According to Helen Smith, "the use of such music demonstrates Bernstein's feelings about serial music, and he had obviously made his opinions clear, as Gottlieb describes the song as an 'inside joke of twelve-tone row in a song about boredom' (1997, p. 5)."[169] In Bernstein's third symphony, "Kaddish," Giger argues that Bernstein associates twelve-tone music with the concept of alienation, and the rebuilding of faith by transforming the twelve-tone row into a purely tonal melody.[170] In looking at the twelve-tone approaches in "Quiet" and "Kaddish" alone, Bernstein's twelve-tone approaches appear to trivialize the practice by using seemingly uninspired manipulations of a row to facilitate extramusical associations of boredom, alienation, or even fear. With regards to *West Side Story*, certainly serialism doesn't come to mind when we think its memorable show tunes such as "Maria" and "Tonight" and numbers such as "Mambo" and "America." Nevertheless, as I will show through analysis of "Cool Fugue," it is

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[167] Ibid.

[168] On the myth of twelve-tone academism and rigidity, see Straus, "A Revisionist History of Twelve-Tone Serialism in American Music."

[169] Smith, *There's a Place for Us*, 126.

[170] See Giger, "Bernstein's the Joy of Music as Aesthetic Credo," 315–16.

problematic to characterize all of Bernstein's twelve-tone pieces as trivial experiments or extramusical programmatic works.

In some of Bernstein's private letters and public statements, it is clear that he struggled with twelve-tone composition. In an article commemorating Copland's 70th birthday, Bernstein writes of Copland, "when he started writing twelve-tone I figured that it was inevitable--everybody has to fool with serialism. God knows I spent my whole sabbatical in 1964 in a desperate attempt at it: I've actually thrown away more twelve-tone pieces and bits of pieces than I have written otherwise."[171] In another press conference in 1977, Bernstein says that he "spent almost the whole year writing twelve-tone music and even more experimental stuff," but after six months of work, "threw it all away"; he explains, that "it just wasn't my music; it wasn't honest."[172]

Although Bernstein never declared the "Cool Fugue" a twelve-tone work, or a serial one, he had doubts about the piece that resonate with his earlier twelve-tone comments. Before *West Side Story*'s premier, Bernstein wrote to his brother who was stationed at a military posting in Puerto Rico, writing that, "I wrote a spic song called 'Maria' which may finally bring me to the jukeboxes, who knows. And one called 'Cool' which will never see a jukebox...."[173] Similarly, when it came time to show Jerome Robbins the "Cool Fugue," Bernstein reflected that, "There was only one moment when I was really scared to play something, it was the 'Cool' fugue. He liked it so much he freaked out. I was so happy."[174] Bernstein's letter to his brother and reflections about his collaboration with Jerome Robbins further invite a closer analysis of the piece examining the role of twelve-tone methodologies.

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[171] "An Intimate Sketch - Aaron Copland Collection - Collections."

[172] "Chichester Psalms."

[173] See Wells, *West Side Story: Cultural Perspectives on an American Musical*, 129.

[174] See ibid., 34.

By and large, Bernstein appears to have spent considerable time learning twelve-tone methods, but was either uncertain of the resulting pieces, or used the pieces for reasons other than serious composition. At first glance, the "Cool Fugue" appears as another piece that uses a naïve twelve-tone opening that quickly dissolves into a fugue. Helen Smith, for example, notes that the "Cool Fugue" begins with a twelve-tone row but then follows tonal fugal principles.[175] But without examining the entire fugue, it hardly seems fair to consider the "Cool Fugue" a twelve-tone serial piece from the first twelve-notes alone. As I reveal in the following analytical study, closer analysis reveals a more complicated and interesting story.

Although Bernstein did not often discuss serialism directly, the distinction between twelve-tone music and serialism is nebulous. As Richard Hermann, Irna Priore, and Joseph Straus have argued, American serialism takes astonishingly varied forms. Hermann defines "serial music" as having "at least one structurally significant dimension that is shaped by at least one of various kinds of ordering relations."[176] Priore, suggests that the term is used in music theory "to designate a compositional method that uses fixed order as its organization principle" and suggests that the "term often refers to the compositional practices of Schoenberg and his adepts, although it was known then as twelve-tone technique."[177] Straus defines serial and twelve-tone music in the "standard ways," noting that "serial music is music referable to a precomposed ordering of tones;

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[175] Smith, *There's a Place for Us*, 166–167. After observing the opening twelve tone row, Smith suggests that the answers starting pitches link with the end of the subjects for tonal reasons. I challenge a tonal reading in this chapter, instead favoring a global serial design.

[176] Richard Hermann, "Early Serialisms in the United States: Aspects of Theory, History, Analysis and Reception," *Theoria* (2011): 109. This essay was presented at the 2009 Society of Music Theory conference in Montreal, Canada in a special session entitled "Theories and Aesthetics: An Historical Reconsideration of Serialism as Practice." This article and Irna Priore's (next footnote) were published in the same volume.

[177] Irna Priore, "Theories of Histories of Serialism: Terminology, Aesthetics, and Practice in Post-War Europe - as Viewed by Luciano Berio," *Theoria* (2011): 73, accessed March 6, 2015, http://libres.uncg.edu/ir/uncg/f/i_priore_theoris_2011.pdf.

twelve-tone music is serial music in which the series consists of all twelve tones."[178] Accordingly, serialism as it refers to a compositional method does not necessarily require strict adherence to row forms, aggregate completion, pitch repetition, combinatoriality, or even "anti-tonal" goals. It is perhaps best to understand serialism as a system that foregrounds various kinds of ordering relations using a variety of approaches associated with twelve-tone music.

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[178] Straus, "The Myth of Serial 'Tyranny' in the 1950s and 1960s," 304.

Figure 5.1 "Cool Fugue" Snapshot

5.2 Analysis of the "Cool Fugue"

The "Cool Fugue" is a dance number that begins in the middle of "Cool" with the marking "Cool Fugue" in the score (See **Figure 5.1**, page 100). A jazz rhythm played by the drum kit on the hi-hat separates the opening material from the fugue, and sets the background rhythm that will persist throughout the fugue. The first subject consists of eight structural notes segmented into two four-note components as outlined in **Figure 5.1a** and **b**. As some authors have noted, the fugal subject appears to reference the subject to Beethoven's *Große* fugue, a symbolic reference to the highbrow, learned or "sophisticated" style.[179] After several trichordal flourishes (note how each are members of set-class 3-5), the answer enters in measure 58 as shown in **Figure 5.1d**. Strangely, the answer enters at D#, an augmented second, or three semi-tones away from the subject on C. As should be apparent, the subject and answer are not coordinated according to 18th century tonic and dominant paradigms. Instead, the entries of subjects and answers first pitches articulate a background structure of two interlocking tritones as shown in **Figure 5.2**.[180] Listening careful to how the subjects and answers are consistently orchestrated confirms this structural reading, as the subjects and answers receive different timbres. But, what do these interlocking tritones have to do with the row?

**Figure 5.2
Interlocking Tritone
Structure**

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[179] Lawrence Kramer discusses some of the implications for the parallel between Bernstein's "Cool Fugue" and Beethoven's *Große Fuge*. See Lawrence Kramer, *Interpreting Music* (University of California Press, 2011), 115; See also Stephen Banfield, *Sondheim's Broadway Musicals* (University of Michigan Press, 1993), 38. Audience reaction to Beethoven's *Große Fuge* during Beethoven's lifetime was "universally condemned" and likely continued for some time. See Robin Wallace, *Beethoven's Critics: Aesthetic Dilemmas and Resolutions During the Composer's Lifetime* (New York, New York: Cambridge University Press, 1990), 67.

[180] Helen Smith appears to be the first to note the coordination of two interlocking diminished seventh chords with the structure of the fugue. See Smith, *There's a Place for Us*, 166.

In my first encounter with the "Cool Fugue," I found myself focusing on the sharply defined four-note units. On first hearing, I thought the second four notes, as outlined in **Figure 5.1b**, articulated some sort of response or even answer to the first four notes in **Figure 5.1a**. To make matters more complicated, Jerome Robbin's choreography directly supports this segmentation: in the both film and Broadway versions of *West Side Story*, the characters mark the ending of each four note segment with some sort of physical or vocal gesture. However, when the chromatic countersubject line enters, as shown in **Figure 5.1d**, the initial four note segmentation becomes retrospectively interpreted as the entire fugal subject (or answer). The peculiarities of the two-part segmentation of subject invited me to look closer at the relationship between the two four-note segments, their relation to the opening twelve-tone row, and ultimately, their role in the serial design of the entire piece. As will soon become apparent, observing the relationship between the first two tetrachords reveals the serial structure that interacts with the unfolding fugal structure. To reveal the work's twelve-tone row, we need simply to reduce out the intermediary trichordal flourishes (each

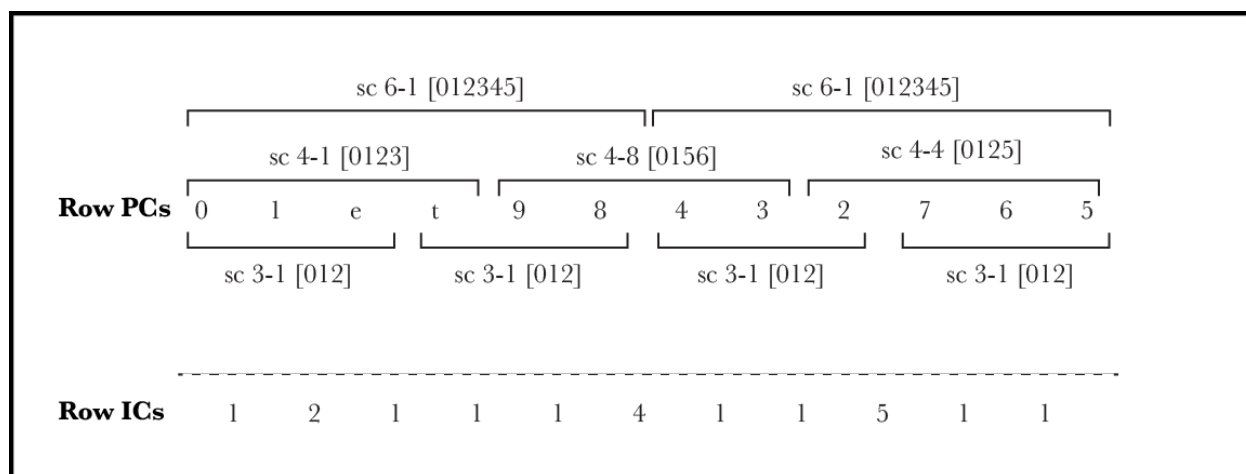**Figure 5.3 "Cool Fugue" Twelve-Tone Row**

Figure 5.4 Analysis of Adjacent Set Classes in the Twelve-Tone Row

members of set-class 3-5) expressed pianissimo between **Figure 5.1a** and **b** add the final four-note

figure from **Figure 5.1c** together. **Figure 5.3** shows this twelve-tone row on a staff and **Figure 5.4**

labels the discrete adjacent set-class content of the row. Some features of the row are noteworthy:

interval class 1 dominates, the row features two set-class 6-1 hexachords, and the four-note

segmentations are members of three separate tetrachordal set-classes.

5.2.1 Transposition Networks

Transposition networks (T-nets) offer a useful method for comparing the two four-note

components of the subjects and answers. **Figure 5.5a** and **b** model the first and second tetrachord

components of the subject, here labeled as Subject X and Y respectively. The starting pitch of each

of the two subject's tetrachords are circled as the bottom left node for each. Transposition arrows

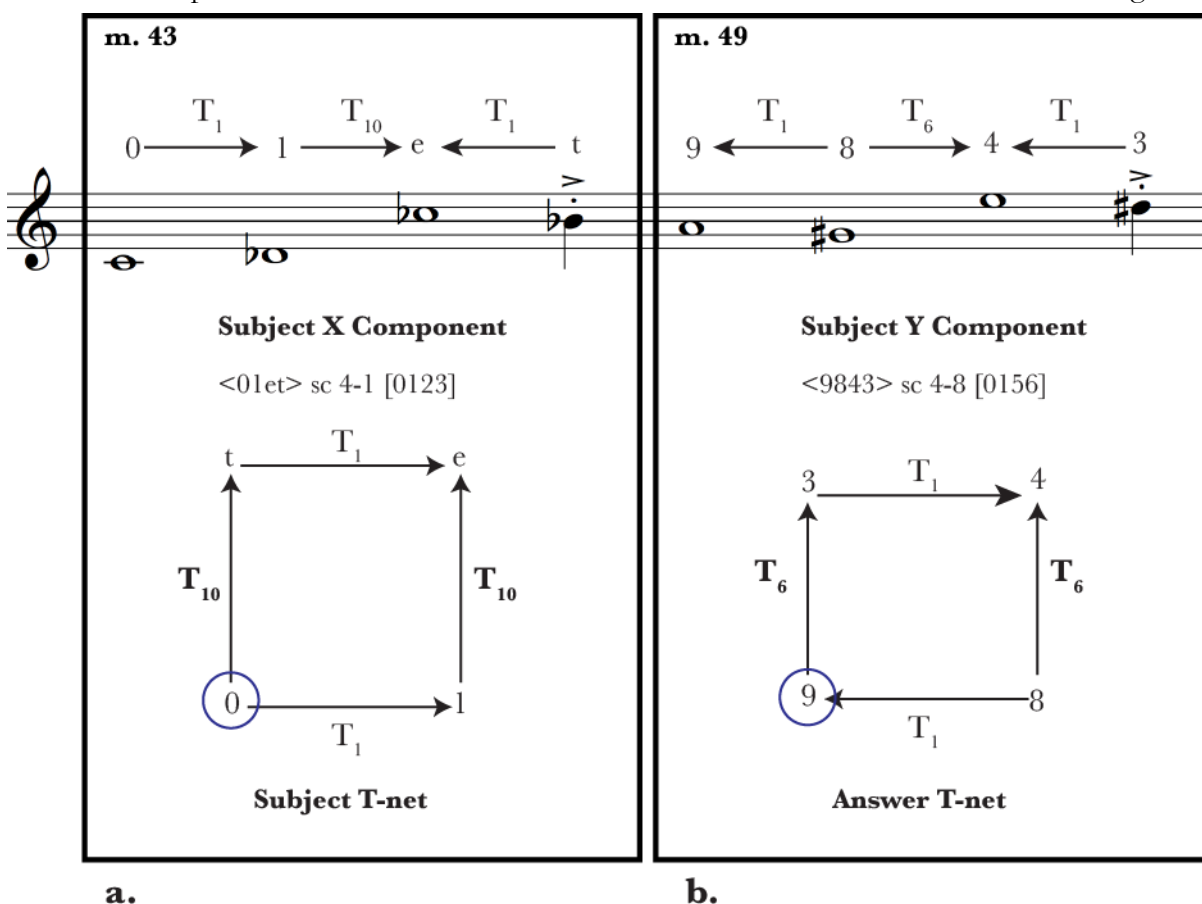are drawn to emphasize the direct audible intervals rather than the order of intervals. Although the

Figure 5.5 T-net Analysis of Subject

two tetrachords feature similar contours with emphasis on two ic 1s and a leap between the two, interpreting their differences reveals the serial structure that governs the piece as a whole.
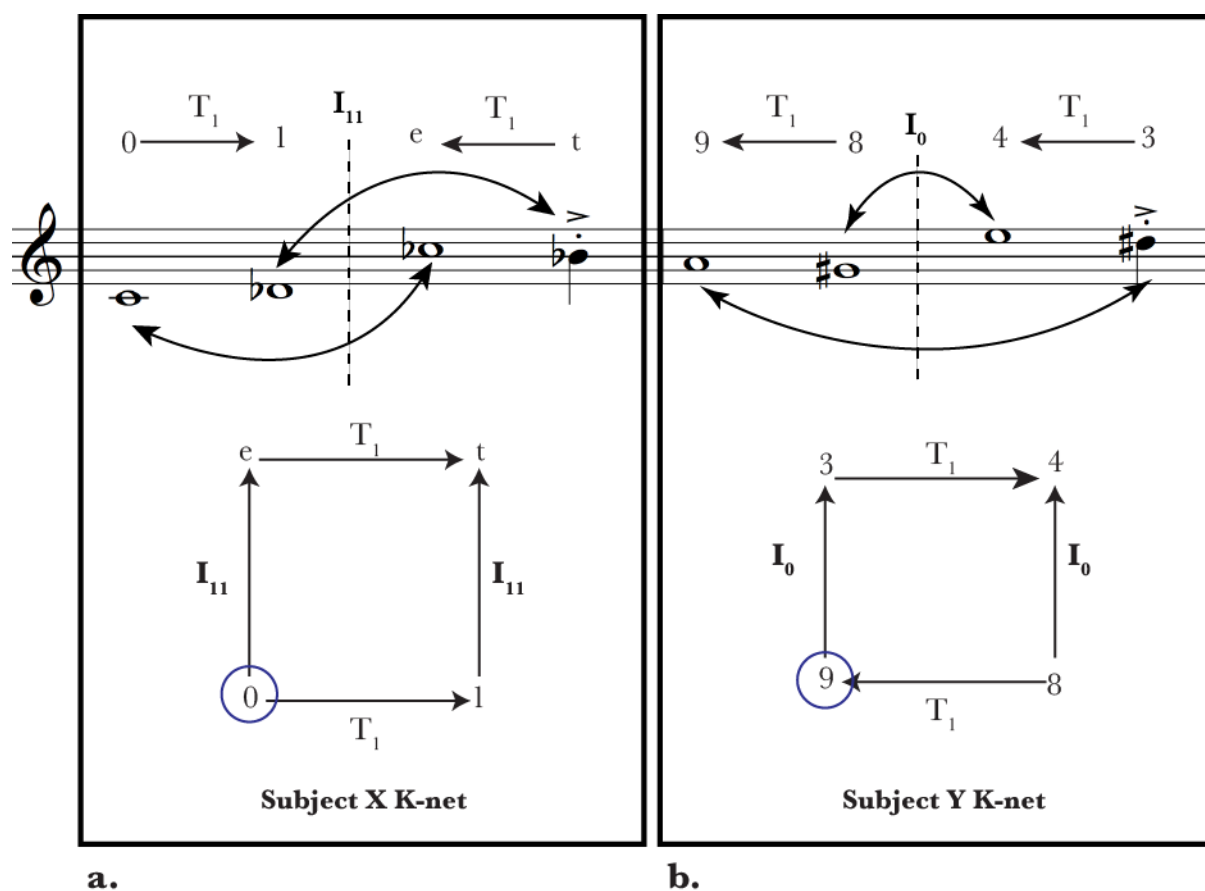
Figure 5.6 K-net Analysis of Subject

5.2.2 Klumpenhouwer Networks

The large leap between each two-note dyads allows a listener to segment the two X and Y components into two separate units related by a leap.[181] Separately organized, the two dyads can be interpreted as inversions of one another most easily modeled by the Twelve-Tone Operator (TTO),

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[181] One could easily define a pitch criterion ($C_{pitch>1}$) that would describe this segmentation. See Dora A. Hanninen, *A Theory of Music Analysis: On Segmentation and Associative Organization* (Rochester, NY: University of Rochester Press, 2012), 35–39.

[182] I_n (or equivalent T_nI) as modeled in **Figure 5.6**.[183] In this interpretation, the top two notes "respond" to the bottom two notes. For the X component, the bottom two notes are related to the top to by I_{11}. Similarly, the bottom two notes of the Y component are related to the top two notes by I_0. As can be seen by comparing **Figure 5.5** with **Figure 5.6**, replacing the vertical arrows of **Figure 5.6** and moving the nodes so the Transposition operators align results in two K-nets in **Figure 5.6**.

K-nets best model wedging between successive set-classes (as shown in **Figure 5.7**) that are (frequently but not always) different set-classes. K-nets model precisely this relationship between the X and Y components of subjects and answers in the "Cool Fugue." Because the transposition arrows articulate the same values and the inversion axes are related by some constant difference, the two networks modeling components X and Y are said to be *positively isographic networks*.[184] The *n* difference between the inversion arrows (vertical arrows) I_{11} and I_0 is 1 ($11+n=0(mod(12))$, n=1). As
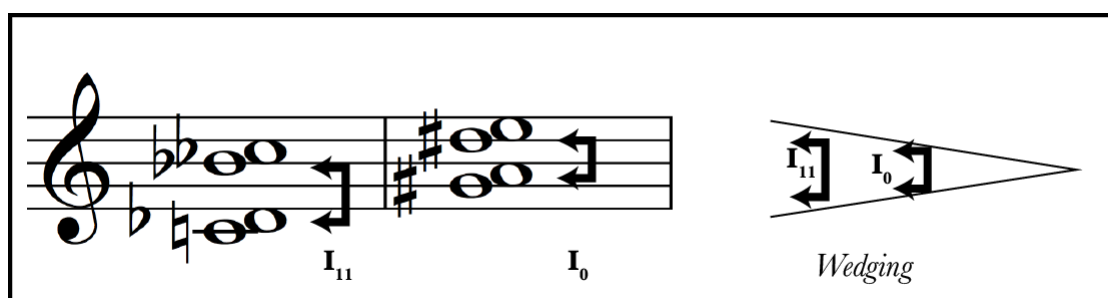

Figure 5.7 X and Y Component Wedging

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[182] Twelve-Tone Operators operate on sole pitches and pcs, or on pitches and pcs in sets and segments. The standard TTOs are Tn and TnI (also written In), as well as the multiplicative operators TnM and TnMI, which make for a total of 48 TTOs. I use the 12 Tn and TnI operators (24 total) exclusively in this thesis. See Robert D. Morris, *Class Notes for Atonal Theory* (Hanover, NH: Frogpeak Music, 1991), 16. For an introduction to Transposition (Tn) and Inversion (In or TnI), see Straus, *Introduction to Post-Tonal Theory*, 38–48.

[183] One might be inclined to hear the subject as first a dyad separated by a half step, and a retrograde response after the leap (a half step in the other direction). However, this interpretation does not hold in the answer. As will soon be apparent, an inversional interpretation allows a more powerful and inclusive interpretation to emerge.

[184] Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them."

a result, we can relate the two K-nets with the hyperoperator $<T_1>$, where $<T1>$ is a notational

simplification of Lewin's $<1,1>$ Hyperoperator as shown in **Figure 5.8**.[185]

The hyperoperator $<T_1>$ represents the clockwise shift of the inversion axis between subject

and answer by one clockwise clock tick or the difference between I_{11} and I_0 inversion axes read

clockwise as shown in **Figure 5.9**.[186] In this figure, dashed lines indicate the axis of inversion and

solid lines show pc mappings. A K-net interpretation explains not only how the X and Y

components are related, but also what causes their differences. Note that an odd value for $<T_n>$

causes a change in sc, whereas an even value for $<T_n>$ does not.
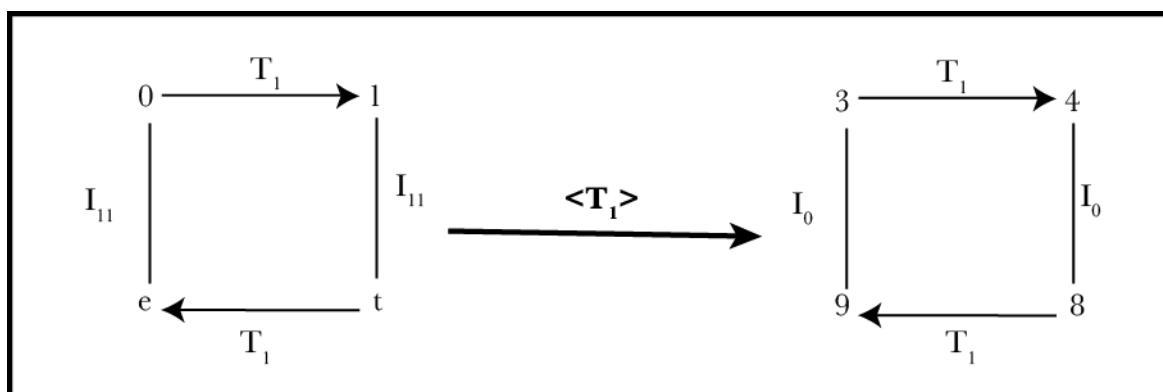
Figure 5.8 X and Y Components K-net Isography

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[185] $<T_1>$ is a simplified notation for David Lewin's $<1,1>$ hyperoperator. T substitutes for the first position indicating transposition, and the subscript n of T_n takes the value of the second digit (in this case, 1). See Xavier Hascher, "Using K-Nets Towards a Transformational Analysis of Schoenberg's Op. 19, No. 4," in *Proceedings of the Symposium Around Set Theory: A French / American Musicological Meeting, IRCAM, October 15-16, 2003* (Paris: Delatour;Ircam-Centre Pompidou, 2008), 49–96.

[186] For a critical look at Klumpenhouwer Networks, see Buchler, "Reconsidering Klumpenhouwer Networks."

We can extend the K-net interpretation to discuss aspects of structure in the entire "Cool Fugue." But before doing so, briefly recall the structural characteristics of set-class 3-5 (016); see chapter two, section 2.1 **Figure 2.2**. All three of Bernstein's motives, the *shofar*, Maria, and Cool articulate three transpositions, T_1, T_5, and T_6, where one transposition of the three is the distance between the first and last note. A network interpretation of set-class 3-5 is given in **Figure 5.10**.
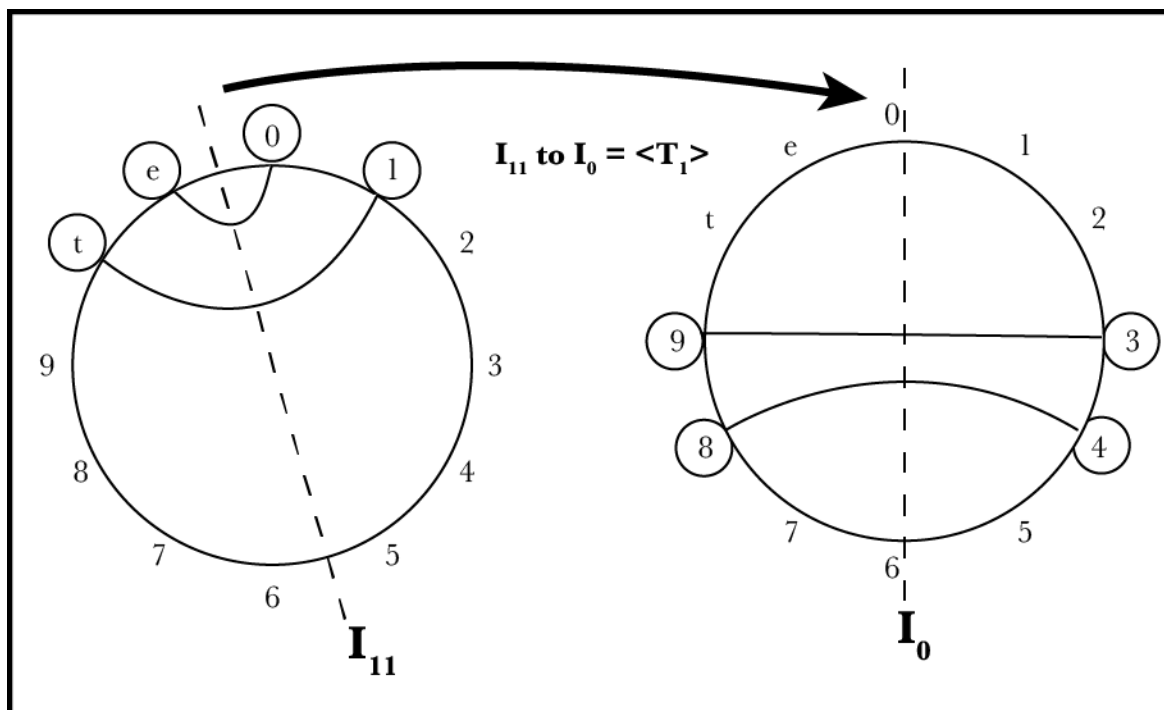
Figure 5.10 Shifting Axes of Inversion
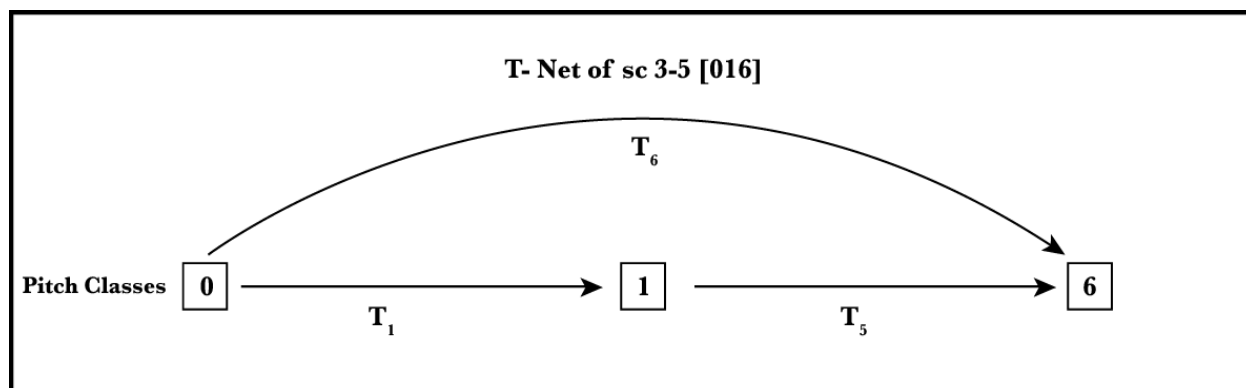
Figure 5.9 T-net of Set Class 3-5 (016)

In a similar fashion to **Figure 5.10**, we can create a network of K-nets with the first three entries of subject components and the next answer component respectively (four-note units beginning in measures 43, 49, and 58). See **Figure 5.11** These networks are *positively isographic*, and are related by hyperoperators $<T_1>$ between Subject components X and Y and $<T_5>$ between Subject Y and Answer X. If we recognize the Subject and Answer forming a compositional module, the hyperoperator $<T_6>$ explains the total inversional shift between successive Subject-Answer modules, much like T_6 is a sum of T_1 plus T_5.

Figure 5.11 K-net of X and Y Components

Because the hyperoperator group $\langle T_n \rangle$ is isomorphic[187] to the T_n group, **Figure 5.10** and

5.11 are said to be *strongly isographic permutation networks*.[188] In essence, the isomorphic edges

(operations) describe a hierarchical network of networks. Note too how the individual K-nets closely

model the X and Y components of subjects and answers (see **Figures 5.7-9**) and therefore avoid the
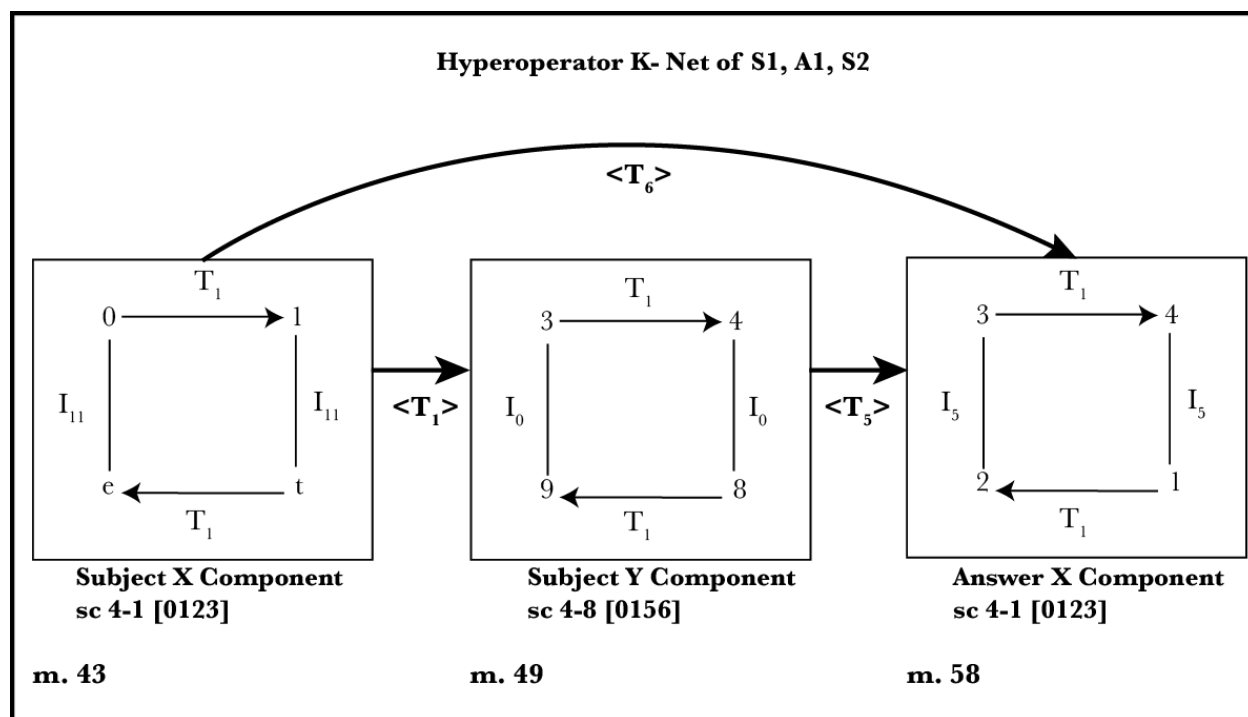
typical charges set against the use of K-nets.[189]

The parallel drawn here suggests that the relationships inside the "Leitmotiv" of the piece, a

trichord motive that is a member of set-class 3-5 [016], help to structure the layout and serial

compositional decisions of the fugue. More specifically, the T_n operators that model intervals in set-

class 3-5 (Class Transpositions T_1, T_5, and T_6 which can represent the ICV [100011]) are

reinterpreted as shifting Inversion (I_n) axes that structure not only the pitch structure of subject and

answers, but also the ordering of successive subject and answer entries. To be sure, the isography

highlighted here between networks of networks and networks of pcs requires an abstraction that

may seem unfeasible for a listener. It might seem difficult to "hear" shifting inversion axes as a type

of correspondence to intervals represented by transposition operations between pitches that form a

---

[187] In mathematics, two mathematical objects are said to be isomorphic if an isomorphism exists between them. An isomorphism is a function that transforms one group into another group of exactly the same structure as the first. An isomorphism describes how two structures can be mapped onto each other, such that corresponding parts (such as operators between nodes) play similar roles in their respective structures. An isomorphism exists between T_n and $\langle T_n \rangle$ such that the groups share the same structure, see the next footnote. For formal definitions of group isomorphisms in the context of music theory, see Robert Morris, *Class Notes for Advanced Atonal Music Theory* (Lebanon, N.H.: Frog Peak Music, 2001), 1.3.6.2.

[188] David Lewin proves this isomorphism formally in his introduction to Klumpenhouwer Networks. See Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them," 116–117. Lewin uses the term *strong isography*. In a private conversation, Jack Douthett suggested the term *strongly isographic permutation networks* to more precisely emphasize that it is the *permutations* that are isographic (and not the nodes on which they operate).

[189] The K-nets I have created closely model the inversion axes of X and Y components of the subjects and answers. As a result, the hierarchical network isographies are not a product of haphazardly chosen network configurations and therefore do not fall prey to "network promiscuity" problems. For a critique of K-nets and their potential for relational abundance (promiscuity), see Buchler, "Reconsidering Klumpenhouwer Networks," 32–41.

member of set-class 3-5 [016]. Therefore, at first glance, the network isography between a network

of networks and set-class 3-5 is not directly hierarchical, but poses a perceptual problem between

different kinds of relationships, here T_n and shifting axes of inversion represented by $<T_n>$.

Although reconciling inversion with transposition may seem troublesome, it is possible to

pose a perceptual solution when considering the specific characteristics of the pitch structure in

"Cool Fugue." By carefully considering the X and Y components of the subjects and answers, it is

possible to create a framework that details how this relationship participates in a larger aural reading.

In this regard, Lewin's comparison of K-net recursion to tonal hierarchy is appropriate here.

Consider a tonal piece that articulates the regions of a triad over the course of many measures

(harmonic regions represented by roman numerals I, III, and V expressing the chordal 1st, 3rd, and

5th of a triad respectively).[190] It is certainly difficult, if not impossible in some cases to aurally notice

that each region was projected or generated from the opening triad, especially in long pieces.[191]

Furthermore, the relationship between aspects inherent in the triad and key centers it supposedly

projects are of a different kind.[192] These problems aside, it is certainly possible that a composer

structured a piece with this in mind, and these observations are noteworthy. Furthermore, a listener

consciously aware, and with proper training, could potentially conquer this seemingly difficult aural

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[190] This is, in part, what Lewin suggests as a parallel. "The opening chord generates from its own internal structure a progression of chords that includes and follows the incipit chord. This is very like the situation in Rameauean tonal theory, where an opening tonic triad generates a rising-fifth progression in the fundamental bass through an aspect of the triad's own internal harmonic structure." Lewin, "Klumpenhouwer Networks and Some Isographies That Involve Them," 94.

[191] For some studies on the processing of hierarchical syntactic structure in music, see Koelsch et al., "Processing of Hierarchical Syntactic Structure in Music"; Cook, "The Perception of Large-Scale Tonal Closure."

[192] To hear the projection of a triad into tonal keys requires that we remember the initial key's fundamental. Given a triad, the chordal third and fifth are upper partials of the triad's fundamental. Key centers work a different way. If we have moved into a new key, say III, we do not hear the relationships in the new key in the context of the piece's "fundamental" (I) but rather the new fundamental represented by the root of III.

challenge of tonal projection, though the perceptual problem of "hearing" the "projection" from the triad remains. As should be apparent, a listener would have to correlate, and not simply hear, the hierarchical relationship between tonal centers and the initial triad that "projects" them. Queries concerned with "hearing" alone should also take these cognitive considerations into account.[193]

The relationship expressed by the network of networks (K-nets and hyperoperators) and the network of pcs (pcs and transposition arrows) might seem like it requires one additional level of aural abstraction from the triadic projection model. This is in large part due to T_n being translated into I_n, i.e. transposition becoming inversion. However, the relationships expressed by the network isographies are actually more entangled and less distant from the tonal relationships than we might initially presume. Before the discovery of Z-related set classes, set-classes were thought to be uniquely described by their interval content.[194] This method still works for set-classes that do not have Z-related set-classes, and allows one to describe a collection either with pcs or an ICV. For example, pcs 0,1, and 6 define set-class 3-5, but set-class 3-5 can also be defined by the ICV [100011] because there are no other trichordal set-classes that share the same ICV. If we interpret

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[193] These relationships could conceivably be consciously or subconsciously integrated. The word *cognitive* implies navigating and integrating structural, sonic, and contextual criteria. The issue at hand is complex and will not be developed further here. Consider Dora Hanninen's discussion on top down structurally informed listening where she explains how an orienting theory can be highly persuasive with regards to music perception. Hanninen, *A Theory of Music Analysis*, 427–429.

[194] Set classes with similar interval class vectors are rare and are expressed in Allen Forte's system as "Z related" set classes. When Z-related set classes are present, they pose a problem for the following discussion. The set classes involved in this study are *not* Z-related. The relationship between *operations* and *objects* underpins Lewin's *Generalized Musical Intervals and Transformations*. See John Rahn, "Review: Generalized Musical Intervals and Transformations," *Journal of Music Theory* 31, no. 2 (1987): 305; Ramon Satyendra, "An Informal Introduction to Some Formal Concepts from Lewin's Transformational Theory," *Journal of Music Theory* (2004): 99–141.

intervals as transpositions, it is straightforward to discuss Transposition Classes, and by extension, Transposition Class Vectors (TCVs). [195]

A TCV acts as another way to describe an ICV. Whereas an ICV recasts distances between objects (relationships expressed as semitone differences) into objects (intervals) in a modular system, a TCV uses the concept of "transposition classes" in a mod 12 system to describe set-classes by considering the transpositions, instead of the intervals, between pcs. For example, the TCV [100011] represents the class transpositions edges $\mathbf{T}_1$, $\mathbf{T}_5$, and $\mathbf{T}_6$, (where bold T's represent transposition class) or alternatively T_1 or T_{11}, T_5 or T_4, and T_6 on any three nodes (consisting of individual pcs or networks of pc sets). With pcs as nodes, TCV is exactly the same as an ICV. The advantage of a TCV over a traditional ICV is the idea that operators can operate on larger nodes with a variety of objects encapsulated in each node. For example, three trichords could act as the nodes that are connected by three transposition classes. Much like a particular ICV allows for only certain trichordal pc configurations, a TCV suggests that the three trichords can only be configured in certain configurations, much like a set class's ICV remains invariant when a set-class member is enacted upon by a TTO. Observing the transformations by transposition rather than the pcs themselves is similar to Lewin's suggestion in chapter 7 of GMIT where he writes, "Instead of thinking: 'I is the intervallic distance from s to t,' we can think: 'T_i is the unique transposition operation on this space that maps s into t.'"[196]

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[195] Another way to express the Unordered *class* T_n operators is by the logic operator XOR on two *n* values that sum to 0 mod(12). For example, unordered T_1, T_5, T_6 is equivalent to the ordered $T_{1\,xor\,11}$, $T_{5\,xor\,7}$, and T_6. XOR indicates "*exclusive or.*" In any configuration of the pcs, there can only be a T_1 *or* T_{11} but not both. Another way to express the XOR relationship is through subsuming the logic operator by observing interval classes 0-6. Thus, Operators T_1 and T_{11} are equivalent as Operator Class T_1. See subsequent footnotes.

[196] Lewin, *Generalized Musical Intervals and Transformations*, 157.

The idea of a TCV can be extended further. Recall that an ICV can represent a set-class (lacking an associated a Z-related sc). Just as a finite set of intervals represent a set-class, the relationships between the X and Y components in the "Cool Fugue" articulate a finite number of particular inversion axes shifts, which creates a certain compositional space (either $<T_1>$ or $<T_5>$ between X and Y components and $<T_6>$ between successive Subject-Answer modules). Therefore, in a manner similar to the way an ICV characterizes the sound of a particular sc, we can define a "Transposition Class Hyperoperator Vector" (TCHV), here [100011] that characterizes the compositional structure of the "Cool Fugue." In this vector, each integer represents the shortest distance between one inversion axis to the next inversion axis. This movement can be most easily visualized on pitch-clock faces, formalized by positively isographic Klumpenhouwer Networks and $<T_n>$ hyperoperators, which are isographic with the T_n TTO. In the "Cool Fugue", the inversion axes move by either $\{<T_1>, <T_5> \text{ or } <T_6>\}$, thus, the TCHV is [100011]. In essence, the notion of an TCHV recasts the inversion axes relationships as a vector. Said in this way, the inversion relationships that structure the four note segments modeled by the TCHV [100011] are isomorphic to the intervals (relationships) that describe set-class 3-5 [016] with ICV [100011].

A few more remarks on the perceptibility of different transposition hyperoperators are useful. Given a particular context, Brian Alegant (1999) suggests that it is possible to distinguish between set-classes that have either even or odd axes of inversion.[197] Thus, every odd shift of an inversion axis $<T_1>$, $<T_3>$, or $<T_5>$ changes the axis to even or odd, which aids the perceptibility of each separate X and Y component. As I have noted, the X component has an odd axis of inversion, and the Y component an even. To this I add the fact that the X component can *only have* an odd axis, and the Y component an even if they are to remain members of their respective set-

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[197] Brian Alegant, "When Even Becomes Odd: A Partitional Approach to Inversion," *Journal of Music Theory* 43, no. 2 (1999): 199–200.

classes. Thus, to move from component X to Y, the axis of inversion must shift by an odd Transposition Hyperoperator Class, either $<T_1>$, $<T_3>$, or $<T_5>$.[198] Furthermore, to get from the Y component back to the X component, the axis must be odd again. In short, the addition of an odd integer to another integer shifts the integer either odd to even, or even to odd. Adding an even integer preserves the original integers odd or even status. By considering the perceptual possibilities of even versus odd set-classes, and recognizing the finite set of X and Y components, the THCV [100011] describes how the entire structure of the "Cool Fugue" is structurally related to the central *Leitmotiv* of the piece that is a member of set-class 3-5 with ICV [100011].

To visualize this discussion, consider **Figure 5.12**. In this figure, the X components are placed on the top row, and the Y components on the bottom row using pc clock-faces. **Figure 5.13** shows the same diagram, but with $<T_n>$ operators depicting the shifting axes of inversion. If we isolate the X component, it is easy to see how the pitches shift around the pitch clock face through each rotation of the axis by $<T_6>$ (see the top arrows of **Figure 5.13**). The fugue ends after all twelve pcs have been activated by the X components and subsequent Y components, a cumulative distance of $<T_6>$. Because $<T_6>$ when done twice returns the axis to its original (it is an involution), we can structurally divide the fugue into a first and second half consisting of two subject-answer modules each, see **Figure 5.14**. Note the $<T_6>$ dashed arrows that move from each subject module to the following answer module. Before we end this analysis, let us reinforce some of these network interpretations by modeling the X and Y components of the entire fugue with Hook's *Uniform Triadic Transformations*.

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[198] Because the axes operate in mod 12 space, the Transposition Operator Class describes the shortest distance of rotation. For example, class $< T_1>$ subsumes both $<T_1>$ and $<T_{11}>$. As a result of this using classes, we lose whether the axis shifts clockwise or counterclockwise, a facet that seems to be of little consequence for this particular analysis.
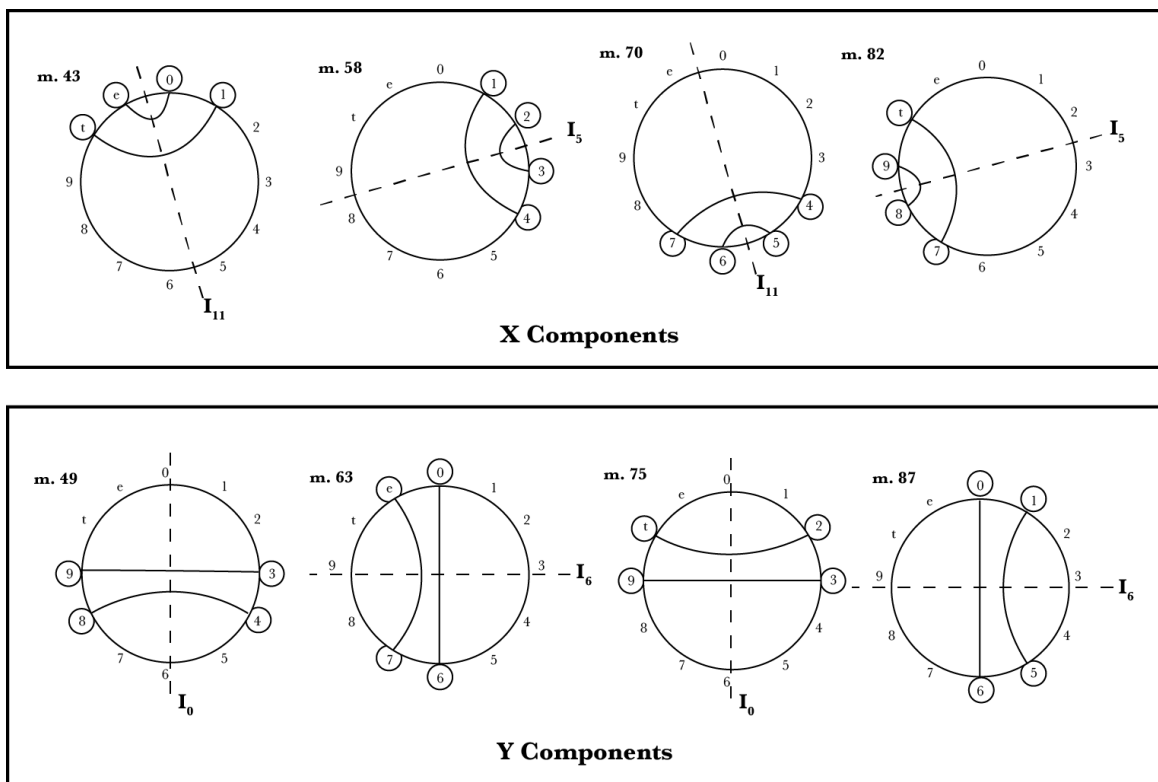
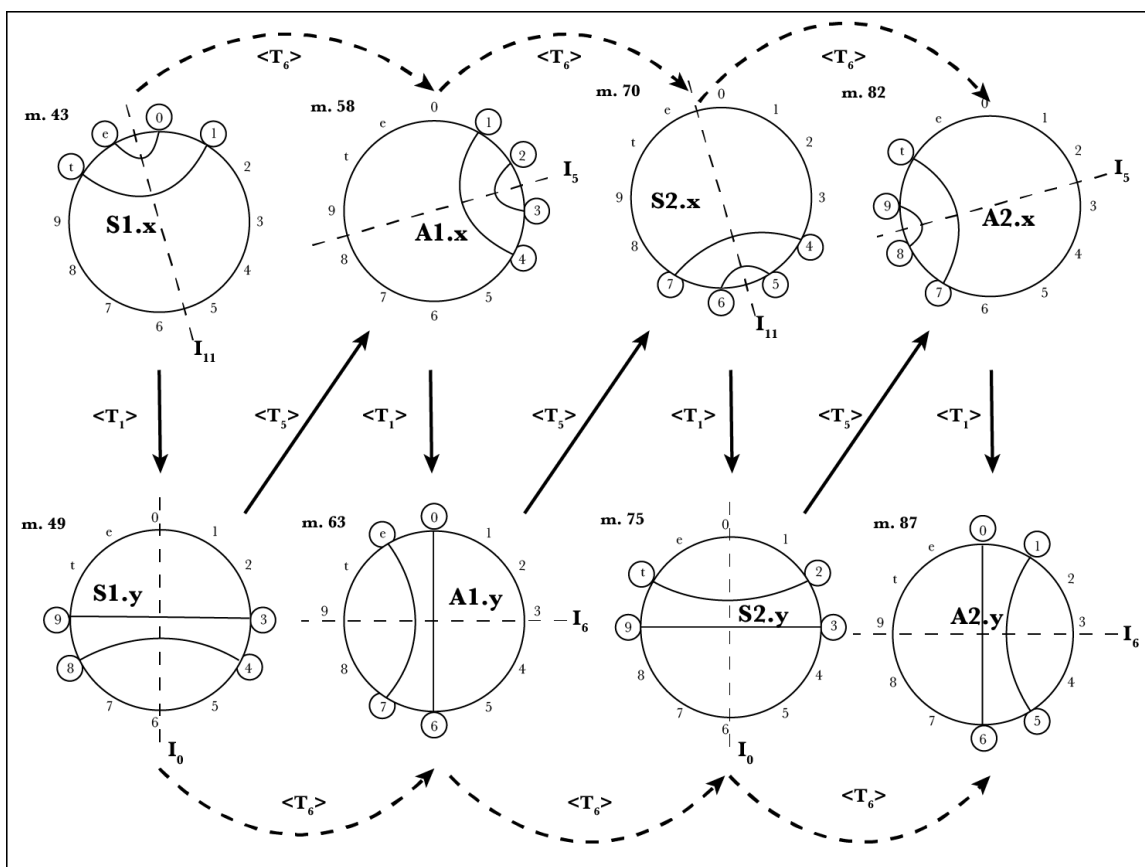**Figure 5.13 X and Y Components on Pitch-clock Faces**

Figure 5.12 T-Hyperoperators Representing Shifting Axes of Inversion
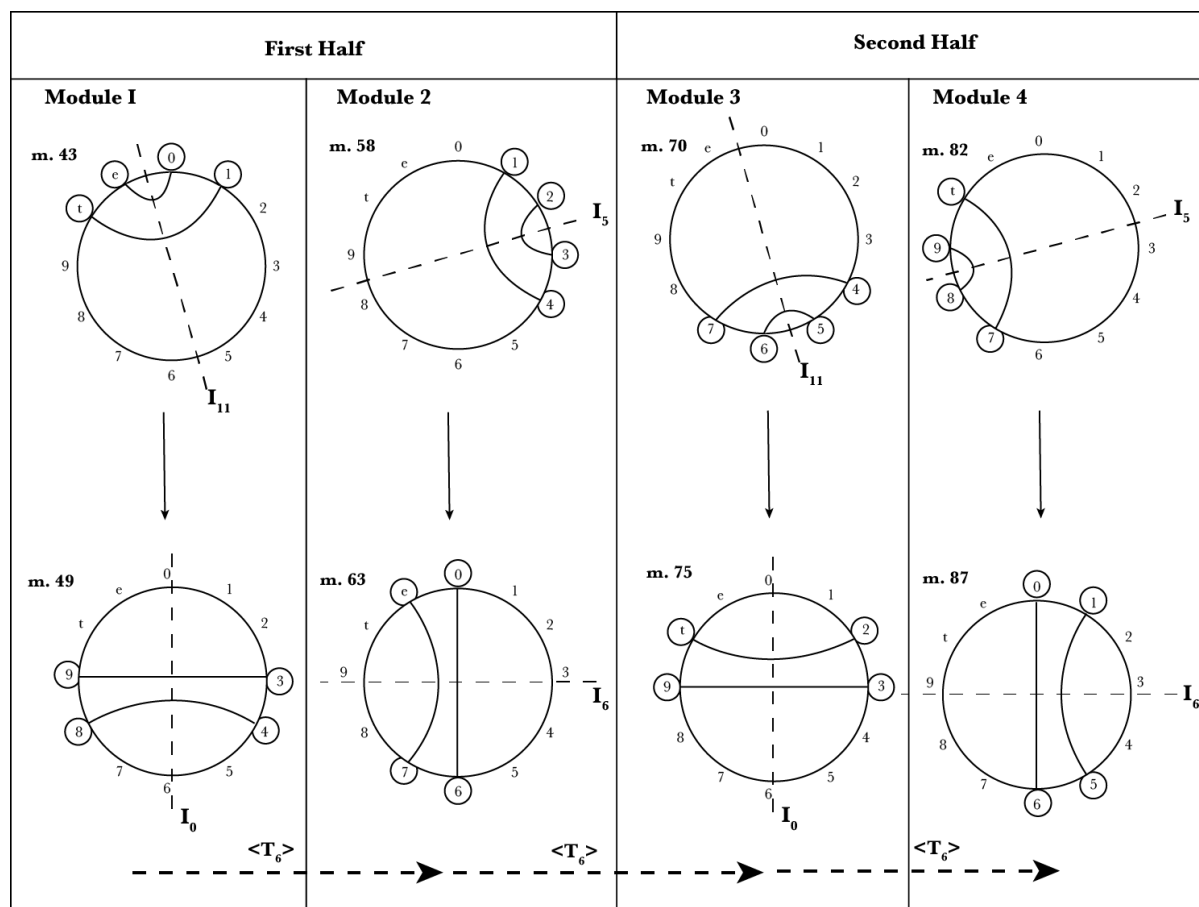
Figure 5.14 Subject and Answer Modules on Pitch-clock Faces

5.2.3 Uniform Triadic Transformations

Recall that a UTT is a triple-order function U that acts on musical objects, Delta (refer to chapter two, section 2.2.2). To model the "Cool Fugue," we only need to change the musical object Delta, upon which the function U operates. In place of triads, the objects of interest, Delta, become the X and Y components of the subjects and answers. To visualize this configuration, consider **Figure 5.15**. The top part of the figure lays out every X and Y component, which become mapped onto the X and Y circles below (see the first two circled components and the arrows that show their mapping). The plus mode represents the X components (on the left circle) and their transpositions. Likewise, the minus mode represents the Y components and their transpositions (right circle). Mode

switches (a minus sign in the first position of the function U) flip between the two circles, and the t+ and t– numbers (second and third terms) in the function represent transposition levels once a switch has occurred. I have circled the particular X and Y components found in "Cool Fugue" and labeled them (S1.X= 1st Subject, X component, A1.X = 1st Answer, X component, and so forth).
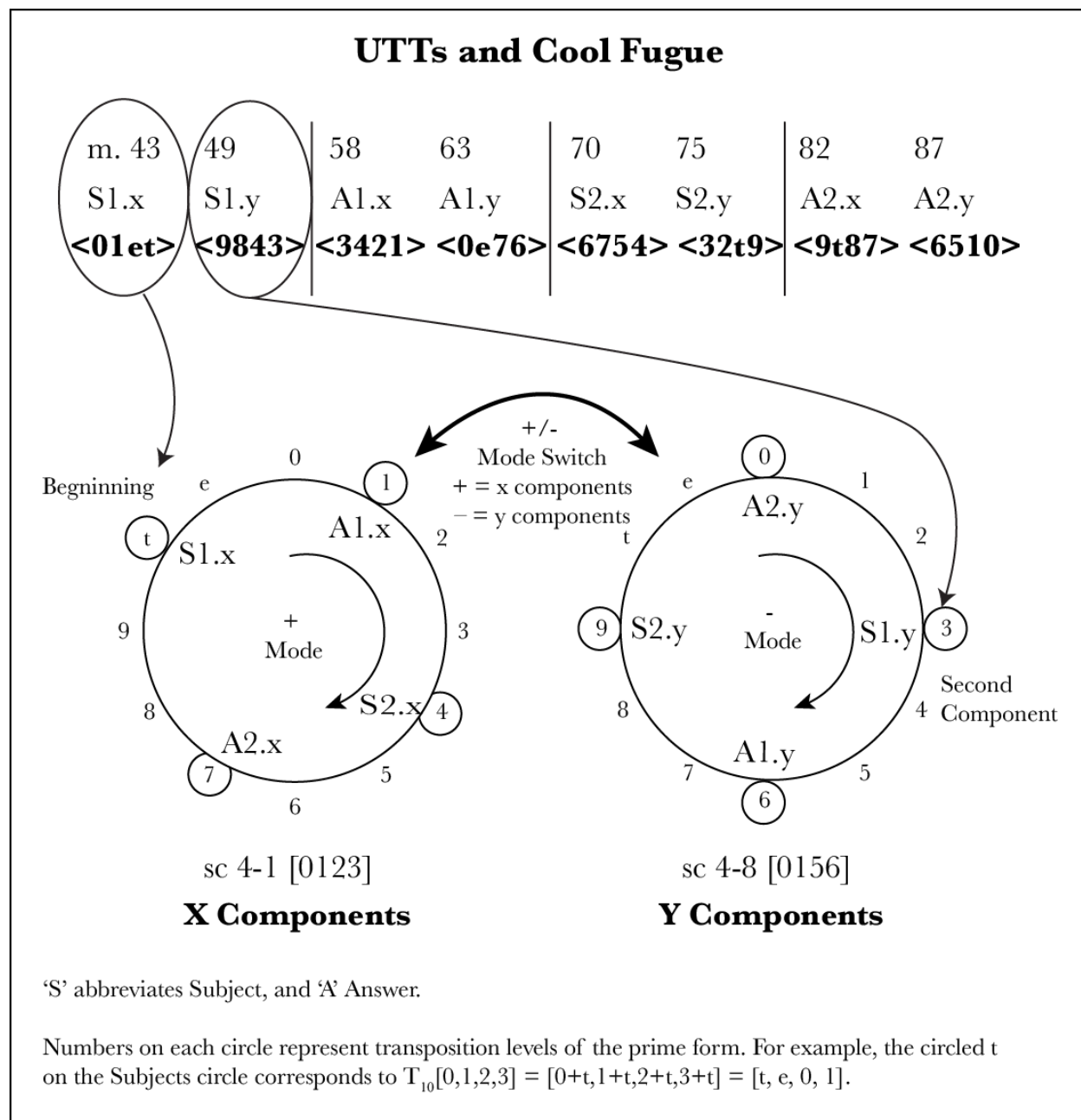

Figure 5.15 UTT Model of "Cool Fugue"

Having replaced the triad circles with X and Y components, we need to find the proper UTT(s) U

that describes the alternating X and Y components that interact with the subjects and answers.

There are two functions sets of functions that model the entirety of the fugue. Both UTTs

are mathematical groups of order eight.[199] This property insures that the UTT function U does not

generate X or Y components besides those present in the fugue, as there are only eight total

components (four X components, and four Y components as shown in **Figure 5.13**). The UTTs

that model the "Cool Fugue" are <–, 5, 10>, a cyclic abelian group, and <–, –2, 10> & <+, 3, 3>,

an Abelian group. The UTT function, U = <– , 5, 10> is perhaps the most elegant; because the

group is generated from one generator, it is cyclic, and because it is cyclic, it is Abelian, which means

that applying the group operation does not depend on the order in which they are written.[200] In

practice, once we select the first X component—the S1.x component, which is *Delta* = (+, t)—we

can model alternate component entries of the subjects and answers in their entirety by applying the

function U = <– , 5, 10> recursively to *Delta* (repeatedly applying the function to *Delta*). Because

the UTT forms a group, it will not create subjects and answers outside those present in the "Cool

Fugue." That is to say, after eight iterations of applying the function U, the original subject will

return. The basic algorithm is as follows:

1. Define the plus mode to be the prime form of set-class 4-1 [0123] and its transpositions
   (0-11)
2. Define the minus mode to be the prime form set-class 4-8 [1256] and its transpositions
   (0-11)

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[199] For formal definitions of groups in the context of atonal music theory, see Morris, *Class Notes for Advanced Atonal Music Theory*, 1.3–1.3.6.7.

[200] On the words cyclic and abelian, see Robert Morris, *Class Notes for Atonal Music Theory* (Hanover, N.H.: Frog Peak Music, 1991), 1.3.5.5.

3. Select the starting X component of the subject, *Delta* = (+, t), i.e. S1.x, and begin applying the function $U = <-, 5, 10>$ to generate the following four-note components. See below:

    a. S1.x = (+, t)

    b. S1.y = <–, 5, 10>(+, t) = (–, 3)

    c. A1.x = <–, 5, 10>(–, 3) = (+, 1)

    d. A1.y = <–, 5, 10>(+, 1) = (–, 6)

    e. S2.x = <–, 5, 10>(–, 6) = (+, 4)

    f. S2.y = <–, 5, 10>(+, 4) = (–, 9)

    g. A2.x = <–, 5, 10>(–, 9) = (+, 7)

    h. A2.y = <–, 5, 10>(+, 7) = (–, 0)

    i. END

As shown above, by recursively applying the function *U* to the objects *Delta* (the X and Y components), it is possible to generate the entire fugue. In essence, the function describes alternating subject and answer components, each rotating around their own modular twelve circle. The fugue completes after the components return to their initial positions—a property encapsulated in the group structure of the permutation group of order eight. Remarkably, the consistent presentations of X and Y components allow the fugue to be modeled with a single mathematical function with a meaningful group structure. Furthermore, the plus and minus modes reinforce the even and odd axes of inversion between X and Y components crucial to the K-net interpretation.

5.3 Conclusion

A few remarks about the etymology of the word fugue prove useful. The Latin word *fuga* from which *fugue* derives, is closely related to both *fugere:* 'to flee', and *fugare* 'to chase.'[201] Considering

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[201] Paul M. Walker, "Fugue," *Grove Music Online.*

a mod(12) pitch-class system, circular metaphors such as those suggested by UTTs are strikingly appropriate to describe the serial structure of this fugue. The "Cool Fugue" does not follow paradigms of traditional Renaissance or 18th century fugal theory. Instead, it can be described as a *serial* fugue whereby the X and Y components chase each other around the mod(12) circles to complete the twelve-tone aggregate. Carefully observing the serial structure reveals a type of imitative circular canon—a serial analogue for traditional renaissance fugal procedures.[202]

The final key to the twelve-tone serial puzzle can be inferred from **Figure 5.16** and **Figure 5.17**. **Figure 5.13** is organized into three boxes: the top box lays out each subject and answer component chronologically; the middle shows how the two twelve-tone sets are formed by accounting for the linking pitches between subject-answer modules; the lowest box shows how the
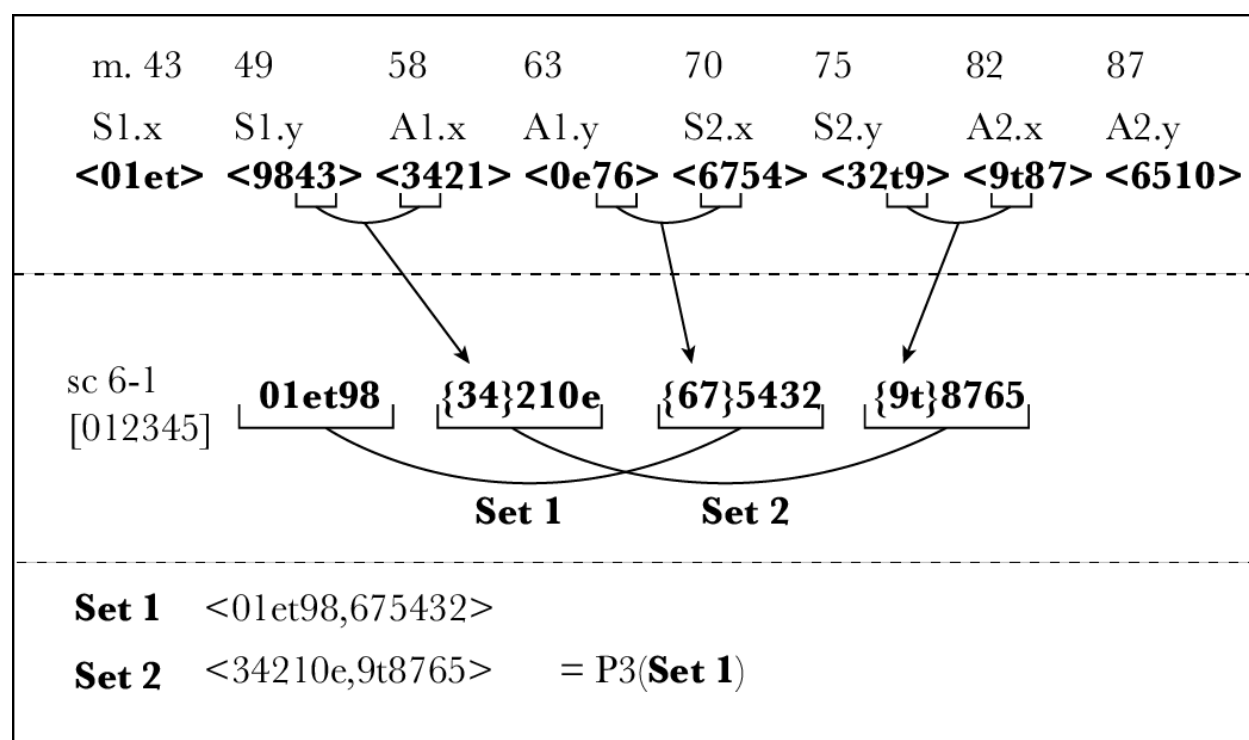
Figure 5.16 Serial Structure of "Cool Fugue"

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[202] Using renaissance terminology introduced by Zarlino, we might want to suggest the term circular *Imitatione legata*. *Imitatione legata* differs from *fuga* as the *consequente* reproduces only approximately the rhythms and intervals of the *guida*, and continues to do so until the end. See Walker, *Theories of Fugue from the Age of Josquin to the Age of Bach*, 10.
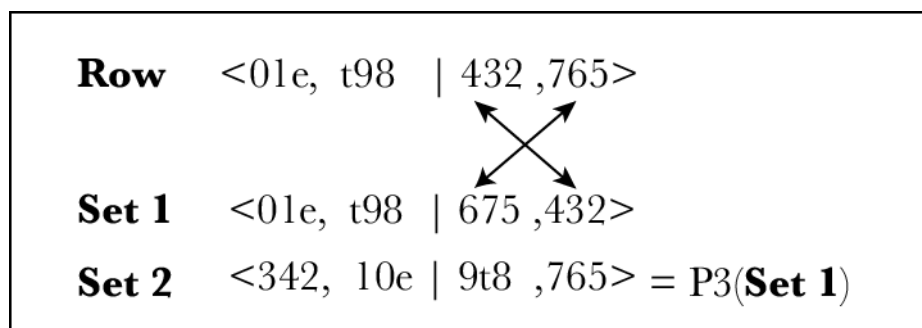
Figure 5.17 Twelve-Tone Row Relations

initial row corresponds to the two sets shown in the middle box. Note how the last two notes of

each Y components link to the subsequent X components forming two interlocking twelve-tone sets

that are closely related to the opening row. In the initial row (see **Figure 5.3**) the last four notes do

not act as X or Y components. If we assume the opening articulates some sort of 'C' centric

grammar, the final four notes iconically represent an embellished dominant seventh harmony (G7),

which acts as a symbolic reference to a dominant preparation for the upcoming answer. Once this

has completed, the last four notes are rearranged in order to maintain the tight-knit twelve-tone

structure. Despite Bernstein's seemingly negative outlook on American serialism, the carefully

woven serial structure hardly seems coincidental.

With the "Cool Fugue" in *West Side Story*, Bernstein introduced a new level of compositional

sophistication to the American musical. Although I don't think it is necessary to include Bernstein

on lists of American serial composers, it is noteworthy to recognize that he wrote twelve-tone pieces

that go beyond seemingly naïve parodies. In the absence of a tonal structure, we can interpret the

"Cool Fugue" as a type of twentieth-century fugal parallel—one that accomplishes the essence of

fugal design through mirror symmetry, shifting inversion axes, particular intervallic saturation and

ordering relationships. Not only did Bernstein "modernize" the "old fashioned notes music has

always used," he also modernized the "old fashioned structures," such as fugue, with twelve-tone

techniques.[203] It is surprising that Bernstein included a fugue in the popular Broadway musical, a composition many consider the most epitome of "highbrow" art.[204] That it also features a serial design is even more remarkable.

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[203] Bernstein, "Introduction to Modern Music," 221–222.

[204] Myers, "Prelude, Fugue and Riffs."

Chapter 6 Conclusion

6.1 Semiotics and Post-Tonal Theory

Just as Schoenberg was unaware of the vast majority of modern post-tonal theory, it is highly unlikely that Bernstein was aware of much—if any—of the formalized theoretical tools used in this thesis used to interpret his music.[205] Although post-tonal theory is widely used to analyze Schoenberg's music, Bernstein might appear to be a less likely candidate for post-tonal theory considering his didactic lectures and their emphasis on reviving tonality (see chapter one, section 1.3-4). However, as I have shown, coupling post-tonal theory with semiotics offers a combined theoretical foundation for understanding several pieces in *West Side Story*. Furthermore, considering Gottlieb's characterization of Bernstein's intervallic compositional approach (see chapter two, section 2.1), my approach may offer insight into many other pieces in *West Side Story* and his compositional *oeuvre* in general.

Several of the analytical approaches used in this thesis can be expanded into larger theoretical constructs. The use of semiotics in a post-tonal framework is ripe for further development. Currently, in music theory scholarship, semiotics helps analysts describe how extramusical topics give rise to musical meanings.[206] Kofi Agawu, for example, draws upon the topics and styles developed by Leonard Ratner and uses Schenkerian methodology to discuss how particular topics interact within tonal structures. In this thesis, I use a similar approach in some

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[205] Schoenberg was unaware of the mathematical theories being attributed to his works and was opposed to overly systematic or algorithmic composition. See D. L. Crawford, "Arnold Schoenberg in Los Angeles," *The Musical Quarterly* 86, no. 1 (March 1, 2002): 32.

[206] See for example Monelle, *The Sense of Music*; Ratner, *Classic Music*; Nattiez, *Music and Discourse*; Agawu, *Playing with Signs*; Nöth, *Handbook of Semiotics*, 429–434; and Robert Hatten, *Interpreting Musical Gestures, Topics, and Tropes: Mozart, Beethoven, Schubert* (Bloomington, Indiana: Indiana University Press, 2004).

instances, but with post-tonal theory. What is new, I believe, is the use of semiotics to discuss compositional grammars as abstract musical sign systems themselves, and the use of semiotics to discuss how different grammars relate or reference one another. In addition, I use semiotics to offer insight into cross-modal alignments, for example indexical alignments of stage action with musical objects, in order to interpret particular compositional decisions, especially in the context of transformational theory. In the context of multimedia artworks, semiotics allows an analyst greater insight into transformational networks.

In addition to enabling more sophisticated multimedia analyses, semiotics offers a framework for separating musical lexemes (musical objects such as triads) from musical syntax (a system governing the placement of musical objects, such as tonality), which proves especially powerful for interpreting some twentieth-century music such as *West Side Story*. A language analogy proves useful: it is not enough for a speaker to simply use the lexicon from the English language to speak *in* English; speaking *in* English requires that a speaker use the English lexicon according to proper English syntax. In musical terms, after separating a particular musical lexicon from a syntax, semiotics can act as a powerful mediator for explaining compositional grammars that reference or relate to other grammars. In the case of *West Side Story*, semiotics with post-tonal theory offers a method to avoid ambiguous or strained tonal readings without completely sacrificing references to tonal idioms. As I argue in chapter three, in "The Rumble," triads do not operate in a tonal syntax, but there are moments that appear to iconically or indexically reference tonal idioms such as cadences.

6.2 Bernstein's Roles

It is troublesome to directly conflate Bernstein's role as a composer with his other careers as an academic, music educator, and conductor. As summarized in chapter one section 1.4, scholarship

has largely over-emphasized Bernstein's didactic lectures as evidence for his supposedly naïve tonal compositional approach. As my analyses of "The Rumble" and "Cool Fugue" reveal, Bernstein's compositions do not always directly agree with his public manifestos. While some of his oversimplifications can be explained as a means to "disarm an audience"—a method to introduce a potentially complicated concept in a humorous and therefore less intimidating way[207]—some of his statements are more problematic and require further research.

Detailing the eclectic mix of compositional syntaxes besides tonality, such as post-tonal centricity and serialism in *West Side Story,* invites questions about Bernstein's didactic goals. Further research into Bernstein's music and lectures, and twentieth-century reception history could help decipher why Bernstein's lectures differed, sometimes considerably, from his own compositional results as revealed here. If his 1966 "Introduction to Modern Music" was intended to act as an aesthetic credo for future works, why did Bernstein include pieces that are directly at odds with his conclusions?[208] What caused Bernstein to passionately defend tonality in his lectures, while he simultaneously used a variety of other approaches in his own compositions? Did Bernstein not know that he was following other compositional grammars, or were his lectures simply sleight of hand to promote his own music? The situation is more confounded when we begin to recognize the numerous myths, such as those surrounding serialism and twelve-tone music in general in post-World War II music.[209]

While it is well known that many of Bernstein's statements were oversimplifications or even misappropriations, analyzing Bernstein's lectures in the context of his own music could help shed

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[207] See David Schiff, "Re-Hearing Bernstein," *Atlantic Monthly* 271, no. 6 (1993): 61.

[208] On the "Introduction to Modern Music" as an aesthetic credo, see Giger, "Bernstein's the Joy of Music as Aesthetic Credo." In Bernstein's lecture, serialism is effectively discounted in favor of revitalizing tonality, but the inclusion of the "Cool Fugue" (see chapter five) contradicts his supposed aesthetic credo.

[209] See chapter five, 5.1 "Bernstein and Serialism" in the present study.

light on larger music related cultural issues. The impact of his lectures varies considerably between scholars and members of the lay-public who are generally less knowledgeable in technical music studies. Although the goal of Bernstein's lectures may have been to musically educate a lay-public, their value as entertainment in and of itself should not be overlooked. *New York Times* columnist, Michael Steinberg, writing about his Harvard lectures summarizes this sentiment: "That it was good theater, a spectacular and generous entertainment is not in question. That it was the cultural or intellectual event that some heavy breathers around Cambridge have hyped it into is enormously in doubt."[210] Given Bernstein's passionate tone as evidence, it is clear that he desperately wanted to promote concert music to a wider audience. To this end, he focused on the power of spectacle, humor, and simplification, but at the expense of sacrificing certain musical truths.[211]

6.3 Further Research

Some of the discoveries in this thesis could shed some light on Bernstein's compositional process. Nigel Simeone suggests that *West Side* Story was composed like most other Broadway scores—in a "relatively haphazard way."[212] Although Bernstein is quoted as saying the three-note "shofar" motive (outlined in chapter two, section 1.1) was a "happy accident" realized in retrospect, we should be careful not to take Bernstein's word at face value. As my analysis suggests, Bernstein's compositional process should not be characterized as haphazard or ad-hoc devoid of careful compositional planning. Indeed, my analyses suggest a more carefully planned compositional

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[210] Michael Steinberg, "The Journey of Bernstein from Chopin to Chomsky," *New York Times* (New York, New York, December 16, 1973), 36.

[211] For some of Bernstein's overdrawn claims of tonality as a natural language, see chapter one, 1.3 "Background: Bernstein's Lectures and their Criticism" in the present study.

[212] Simeone, *Leonard Bernstein*, 80.

process. Considering the tight-knit serial structure of the "Cool Fugue," for example, an ad-hoc approach to composition seems highly unlikely.

As discussed in chapter five, Bernstein discussed how he experimented with twelve-tone composition, but ultimately threw out the vast majority of his twelve-tone attempts. Further research could trace Bernstein's serial output with cross reference to his public comments on twelve-tone music in an effort to trace not only his appropriation of twelve-tone methods, but also his approaches to composition in general. In "Quiet" from *Candide*, for example Bernstein uses serialism to portray boredom—no doubt, the musical material is also "boring" with simple, one might even say appropriately naïve manipulations of a twelve-tone row. One year later, he wrote the "Cool Fugue," a piece with a considerably more complicated serial structure and without a negatively connoted extramusical association, but never publically noted its serial construction.[213] If the "Cool Fugue" has slipped under the serial-radar, I suspect other Bernstein pieces have as well.

Some of the observations made in this thesis could benefit from sketch studies and archival research detailing Bernstein's music education. The structural hypotheses suggested in chapter three, or the serial design of the "Cool Fugue," for example, might gain further support from a close analysis of extant sketches or greater knowledge of Bernstein's twelve-tone studies. In this thesis, much of the analyses derive from careful observations of the music with references to Bernstein's public lectures. The case for using the "Tristan" chord in the compositional plan for "The Rumble," for example, is largely supported by Bernstein's detailed analyses of the "Tristan" chord in his lectures, and his penchant for borrowing and re-appropriating musical ideas in his own compositions.[214] Perhaps early sketches for "The Rumble" and other pieces could reveal whether

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[213] Bernstein was, however, apprehensive of the work. See section 5.1 in the present work.

[214] For a look at several of Bernstein's musical borrowings in *West Side Story* see Block, *Enchanted Evenings: The Broadway Musical from Show Boat to Sondheim*, 260–271. For Berstein's lectures on the "Tristan" chord, see footnotes 107-109.

certain hypothesized background structures were pre-planned—certainly, the particular key signatures employed in "The Rumble," and the tight-knight serial structure of the "Cool Fugue" do not seem arbitrary. Archival research may shed further light on the working relation between Bernstein and Jerome Robbins, especially as it pertains to particular compositions and their correlation to choreography.

Analysis of *West Side Story* challenges illusory notions of supposed binary oppositions: opera versus broadway, highbrow versus lowbrow, and tonal versus atonal. By closely interpreting how various compositional grammars in *West Side Story* blur supposed opposing binary musical aesthetics, genres, and styles, this thesis opens new and perhaps unexpected avenues for Bernstein research.

Appendices

Appendix A.1 "The Rumble" 1/3

Appendix A.2 "The Rumble" 2/3

Appendix A.3 "The Rumble" 3/3

Appendix B.1 Semiotic Glossary

Theatrical Semiosis[215]

    Inner-frame of communication: describes a bidirectional exchange between two or more actors on-stage.

    Outer-frame of communication: superficially unidirectional communication (unless feedback from the audience is taken into account) between an actor to an audience.

Sign (Peirceian Triad)[216]

    1.   **Sign-Vehicle**, e.g. the "Tonight" melody sung by Tony in the "Tonight" Ensemble that references the Referent melody (see Referent). Peirce calls the Sign-Vehicle the *Representamen*

    2.   **Referent**, e.g. the "Tonight" melody in the "Tonight" balcony scene that the Sign-Vehicle refers to. Peirce calls the Referent the *Object*.

    3.   **Interpretant**, e.g. the interpreted meaning derived from the reference created by the Sign-Vehicle and Referent. Some semiotic studies use the word *sense* in place of Peirce's Interpretant.

Peirce's Second Trichotomy of the Sign (Relation between Sign-Vehicle and Referent)

    1.   **Icon** – a reference in which the connection between Referent and Sign-Vehicle can be described in terms of some shared quality or likeness perceived by the interpreter, for example a portrait of a person.

    2.   **Index** – describes a reference between Referent and Sign-Vehicle that is a type of factual, existential contiguity, a type of causal connection (temporal or spatial contact). For example, a bullet hole in a pain of glass indexically references the bullet that passed through it.

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[215] Nöth, *Handbook of Semiotics*, 363.

[216] For the following definitions, see Ibid., 42–46; Atkin, "Peirce's Theory of Signs."

3.   **Symbol** – Symbol refers to a reference between Referent and Sign-Vehicle that results from some conventional or general connection between the Sign-Vehicle and the referent. Words, such as "give," "bird," or "marriage" are examples of symbols.

Exosemantic and Endosemantic[217]

1.   **Exosemantic** content structures that reference extramusical sound events. For example, a reference to a bird's call.

2.   **Endosemantic** content structures involve musical references to sound structures (such as motifs or themes) that only (presumably) exist in the music, for example a musical quotation.

   a.   **Intraopus** indicates references of sound structures within a single composition or work (a prior motif, melody, etc.)

   b.   **Interopus references are those that reference other musical works**

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[217] See Bright, "Language and Music"; See also Nöth, *Handbook of Semiotics*, 431.

Appendix B.2 "Rigoletto" Text

Italian Lyrics

DUCA
Bella figlia dell'amore,
Schiavo son dei vezzi tuoi;
Con un detto sol tu puoi
Le mie pene consolar.
Vieni e senti del mio core
Il frequente palpitar.

MADDALENA
Ah! ah! rido ben di core,
Che tai baie costan poco
Quanto valga il vostro gioco,
Mel credete, so apprezzar.
Son avvezza, bel signore,
Ad un simile scherzar.

GILDA
Ah, così parlar d'amore
A me pur intame ho udito!
Infelice cor tradito,
Per angoscia non scoppiar.

RIGOLETTO
a Gilda
Taci, il piangere non vale...
Ch'ei mentiva sei sicura.
Taci, e mia sarà la cura
La vendetta d'affrettar.
Sì, pronta fia, sarà fatale,
Io saprollo fulminar.
M'odi! ritorna a casa.
Oro prendi, un destriero
Una veste viril che t'apprestai,
E per Verona parti.
Sarovvi io pur doman.

GILDA
Or venite...

RIGOLETTO

English Translation[218]

DUKE
Fairest daughter of love,
I am a slave to your charms;
with but a single word you could
relieve my every pain.
Come, touch my breast and feel
how my heart is racing.

MADDALENA
Ah! Ah! That really makes me laugh;
talk like that is cheap enough.
Believe me, I know exactly
what such play acting is worth!
I, my fine sir, am quite accustomed
to foolish jokes like this.

GILDA
Ah, these are the loving words
the scoundrel spoke once to me!
O wretched heart betrayed
do not break for sorrow.

RIGOLETTO *to Gilda*
Hush weeping can do no good...
You are now convinced he was lying.
Hush, and leave it up to me
to hasten our revenge.
It will be quick, it will be deadly,
I know how to deal with him.
Listen to me, go home.
Take some money and a horse,
Put on the men's clothes I provided,
then leave at once for Verona.
I shall meet you there tomorrow.

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[218] Translation from "'Bella Figlia Dell'amore' from *Rigoletto* by Verdi," *Island City Opera*, accessed April 29, 2016, http://www.islandcityopera.org/park/translations.

Impossibil.

GILDA
Tremo.

RIGOLETTO
Va.

GILDA
Come with me now.

RIGOLETTO
It's impossible.

GILDA
I'm afraid.

RIGOLETTO
Go.

Appendix B.3 "Tonight" Ensemble Text

RIFF
The Jets are gonna have their day
Tonight.

BERNARDO
The Sharks are gonna have their way
Tonight.

RIFF
The Puerto Ricans grumble: "Fair fight."
But if they start a rumble,
We'll rumble 'em right.

BERNARDO
We're gonna hand 'em a surprise
Tonight.

RIFF AND JETS
We're gonna cut 'em down to size
Tonight.

BERNARDO AND SHARKS
We said, "O.K., no rumpus,
No tricks."
But just in case they jump us,
We're ready to mix
Tonight.

ALL
We're gonna rock it tonight,
We're gonna jazz it up and have us a ball!
They're gonna get it tonight;
The more they turn it on the harder they'll
fall!

RIFF AND JETS
Well, they began it!

BERNARDO AND SHARKS
Well, they began it!

ALL
And we're the ones to stop 'em once and for
all,
Tonight!

ANITA
Anita's gonna get her kicks
Tonight.
We'll have our private little mix
Tonight.
He'll walk in hot and tired,
So what?
Don't matter if he's tired,
As long as he's hot
Tonight!

TONY
Tonight, tonight,
Won't be just any night,
Tonight there will be no morning star.
Tonight, tonight, I'll see my love tonight.
And for us, stars will stop where they are.
Today
The minutes seem like hours,
The hours go so slowly,
And still the sky is light . . .
Oh moon, grow bright,
And make this endless day endless night!

RIFF
I'm counting on you to be there
Tonight.
When Diesel wins it fair and square
Tonight.
That Puerto Rican punk'll
Go down.
And when he's hollered "Uncle"
We'll tear up the town!

(**RIFF**, **TONY**, and **MARIA** *sing
simultaneously*)

RIFF
So I can count on you, boy?

TONY
All right.

RIFF

We're gonna have us a ball.

TONY
All right.

RIFF
Womb to tomb!

TONY
Sperm to worm!

RIFF
I'll see you there about eight.

TONY
Tonight . . .

MARIA
Tonight, tonight
Won't be just any night,
Tonight there will be no morning star,

*(**JETS, SHARKS, MARIA, TONY**, and
ANITA sing simultaneously)*

SHARKS
We're gonna rock it tonight!
They're gonna get it tonight,
They began it,
They began it,
The began it.
We'll stop 'em once and for all.
The Sharks are gonna have their way,
The Sharks are gonna have their day,
We're gonna rock it tonight.
Tonight!

JETS
We're gonna jazz it tonight!
Tonight!
They began it,
And we're the ones to stop 'em once and for all!
The Jets are gonna have their way,
The Jets are gonna have their day.
We're gonna rock it tonight.
Tonight!

ANITA
Tonight, tonight,
Late tonight,
We're gonna mix it tonight.
Anita's gonna have her day,
Anita's gonna have her day,
Bernardo's gonna have his way
Tonight, tonight,
Tonight, this very night,
We're gonna rock it tonight!

MARIA
Tonight, tonight,
I'll see my love tonight.
And for us, stars will stop where they are.

MARIA AND TONY
Today the minutes seem like hours.
The hours go so slowly,
And still the sky is light.
Oh moon, grow bright,
And make this endless day endless night,

ALL
Tonight

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